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THE WHITE HOUSE
WASHINGTON

August 23, 1974

MEMORANDUM FOR BILL BAROODY

FROM: Clay T. Whitehead *to*

Attached is a list of names of scientists as a starting point for the group that should meet with the President. I believe it would be best to start from this list rather than the list you originally gave us since it is much broader in scope and political balance.

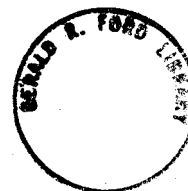
Some of the individuals on this list I do not know, and you can take it from here. However, I think it is very important that the final list include representatives from more than the academic physicist-dominated science establishment that has dominated Presidential communications with the science community.

The relations between the White House and the science community have become a bit strained since we did away with the Science Adviser, and the President needs to be a bit careful in dealing with scientists.

If I can be of any help, give me a call.

Attachment

cc: Mr. Buchen ✓



Dr. William O. Baker
President
Bell Telephone Labs
Mountain Avenue
Murray Hill, New Jersey 07974

Dr. Ivan L. Bennett, Jr.
Vice President-Health Affairs and Director
New York University Medical Center
550 First Avenue
New York, New York 10016

Dr. Lewis M. Branscomb
Vice President and Chief Scientist
IBM Corporation
Armonk, New York 10504

Dr. Harvey Brooks, Dean
Division of Engineering and Applied Physics
Harvard University
217 Pierce Hall
Cambridge, Massachusetts 02138

Dr. Harold Brown
President
California Institute of Technology
1001 East California Boulevard
Pasadena, California 91109

Mr. J. Fred Bucy, Jr.
Executive Vice President
Texas Instruments, Inc.
Post Office Box 5484
Dallas, Texas 75222

Dr. Robert A. Charpie
President
Cabot Corporation
125 High Street
Boston, Massachusetts 02110

Dr. Eugene G. Fubini
Xerox Building
1901 North Fort Myer Drive
Arlington, Virginia 22209



Dr. Philip Handler
President
National Academy of Science
2101 Constitution Avenue, N. W.
Washington, D. C. 20418

Dr. Joshua Lederberg
Department of Genetics
Stanford University
Stanford, California 94305

Dr. William McElroy
Chancellor
University of California at San Diego
LaJolla, California

Dr. William Nierenberg
University of California
Director
Scripps Institute of Oceanography
LaJolla, California 92038

Dr. Thomas O. Paine
Senior Vice President
Technology Planning and Development
General Electric Company
Fairfield, Connecticut 06431

Dr. Gerard Piel
Scientific American
415 Madison Avenue
New York, New York 10017

Dr. Allen E. Puckett
Executive Vice President
Hughes Aircraft Company
Culver City, California 90230

Simon Ramo is a Member of the Executive Committee and
Director of Bunker-Ramo Corporation, formerly President;
the original firm (Ramo-Wooldridge) played a key role in the
systems engineering and management of our missile program



Dr. Roger Revelle
President
Center for Population Studies
Harvard University
Cambridge, Massachusetts 02138

Dr. Robert Seamans
President
National Academy of Engineering
2101 Constitution Avenue, N. W.
Washington, D. C. 20418

Dr. Lloyd H. Smith, Jr.
Chairman
Department of Medicine
University of California
San Francisco, California 94122

Dr. John G. Truxal
Dean, School of Engineering
State University of New York at Stony Brook
Stony Brook, New York 11790

Dr. James B. Wyngaarden
Chairman
Department of Medicine
Duke University Medical Center
Durham, North Carolina 27710



Thursday 9/5/74

Handler
Dr. Philiz

11:10 Dr. Handler's secretary called to see if we had been able to arrange an appointment for him; will be in and out of the office for the next couple of weeks and hoped to arrange a meeting to suit your schedule.

See attached letter which you wanted to discuss with Tom.

See if Jack Marsh or Ted Marsh
can handle this
P.



NATIONAL ACADEMY OF SCIENCES

OFFICE OF THE PRESIDENT
2101 CONSTITUTION AVENUE
WASHINGTON, D. C. 20418

August 29, 1974

The Honorable Philip W. Buchen
Counsel to the President
The White House
Washington, D. C. 20500

Dear Mr. Buchen:

At the suggestion of Governor Scranton, I write to request an early opportunity to discuss with you an appropriate arrangement whereby the President may have available to him competent advice with respect to the multitude of scientific and technological issues which, perforce, must confront him.

Each President since Mr. Truman has had the benefit of such an apparatus. As you will know, President Nixon disbanded the Office of Science and Technology and the President's Science Advisory Committee in January of 1973. The present arrangements are considered insufficient by most of those who have knowledgeably considered the problem.

I enclose a copy of a report entitled "Science and Technology in Presidential Policymaking." This report was prepared by a 'blue ribbon' committee chaired by Dr. James R. Killian, Jr., President Emeritus and Honorary Chairman of the Corporation of the Massachusetts Institute of Technology. In June, Dr. Killian and I discussed this report with then Vice-President Ford who, at the time, indicated that if the Congress were to send up the legislation described in the report he would recommend that such a bill be signed by the President. However, there is no reason for President Ford to await such legislation to implement its principal recommendations.

Dr. Killian and I would be pleased to discuss these matters with you and to offer specific suggestions concerning highly qualified candidates for such service in the Executive Office of the President. I shall also be



The Honorable Philip W. Buchen
August 29, 1974
Page Two

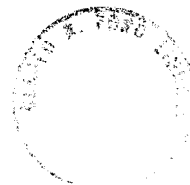
pleased to present, for the President's consideration, a brief analysis of some major technological issues with which it seems certain that he will be confronted in the relatively near future.

I look forward to hearing from you at your earliest convenience.

Sincerely yours,



Philip Handler
President



NATIONAL ACADEMY
OF SCIENCES

SCIENCE AND
TECHNOLOGY
IN
PRESIDENTIAL
POLICYMAKING
A Proposal



*Wiesner Dr
Jerome*

OFFICE OF THE PRESIDENT

CAMBRIDGE, MASSACHUSETTS 02139

September 20, 1974

The Honorable Philip W. Buchen
Counsel to the President
The White House
Washington, D. C.

Dear Mr. Buchen:

The Association of American Universities, an association of the major graduate (and research) universities of the United States, meets in Washington on October 22 and 23. The meeting is attended by the presidents of the member universities.

In the past, the President of the United States has occasionally invited the group to the White House for a discussion about national higher education and research problems. It has occurred to me that President Ford might find an opportunity to meet with this group both interesting and extremely useful.

The AAU has a Washington Office and an Executive Secretary, Mr. Charles Kidd.

Incidentally, the recent Chairman of the group has been Dr. Robben W. Fleming, President of the University of Michigan.

Sincerely yours,

Jerome B. Wiesner
Jerome B. Wiesner
President

JBW/jh



THE WHITE HOUSE
WASHINGTON

Evo:

Please advise
Ted of Jerome
Weisner's interest
as well and send
him a copy of the
letter which I
believe came from
Weisner.

THE WHITE HOUSE

WASHINGTON

September 21, 1974

Dear Dr. Handler:

Philip Buchen referred your letter to me for consideration. Science and Technology in Presidential Policy Making was as challenging as Phil's interest and Bill Scranton's referral.

I would like to see you and Dr. Killian to hear your specific suggestions. Mrs. Shelton in my office will be glad to arrange a time for this. Please phone (202) 456-2735.

Sincerely,



Theodore C. Marrs
Special Assistant to the President

Dr. Philip Handler
President
National Academy of Sciences
Washington, D. C. 20418

Copies to: ✓ Mr. Buchen
Mr. Scranton



9/28/74

To: Dr. Marrs

From: Eva

Mr. Buchen asked me to get this
to you -- in connection with the
science-related matters we
sent you from Dr. Handler.



THE WHITE HOUSE
WASHINGTON

September 24, 1974

Dear Dr. Wiesner:

Thank you so very much for your letter of September 13th transmitting a copy of the report of the National Academy of Sciences concerning Presidential policy-making for science and technology.

I'm sorry we couldn't get together on the 16th, but I'll look forward to an early meeting.

With deep appreciation.

Most sincerely yours,

Philip W. Buchen
Counsel to the President

Dr. Jerome B. Wiesner
President, Massachusetts
Institute of Technology
Cambridge, Massachusetts 02139



THE WHITE HOUSE
WASHINGTON

9/18/74

Mr. B.

The previous material
which we received from
Dr. Philip Handler, President
of the National Academy of
Sciences, was referred to
Jack Marsh.

Eva



Tuesday 9/17/74

11:40 Dr. Jerome Weisner's secretary (Barbara Wollan) called (617) 253-4665 to say when you and he talked recently, he had mentioned the possibility of his coming to Washington yesterday and meeting with you. However, he was unable to be here and will let you know the next time he will be in Washington so you can get together.





OFFICE OF THE PRESIDENT

CAMBRIDGE, MASSACHUSETTS 02139

September 13, 1974

Mr. Philip W. Buchen
The White House
Washington, D. C.

Dear Mr. Buchen:

Enclosed is the recent National Academy of Sciences report to the Executive Branch regarding Presidential policy-making for science and technology. Enclosed also is some recent testimony given by Dr. Killian, Dr. Kistiakowsky, and me at the Congressional Hearings on the matter. I hoped to send you some additional material, but on short notice was not able to find it.

I will attempt to assemble a representative collection of material, including reports, memoranda, etc., which the advisory group provided to previous Presidents. This may help you get some feeling for the range of activities with which the group dealt and the variety of ways in which the Special Assistant for Science and Technology and the Science Advisory Committee provided information and assistance to the President.

Sincerely yours,

Jerome B. Wiesner
President

JBW/jh
Enclosures

August 20, 1974

Philip B. Yeager, Esq.
Committee on Science and Astronautics
House Of Representatives
Suite 2321 - Rayburn House Office Bldg.
Washington, D. C. 20515

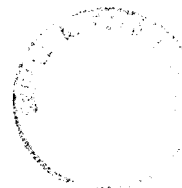
Dear Mr. Yeager:

I have been away and this has delayed my response to your letter of July 31 and the list of questions. Let me, as a first step in my response, send you comments on the questions addressed specifically to me and then later I will get into your hands comments on the long list of general questions.

Yours cordially,

J. R. Killian, Jr.

JRK:df
Enclosure



Responses to Supplemental Questions Addressed to Dr. Killian

1. For what major reasons did you conclude that the Office of Management and Budget could not be adapted to provide the required scientific and technical analysis to the Office of the President?

While I feel that the Office of Management and Budget needs to strengthen its staff to deal with problems relating to science and engineering in government, I do not feel that it provides the proper environment for a strong advisory mechanism for the President. For the Council proposed in the Academy report or for any alternative arrangement, highly professional scientists and engineers will be needed, and I think it would be difficult to secure the quality of personnel we have in mind for staff positions in OMB. By putting the whole advisory mechanism in OMB, you would immediately downgrade it and make its work with other White House agencies more difficult if not impossible. It should be co-equal with OMB.

The proposed Council should work closely with OMB, but it would have many responsibilities, tasks and opportunities that would not seem appropriate for OMB.

In the early days, there was a superb relationship between the Special Adviser to the President for Science and Technology and PSAC with the Bureau of the Budget. The procedure by which the Administration's bill for U.S. Space Program was agreed upon and the arrangements creating NASA was a joint effort between the Bureau of the Budget and the Office of the Special Assistant for Science and Technology. I think it would not have come out as well as it did if these groups had not operated on a co-equal basis.

2. On page 4 of your report you conclude that the current arrangement, involving the Director of the National Science Foundation, is inherently unsatisfactory and insufficient to serve the needs of the Presidency. This conclusion is of central importance to our examination -- so while you and Dr. Handler did respond to a question by

Responses to Supplemental Questions Addressed to Dr. Killian

Mr. Mosher on your conclusion, do you have any additional comments to make?

I am increasingly convinced that the present arrangement involving the Director of the National Science Foundation is inherently unsatisfactory. I understand at the present time that NSF is acutely short of upper echelon personnel. The departure of Bisplinghoff must surely create problems for Stever. Dr. Stever is going to have his hands full carrying out the administrative responsibilities required by NSF as indeed would anyone in that post. Now his responsibilities were divided, compounding his problems.

I feel strongly that the President can benefit from the undivided attention of a Science Adviser and a Council drawing upon the support of a panel structure such as had been recommended. He should have the assurance that this Adviser and this Council are working solely in his behalf and that he has their undivided support and loyalty.

Another reason I feel that the present arrangement is unsatisfactory is that the Director of the National Science Foundation acting as Science Adviser does not deal with any matters relating to defense. The President needs a variety of inputs in dealing with defense technology but most certainly he needs objective, thorough advice from competent scientists and engineers who can reach judgments not affected by the vested interests of the services in the Department of Defense. I am troubled, too, by the prospect that we will continue to encourage a cleavage between the domains of civilian technology and military technology. The proposal that the Academy report makes would avoid this and would contribute to an interaction beneficial both to civilian and military matters which could strengthen all of our technology.

I am deeply troubled by the way in which we are currently handling decisions on enormously expensive new weapon systems. There should be an evaluation of these systems that is free of any service rivalries.

One of the fortunate contributions which PSAC and the Special Assistant made during the Eisenhower Administration was to create a situation where the Secretary of Defense and his office welcomed the opportunity to have inputs from PSAC as they sought to deal with

Responses to Supplemental Questions Addressed to Dr. Killian

the recommendations from the military services. There were times when Secretaries of Defense requested the assistance of PSAC and its panels as they sought to make sound decisions on complex technological matters.

I find the separation of military advice from civilian advice that is an inherent part of the present arrangement to be unfortunate and not in the best interest of the President.

Under the Nixon arrangement, the Director of NSF in his capacity as Science Adviser reports to the Secretary of the Treasury. I find this arrangement quite anomalous.

3. How many, and what types of people do you see for the staff of the proposed Council?

The Academy report recommended that the staff of the proposed Council be relatively small, possibly 25 or 30 professional members. These staff members should be competent scientists or technologists and temperamentally fitted to work in the White House and the Executive Office of the President. Some of them might well be analysts who have had experience in modeling. They should have the competence to provide support to the ad hoc panels made up of outside members which the Council would create to deal with specialized problems. They should also have the administrative competence to perform this role and should be able to assist in the preparation of reports.

4. On page 7, you recommend that the chairman of the Council serve as a member of the Domestic Council. On page 8, you suggest that the chairman participate actively in the work of the National Security Council. What are the reasons for the difference in these recommendations?

The National Security Council is of long standing and its statutory membership has become, I suspect, a fairly rigid array that would be hard to change. Still, the NSC needs inputs in the fields of military and disarmament technology and related matters from a group that is not dominated by the Department of Defense or by a single powerful member of the NSC, and this should be provided by a strong science mechanism having access to the President.



Responses to Supplemental Questions Addressed to Dr. Killian

The Domestic Council is a new body that is still finding its way and its function. It also deals with a number of problems that involve a mix of economics and other social sciences, politics and legal matters together with science and engineering. In general, the present makeup of the Domestic Council and its staff does not insure that it is sensitive to the engineering and scientific components of the problems with which it deals. Moreover, many of these problems are of major national importance. They involve almost all the great governmental departments. There should be an arrangement which makes it possible to achieve a broad coupling with the already established Federal Council of Science and Technology. The departments and agencies dealing with domestic needs are not nearly so well equipped with competent staff in science and engineering as is the Department of Defense, and this makes it all the more important that there be a member of the Council who can identify the components of policy that require scientific and engineering inputs. It seems to me that this would greatly strengthen the Council and aid it in that dealing with matters involving the interdependence of science, technology, and economic, political and social factors.

5. Dr. Seamans described this nation's tendency toward ad hoc reactions to crises and problems. You and others have suggested that any science policy apparatus should include a "horizon-scanning" capability.

Yet, even when we have used "horizon-scanning" in the past -- and Dr. Seamans and Dr. Wiesner gave excellent examples with President Roosevelt's 1939 Energy Message to the Congress and a 1964 OST energy report, respectively -- we must often end up not using the results of the "horizon-scanning." What are your thoughts on how we can as a nation do better in using the results of "horizon-scanning" -- and will the proposed Council help?

I am afraid that we can never be sure that we have the foresight to utilize the result of horizon-scanning or early warning, but this does not mean that we should not try. There have been impressive examples of where horizon-scanning early warning have produced results. I think of the Technology Capabilities Panel, which Eisenhower appointed to deal with military and intelligence technology. I think this had a very great effect on our national security policy and programs. I think

Responses to Supplemental Questions Addressed to Dr. Killian

of the Solarium studies for the NSC that took place during the Eisenhower Administration which were also productive in peering into the future and producing results.

I think it was Robert Bridges who spoke of the great need for "the masterful administration of the unforeseen". We need to be preoccupied with this kind of masterful administration and early warning can help even though it does not foresee all the important future developments and even though all those that it does foresee do not result in action.

6. Following up on your dialogue with Rep. Symington during the hearings, what types of relationships do you visualize the proposed Council having with the Congress?

The Academy report states that the Committee preparing it concluded that it would be best to establish the Council by legislative action and that the proposed Council be made up of members appointed by the President with the advice and consent of the Senate. It is my judgment that the Chairman of the proposed Council should be available for testifying before Congressional committees on matters not involving advices to the President that he considered privileged.

May I add a personal note that is not related to your questions, that I think that at the present juncture it would be a help to the President to appoint a single person to be a Science Adviser and to help in shaping plans for a more comprehensive arrangement such as that recommended by the Academy report. I can think of at least a score of individuals having the stature, the wisdom and the experience to help the President at this juncture in working out problems for science advice that would best accord with his working style. He should have available carefully studied options. I think we should not wait on the lengthy legislative process to make arrangements for the President to have scientific advice. This legislative process can come later, but the President would benefit from help now. I would also make another observation. In the last five years or more we have seen an unfortunate erosion of the relationships between the top policy-making parts of government and the academic community. This was not always so. During the war and for the two decades following the war, there was an extraordinary

relationship between government and academia that served powerfully to mobilize the best creative talent in the country on behalf of government while at the same time adding great strength to our university system. We need to rebuild this confidence and interaction and underlying many of the concepts of the Academy report is the belief that its recommendations would serve to accomplish this end.

8/20/74

Hearings on Federal Policy, Plans, and
Organization for Science and Technology
Committee on Science and Astronautics
U. S. House of Representatives
June 26, 1974

STATEMENT OF JAMES R. KILLIAN, JR.
HONORARY CHAIRMAN OF THE CORPORATION OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Mr. Chairman and Members of the Committee:

I appear today as chairman of the ad hoc Committee on Science and Technology in relation to government of the National Academy of Sciences. At your invitation, Dr. Handler and members of the ad hoc committee have the honor of presenting the Committee's report entitled "Science and Technology in Presidential Policymaking: A Proposal," of which you have printed copies.

We have expedited the completion and printing of our report so that it might be available for this hearing today and released to the public as a statement presented at this hearing.

Joining me in this presentation are the following other members of the Committee: Dr. Ivan L. Bennett, Jr., Director, New York University Medical Center; Dr. Emanuel R. Piore, Retired Vice President and Chief Scientist, International Business Machines Corporation; and Dr. Kenneth S. Pitzer, Department of Chemistry, University of California, Berkeley.

As you will note, the ad hoc Committee is composed of members with highly diversified backgrounds drawn from engineering, the physical and biomedical sciences, economics, and political science with broad experience in industry and in government advisory organizations at high policy levels. The Committee has had the benefit of suggestions from all those who have served in the past as presidential science advisers.

As you will note on page 53, we acknowledge the assistance of many highly qualified persons within and outside the federal government who have had special experience concerning government decision-making involving science and technology. Several of us have met with Members of Congress and with highly placed officials in the Executive Office of the President. Finally, we invited fifteen people to prepare background papers or memoranda to illuminate the decision-making process in a number of selected problem areas.

Our charge from the Council of the National Academy of Sciences was "to look into the question of scientific and technical advice to the government, including the advisory and coordinating functions previously carried out by the White House science advisory complex."

Before presenting a summary of our report, let me congratulate you and your staff on your two impressive reports covering your first and second sessions on "Federal Policy, Plans, and Organization for Science and Technology." I hasten to emphasize that the testimony, the studies, and the staff critique included in your reports are important and highly useful documents. I congratulate the Committee on Science and Astronautics on the depth of its studies and on the statesmanlike plan it has adopted for dealing with this important aspect of science and government. In my judgment, our ad hoc Committee's report which we present today carries your studies another step ahead, and in the next phase of your investigation, I hope it will prove useful to you in reaching definitive conclusions and even in proposing legislation.

Now let me turn to the report of the Academy's ad hoc Committee. We very early reached the following conclusions which have shaped the content of our report.

1) That we would give our primary attention not to the current state and needs of U. S. science and technology but to ways in which science could best serve the government. While we have not sought to examine the needs of science or to formulate a comprehensive policy or priorities for the federal government in its use and support of science, engineering, and technology, we believe that the proposals we make can contribute importantly to the formulation of science policy, to the setting of priorities, and to the advancement of U. S. science and technology.

2) We have all shared the view that science and technology continue to be dynamic, exciting forces, steadily transforming our society. While we have directed our attention to organization arrangements for assisting the President and his Office in making policy, we have at the same time kept steadily in view our conviction that science is an intellectual endeavor of unparalleled grandeur and scope that has extended the reach of man's mind out to the furthestmost galaxies and into the recesses of the atom's nucleus, and that promises one day even to provide an intimate comprehension of man himself. Technology and engineering are to us something more than the material goods they provide; they are humanistic enterprises of the human mind as it learns how best to "assess himself in relation to the universe." And, as Americans, we are doubly proud of this human achievement, for nowhere and in no era have science and technology so flourished and been so

productive as in the America of the last few decades. We want this achievement to be continued and enhanced, and we believe that the wise support of the federal government is essential if American science is to continue to prosper.

In considering ways in which science can be more effectively used by government, we concluded that we should devote our attention to the future instead of emphasizing the experiences and arrangements of the past.

The fundamental thesis of this report is that the process of summation that takes place at the level of the Presidency requires accessibility of scientific, technological, and engineering counsel at that level. There have been and will again be occasions when the assistance is called for by the President himself and should be delivered directly to him. More often, in the daily process, the need is for interaction between the President's scientific counselors and fellow planning or management instruments within the White House. Such interactions are necessary to identify problems and opportunities calling for scientific and technical judgments and to assure that, as policy takes shape, the scientific and technical considerations will be given their appropriate weight and the full range of technical options is presented, from among which policymakers may decide in a fully informed manner.

In arriving at our recommendations, we have considered various alternative arrangements for providing such scientific and technical analysis and judgment to the Office of the President, including those of the past and present. We have considered the adaptation of the Office of Management and Budget so that it could perform the necessary science and technology functions in the Executive Office of the President. With regard to current arrangements, we view with admiration the efforts of the Director of the National Science Foundation

in also serving as Science Adviser to the President, but we have concluded that this arrangement is inherently unsatisfactory and insufficient to serve the needs of the Presidency.

These and other arrangements were debated, but in the end we concluded that while some previous arrangements were effective and appropriate for their time, there is now need for a new arrangement.

Programs spanning the entire spectrum of fundamental research, applied research, development, and utilization of the end products of this process are planned and managed by almost every major department and agency of government. For the nation, it is imperative that the totality of the federal program represents a balanced response to society's needs, as perceived by the President and the Congress, and opportunities and directions, as perceived by the technical community. There are few major national goals whose achievement rests on the applied research and development program of a single agency. The applications of research are often unpredictable, depending in large measure on the awareness by applied scientists addressing a practical problem of new research findings, wherever they were obtained. Thus, the pluralistic pattern of broad research and development programs sponsored by many agencies serves the nation in good stead. To be sure, it is national policy that we maintain a healthy, vigorous national fundamental scientific endeavor. That is made evident in the program of the National Science Foundation and in the basic research sponsored by the National Institutes of Health, the Department of Defense, and other departments and agencies.

Hence, it is of enormous importance that there be, within the Office of the President, a knowledgeable body capable of assisting the President

in overseeing this vast total endeavor--about \$20 billion in FY 1975--to assure its balance, to be aware of unexploited opportunity, to assure that the nation will, tomorrow, have those resources and capabilities necessary to optimize the future contribution of science and technology to the national welfare.

Given these premises, the ad hoc Committee proceeded to formulate the following seven recommendations and a corollary proposal to which we attach importance. I present these recommendations as they appear in condensed form in the printed report. These recommendations are subsequently considered at greater length in the main body of the report.

1. We recommend that a Council for Science and Technology be established as a staff agency in the Executive Office of the President.

The council would consist of at least three full-time members, highly qualified by training and experience to serve the needs of the President. Members would be drawn from the sciences, engineering, and related fields. They would be appointed by the President with the advice and consent of the Senate and would serve at the pleasure of the President. One member would be designated by the President to be chairman and would bear the responsibility of reporting to the President. While we have concluded that it would be best to establish the council by legislative action, we recognize that alternative means may be preferable at a given time.

It is essential that members of the council gain the confidence of the President and his Office and that its chairman, possessing this confidence, have access to the President.

Given this confidence and this access, the council can be of great assistance to the President in the difficult decisions he inevitably must make. Wisely and humanely used, technology can serve the highest aspirations of our society. Used in an unenlightened manner, technology can be destructive and wasteful. Our purpose in making this recommendation is to urge that the President have

immediately at hand the means to obtain the best scientific and technical judgment of the nation to aid him in reaching decisions where science and technology are involved.

In our judgment, the council we propose will best accomplish this, but we recognize that a given President may choose some other way more in accord with his style. More important than any specific structural suggestions is the recognition that science and technology at this time of worldwide scarcity and insecurity have a benign and fatefully important role in the making of policy at the Presidential level.

2. We recommend that the Council for Science and Technology be empowered and enabled to draw upon the best talents available in the nation's scientific, technological, and engineering communities both from within and outside the government.

To be of value, counsel in all these areas must reflect the most advanced current knowledge over the whole range of science, technology, engineering, and medicine. No council, however large, can cover the entire range. To exercise its own functions, the council will be obliged to seek assistance from individual consultants and from panels of specialists. It would draw heavily on departments and agencies themselves, as well as upon the resources of industry, the universities and nonprofit research centers, the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

3. We recommend that the Chairman of the Council for Science and Technology serve as a member of the Domestic Council.

Among the problems and policies with which the Domestic Council, as well as the departments and agencies that are its constituent members, must deal, a substantial number involve components of science and technology not always well perceived within either the Domestic Council or its agencies. The committee believes it to be in the best interests of the work of the Domestic Council in support of the President that the Council for Science and Technology be assigned a strong presence in it.

4. We recommend that the Council for Science and Technology participate actively in the work of the National Security Council.

The National Security Council must organize its work in a fashion that will best serve the President in accord with his preferred manner of dealing with national security affairs. Consistent with that requirement, there should be provision for systematically introducing into the work of the National Security Council the judgments of qualified scientists and technologists. We trust that the council we propose would be looked to, as was the President's Science Adviser and the President's Science Advisory Committee, for provision of the nation's best scientific and technical knowledge and judgment, particularly in those matters that involve advanced technology or the insights and early warnings that scientists working at the frontiers of their specialties are qualified to transmit. In this fashion, the National Security Council can benefit from highly professional judgments on military technology and arms control, undistorted by jurisdictional lines of thought.

5. We recommend a role for the Council for Science and Technology in those areas of foreign policy strongly affected by scientific and technological considerations.

In a speech to the United Nations on April 14, 1974, the Secretary of State said, ". . . In a global economy of physical scarcity, science and technology are becoming our most precious resource. No human activity is less national in character than the field of science. No development effort offers more hope than joint technical and scientific cooperation." Within this context, Dr. Kissinger directed his remarks toward the needs of the developing countries. Relationships with the developed countries as well are affected deeply by developments in science and technology as they work upon the international scene and America's position on that scene. International relationships in all their aspects are involved in bilateral and multilateral agreements in science and technology. The Council for Science and Technology, working with the National Security Council and the Secretary of State, can help generate and respond to Presidential initiatives to attack mutual problems through international scientific and technological cooperation.

6. *We recommend that the Council for Science and Technology cooperate closely with the Office of Management and Budget on significant budget and management issues involving science and technology.*

The Office of Management and Budget must possess a strong scientific and technological competence of its own, but such inhouse competence cannot completely meet the needs for the full range of expert counsel required. The council we recommend should serve as a scientific and technical resource to the Office of Management and Budget and should assist in the allocation of resources for the government's scientific and technological programs. We believe that the council could be of great assistance in participating with the Office of Management and Budget in evaluating the quality and technical feasibility of major proposed programs and in placing them in some order of priority.

7. *We recommend that the Council for Science and Technology submit an annual report to the President, and through him to the Congress, on major developments in science and technology of significance for national policy.*

These annual reports to the President are not to deal with the overall state of science and technology, but with specific major developments and trends within science and technology that offer significant new opportunities or raise important problems. For the Congress and for the public-at-large, the most important service the report can provide will be to illuminate opportunities and problems that affect society as a whole.

**The Committee Offers a Corollary Suggestion
Concerning Long-Range Policy Research and Analysis**

In considering the needs of the federal government for scientific and technological counsel, the committee has been especially struck by the lack of capability for long-range policy research and analysis, which would examine continuously the longer run implications of current budget decisions and other policies and would seek to anticipate problems that will face the President and the Congress in future years. These functions involve careful and imaginative integration of the analytical methods of science, engineering, economics, statistics, public administration, and other social sciences. At present, the federal government, in general, and the Executive Office, in particular, are inadequately equipped to avail themselves of powerful methods that scholarship has developed for policy research of long horizon and wide scope.

Recommendation of a specific organizational design for policy research and analysis is beyond the scope of this committee. We do emphasize the essential importance of this function, however, and while the proposed Council for Science and Technology cannot itself perform this function, we suggest that the usefulness and effectiveness of the council would be greatly increased were there available a mechanism for systematic long-range policy research and analysis.

We propose, therefore, that consideration be given to means by which the Executive Office of the President could benefit from improved and still developing techniques of policy research and analysis. As scientists, we are aware of the close relationship of these new techniques to the method and spirit of the physical, biological, and behavioral sciences, and we believe that a way can be found for making them continuously useful to the Executive Office of the President.

Presidential Science Advising

G. B. Kistiakowsky

The successful launching of Sputnik I in 1957 stimulated vigorous public condemnation, both here and abroad, of the Eisenhower Administration for having allowed the Soviet Union to "forge ahead" of the United States in matters scientific and technological. President Eisenhower responded by creating the President's Science Advisory Committee (PSAC) in the Office of the President and appointing a full-time Special Assistant for Science and Technology. In this largely accidental manner (because the accusations were not justified) institutionalized science advising of the President originated.

The Rise and Fall of Presidential Science Advising

In contrast, the causes of the decay and final liquidation of this institution, later affiliated with a statutory Office of Science and Technology (OST), are several and complex. The dissection of these causes might be useful in developing a constructive proposal for a new source of competent policy advice to the President on matters related to science and technology. (That such advice would be beneficial to our country should be evident from the events of recent years.) These complex causes can be simply summarized by saying that the most recent Presidents—Johnson, in the later years of his Administration, and Nixon—preferred to deal with very different sources of information and advice and felt that they had no need for a scientifically trained adviser at their elbow. Since the entire PSAC-OST apparatus was intended to serve the needs of the President, his choice cannot be challenged, although the wisdom of that choice may be. But the historical record is really not that simple: PSAC

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and OST committed some political errors that contributed to the decay of their influence in the White House.

Initially, PSAC found a dearth of scientifically trained individuals in the so-called policy-making positions (that is, the presidential appointees and their career equivalents) in several departments and agencies of the Executive Branch. The special assistant and PSAC worked hard to remedy this situation. They were active in creating the high-level office of director of Defense Research and Engineering to provide the Secretary of Defense with expertise in matters of military technology. The office of Science Advisor to the Secretary of State was reactivated, and science attachés were appointed to several embassies. The National Aeronautics and Space Administration (NASA) was created, and included in it was the large technical staff of the National Advisory Committee on Aeronautics. On the advice of the special assistant and PSAC, the President established the Federal Council for Science and Technology to coordinate the relevant policies of all agencies. They also urged the appointment of assistant secretaries for research and development (R & D) in the cabinet departments lacking them. In time, several such offices were filled, and, as the total appropriations for R & D increased, the internal government machinery for allocating and administering these funds grew in the way envisaged so well by Parkinson. The picture now is not one of a dearth of such officials, but, if anything, of an overabundance. Unfortunately, they have not engaged enough in group efforts (for instance, through the Federal Council on Science and Technology) to formulate proposals for technology-related policies of national scope. Although they are now selected only after a rigorous partisan loyalty scrutiny by the White House staff, they still seem to acquire somewhat parochial views in their federal jobs. Without technologically compe-

tent guidance from the White House Office, free of local vested interests, they tend to press for their own agency "positions," with less regard for overall national needs. One striking example of such uninhibited parochialism is President Nixon's "Project Independence," designed to eliminate in 5 years the shortage of energy sources. Under the direction of the chairwoman of the Atomic Energy Commission (AEC), more than half of the project's total proposed \$10-billion expenditure is to be spent on AEC projects, some very long range.

In the Eisenhower years, PSAC and the special assistant concentrated on matters of national security, such as military R & D projects, the development of a sensible space program, negotiations for the nuclear test ban treaty and other measures of arms control, and certain technologies involved in foreign intelligence operations. To a great extent, these activities were of an analytical and critical nature. Thus, on the President's instruction, a major study was set up in 1959 to evaluate the need for immediate resumption of nuclear weapons tests, at the time suspended by a moratorium. Such tests, frantically urged by the Air Force and the AEC, would have meant breaking off test ban negotiations with the U.S.S.R. Through the study, it was possible to establish to the satisfaction of the President that the case for the resumption of tests was weak. Negotiations were therefore continued. Another PSAC panel, set up at the request of the Secretary of Defense, decided upon the unsoundness of the Army's plan to test its Niki-Zeus anti-ICBM missiles against its own short-range Jupiter rockets, to be launched from Johnson Island in the Pacific. The panel recommended that, instead, the tests involve the Air Force's ICBM's launched from California, and this recommendation was adopted over the intense objections of the Secretary of the Army, who was attached to the Jupiters that were built in his home state. After the shooting down of Gary Powers' U2 plane over the U.S.S.R. and the President's decision to discontinue these photographic intelligence-gathering flights, a PSAC panel played the key role in recommending to the President a rational (and eventually highly successful) program for intelligence satellites, a program that put order into the existing chaotic situation. In 1960, with the help of NASA, a fairly detailed esti-

mate of the cost and the time required to land a man on the moon was prepared by another panel at the President's request. Upon hearing of the \$30 billion estimate (which is quite close to the total actual cost of the moon landing operation), President Eisenhower rejected the project out of hand. President Kennedy, who was shown this report late in 1960, was also cool to the project and changed his mind only after the fiasco of the Cuban invasion and Gagarin's successful orbit of the earth. Apparently Kennedy felt the need to focus public attention on a spectacular project of our own.

In comparison with these and other activities in the broad national security area, which involved large systems issues, the special assistant's and PSAC's successes in civilian fields were less impressive. Two early PSAC panels produced, after considerable labor, short public reports dealing with the roles of science and of public education as they relate to the continuing progress of American society. These reports were a bit long on platitudes and short on concrete proposals, although they seem to have had favorable effects on the National Defense Education Act and on changes in high school curricula. Later, in 1960, another panel report concluded that academic scientific research and graduate education in the sciences are two facets of the same essential public activity. It therefore urged changes in the more or less official federal doctrine that the government gives research funds to universities only to buy research results. That report was personally endorsed by President Eisenhower in a foreword in which he wrote that the federal government must assure the "progress of American science, one of our essential resources for national security and welfare" and concluded that "basic scientific research and the process of graduate education in universities must be viewed as an integrated task. . . ." This report had some beneficial effect on government policies, but, in hindsight, perhaps it overemphasized the need for increasing the number of graduate schools in the United States. The present situation suggests that some weaker institutions of higher education would have done better to remain colleges, rather than strive to become universities.

Especially in those years, the problems of academic basic science were but a small part of the activities of the

special assistant and PSAC. Their efforts to assess and influence federal in-house and extramural R & D in the life and biomedical sciences were somewhat ineffectual, and their influence on other in-house civilian R & D activities was slight.

In the Kennedy Administration, the special assistant and PSAC acquired a far more active role in overseeing civilian R & D but lost substantially in their influence over technological national security matters. This loss was to some extent due to the fact that Robert McNamara, the incoming Secretary of Defense, and McGeorge Bundy, the new Special Assistant to the President for National Security Affairs, being more forceful personalities than their predecessors, had greater influence in the White House. Thus, the director of Defense Research and Engineering acquired a large staff. And another large office, that of Systems Analysis, was set up in the Office of the Secretary of Defense to assess the cost effectiveness of proposed weapons systems. Over several years, therefore, the Department of Defense succeeded in largely bypassing OST critique and even in greatly weakening the control of the Bureau of the Budget. Concurrently, the Assistant for National Security Affairs set up his own staff to deal with arms control matters; the science advisor was less welcome to him in the White House meetings on national security affairs than science advisors had been in Eisenhower years.

The intensified activity of OST in the civilian sector of science and technology led to numerous public reports, some quite detailed. They dealt with a widening range of issues, such as the projected needs for scientific and engineering manpower, the preservation of the quality of the environment, use of computers in higher education, and so forth. In hindsight, it would seem that at least some of them might have more advantageously come from an organization like the National Academy of Sciences—National Research Council for submission to PSAC. While thorough and constructive, they were not without faults and so were subjected to in-house and public criticism that contributed to a gradual weakening of the authoritative voice of PSAC and OST. It is in fact questionable that these reports, of which some 60 were released through 1972, contributed much in the last 6 or 7 years to the formulation of national policies.

In the beginning of his term of office, President Johnson welcomed the science advisor's participation in high-level discussions and PSAC activities, but he eventually became aware that PSAC, in common with the majority of the scientific and scholarly community in the country, was less than enthusiastic about his escalation of the war in Vietnam. His reaction, not unexpectedly, was such that in the last couple of years of his Administration the science advisor and PSAC had virtually no access to the President. This situation became known in government circles, and the hard, unwritten rule became operative: White House staff members who lose access to the President lose influence in the government, even in matters that normally do not involve the President.

During the 1960's, the makeup of PSAC underwent major changes. It consisted at first mainly of senior physical scientists, largely from academia, who had extensive governmental advisory experience and had been involved on a managerial level in World War II technical work. Starting in 1959, a conscious effort was made by PSAC to widen its representation by recommending for membership younger individuals and members from medical and social sciences and high-technology industry. However well-intentioned these efforts were, they had the unfortunate result that PSAC ceased to be a coherent, thinking organism. Any topic being discussed by PSAC in later years involved the expertise or substantive knowledge of only a subcritical minority and left the other members of the committee quite uninvolved. The membership of PSAC became largely a source of panel chairmanships.

The End of the Science Advisor and PSAC

About a year ago, the White House announced that PSAC, OST, and the post of science advisor would soon be eliminated. They were. Why? The clue is in a statement about PSAC and OST attributed to John Ehrlichman in an earlier interview—he said he needed no policy advice, only facts. The next "logical" step might have been to conclude that, just for facts, they did not need an office next door; facts could be gotten from the rest of the government. This attitude and the liquidation

were undoubtedly furthered by several factors.

By all accounts, Nixon's first science advisor was no match for the other senior staff people, and his advice was soon disregarded or even not asked for; one or two PSAC members committed the sin of disagreeing publicly with presidential decisions on policy matters that had been discussed by PSAC. These indiscretions were apparently regarded as grave by the President, and, indeed, it is difficult to see how confidential presidential advisory work, which involves access to privileged information, can be combined with public opposition to policies already chosen by the President. Overlaying these irritations might have been a feeling that PSAC and OST were too closely affiliated with the scholarly community and academia, many members of which, from the beginning of Richard Nixon's public life, have been among his most consistent opposition.

In any case, the first science advisor left and was replaced by a capable but young and publicly unknown individual. This made it easy to place him low in the White House hierarchy. A major contributing factor to the decreasing estate of OST and PSAC was Henry Kissinger: He insisted that all information for the President relating to the technology involved in national security be filtered through him, and after a while he assembled his own group of technical consultants. In matters of civilian science and technology, the last White House science advisor had to deal with the staff of the Office of Management and Budget (OMB) instead of being coequal on these issues with its director. Eventually OST became somewhat subordinate to a former SST salesman and promoter, who, despite his failures with SST, had the job of gathering and organizing new technological ideas for a federally sponsored civilian technology-innovation activity contemplated by the White House. Lacking forceful and competent guidance from the Office of the President to formulate and then defend a coherent innovative program, the parochial departmental and non-governmental proposals, which added up to more than a billion dollars, were chopped down by the OMB to some \$20 million for 1973. Only a portion of this sum was actually committed. In these various ways were OST and PSAC thoroughly undermined before their official demise.

The Present and the Recent Past

The present situation, in which the director of the National Science Foundation (NSF) is called the science advisor, has little in common with presidential science advising. While undoubtedly useful on occasions when higher placed officials assign specific tasks to him, the director of NSF reports several echelons down in the White House hierarchy and through the Secretary of the Treasury (the present Secretary is alleged to have stated in 1972 that technological innovations will be of minor importance for the future of the United States). Inasmuch as OMB controls the budget of the NSF, the science advisor has to be subservient to OMB. When matters related to technology are not settled within OMB or in the Office of the Secretary of Defense, they are taken to the President for resolution by his Madison Avenue aides and others who know equally little about the technological essence of the problems and, therefore, little about their true costs, chances of success, impact on environment, possible alternatives, and so forth.

It is not very surprising, therefore, that unsound decisions have been made by the Nixon Administration on many issues involving technology. One might bring up the almost criminal neglect and mismanagement of what has now become known as the energy crisis, the inevitability of which was predicted by experts some time ago; the ambivalence about domestic and international issues involving the environment; the abrupt and harmful changes in policies involving academic research and the training of graduate students, induced by mistaken interpretation of the temporary excess of technical personnel over available jobs; the persistence on the SST project and the forcing through of the costly Space Shuttle without due regard for their usefulness and their effects on the stratosphere; the inept performance of the Department of Transportation regarding mass transit; the phoney cancer "research" program; the insistence on Safeguard ABM (costing billions of dollars) in the face of valid negative evidence; the unnecessary and costly speedup of the Trident submarine program; the encouragement of the "binary" nerve gas munitions, although their introduction may be more dangerous to world peace than the stockpiling of plutonium.

Looking to the Future

Reviewing these and other events of the last few years, one is led to the conclusion that the dismal state of technology-related federal policies cannot be substantially improved in the current Administration. In the near future, therefore, one should mainly hope for restraining actions and initiatives from Congress, perhaps with the aid of its new Office of Technology Assessment. Looking further ahead, one sees that the leadership of technology-oriented policy innovations needs to be returned to the Executive Branch because it has far greater human resources in this domain and because all money bills must originate in the House of Representatives, where local concerns and short-range issues play such a dominant role. Therefore, the scientific-technological community should direct its efforts toward restoring a source of effective scientific advice for the next President, hopefully an individual who will wish to have this resource. What the scientific-technological community should do now is prepare a strong, documented case for the necessity of such an advisory mechanism at the President's elbow and to formulate concrete concepts for its organization. It would be advantageous to convey these arguments to the individuals who will become involved in the next campaign for the presidency, so that the President-elect in 1976 will have had an opportunity to appreciate the reasons for having a science advisory apparatus near him. This was the way President Eisenhower came to feel soon after creating PSAC, President Kennedy felt from the beginning because of the active participation of Jerome Wiesner and others in his campaign, and President Johnson felt before becoming embroiled in the Vietnam war.

Arguments about a future science organization must allow for the greatly changed domestic and international position of the United States. The days when weak and just plain foolish projects (ANP!, the Aircraft Nuclear Propulsion) could be financed and their failure accepted with equanimity are gone. The growth of science and technology now offers many more choices for costly federal undertakings than existed, say, 15 years ago. Meanwhile, the resources of our nation have become more limited relative to the costs of many proposed ventures, ventures

that have grown to rather majestic sizes. Choices early in their formulation will have to be made by the President, and these choices will have to be the right ones, whether involving matters of technology related to national security, the development of energy sources, the extent of environmental aggression that is socially tolerable, biomedical projects, or foreign policy issues, such as the treaties on the uses of the seas or on qualitative limitations of the arms race. The above-proposed thinking about a future science advisory organization should also take into account the fact that the size and competence of the senior, in-house federal technical staff has grown greatly since the days when PSAC was first created.

Last but not least, this thinking must reflect public attitudes toward science and technology. From the establishment of PSAC until well into the 1960's, the United States was euphoric about the public benefits of science and technology. Science and technology made our nation the "first of the world" and promised many returns on investment in R & D. This mood is gone, for several reasons. The scientific-engineering community acting at times in visibly self-serving ways, difficult to reconcile with their proclaimed public interest mission; the brutal and massive use of American technology in Indochina; the not-uncommon disregard of the welfare of the consumer and the despoilation of the environment by domestic industry—all contributed greatly to this change. And so the United States went through an intense and vocal antisience period. This is beginning to be replaced by a realistic attitude, which recognizes that technology can be directed toward socially beneficial, as well as evil, antisocial ends. The key national objective must be to maximize the former and minimize the latter, not to slow down total technological progress. It should be possible, on balance, to accomplish this task if there is an adequate science advisory structure high up in the government, as well as monitoring and pressure on it by nongovernmental public interest groups possessing some technical competence. It is a task that *must* be accomplished—the wrongful uses of technology are too destructive and the unwise uses too wasteful, both in economical terms and in terms of misused human resources and missed opportunities for progress.

A new OST [perhaps a Council on Science and Technology (COST)] should be an influential, even though a small, part of the innovative process. To be effective, it should be closely linked with the senior technical personnel in the departments and agencies of the Executive Branch, and its activities should be primarily critical and analytical, avoiding managerial responsibilities for on-going projects.

Functions of a Council on Science and Technology

To be of maximum use to the President, the activities of COST should include short- and long-range problems. Of major importance among the former would be the competence and the authorization to participate in the formulation of the budget for government activities related to science and technology. This would be done in cooperation with the budgetary staff of OMB. The concern of COST, however, should be not the restraint of expenditures, but the clarification of technology-related issues in budgetary proposals of the agencies, a careful rating of priorities, and then vigorous support of worthy programs. When the evaluation by COST conflicts with that by OMB, the issues should be taken to the director of OMB and to the President for resolution. To be effective in this process, the necessary, but obviously not sufficient, condition is that COST have the authority to insist on detailed information from the agencies in order to break through the usual budgetary camouflage and perhaps even to go into the field occasionally (as the early PSAC panels did) for independent evidence. The Defense Department, including its subordinate and affiliated agencies—National Security Agency, Defense Intelligence Agency, Central Intelligence Agency, AEC, and NASA—has become relatively independent of OMB. For COST to pry into their budgetary proposals would be especially difficult, but their activities relating to COST should not be excluded or neglected.

The budgetary process is emphasized here because it is the key event within the government by which policies are transformed from words into action. Once started, authorizations and government actions are hard to stop. Furthermore, the overwhelming fraction of "line items" in the President's budget

pass Congress with no major changes. The thrust of COST in the budgetary process should be firmly guided by the philosophy that sound advances in science and technology, sponsored by the federal government, are absolutely essential for the long-range welfare of the country and so deserve a very high priority in the budget. What should be most useful to the President in his budgetary meetings is a technically and scientifically authoritative voice that emphasizes neither the natural empire-building of the agencies nor the economy drive of the OMB. That is what COST must provide to earn its keep.

One might think that this is of little importance, because what is listed in the federal budget as R & D programs is but a small fraction of the total (about 7 percent now); however, this fraction determines very much larger expenditures in later years. Moreover, to every President those parts of the budget over which he can exercise some choice should be of greater interest than those which are fixed by statute or by old commitments—and these amount to more than 50 percent of the total. If, then, to the R & D portion are added those other activities that involve technological issues and that are listed in other parts of the budget, one finds that COST could be legitimately vocal on a substantial portion of the budget issues that are of prime interest to the President.

Needless to say, if the leadership of COST gains the confidence of the President, it will be called upon to perform various ad hoc tasks, such as briefing the President on current events that are of public interest in the world of science and technology, participation in the preparation of some executive orders and messages to Congress, the preparation of an annual message on the status of science and technology, and so on. However, so much depends on the personal preferences of the next President that further detailing of the potential relationship is impossible.

Concerning long-range issues, COST should take a leading role in the preparation of presidential policy proposals for the furtherance of technological innovation. Such innovation, backed up by enlightened policy on basic science, is essential to providing better standards of living for underprivileged groups without doing so at the expense of other groups in the population; it is needed to prevent damage to the environment without loss of industrial pro-

ductivity; it is indispensable to counteract the reckless rise in the costs of petroleum, to be followed, without doubt, by similar escalation in the costs of several other essential, imported raw materials; and it is needed to maintain and promote the status of our technology vis-à-vis our foreign trading partners, in order that we may continue to sell our myriad products and buy their raw materials.

Although these policies requiring statutory changes and fiscal commitments would have a common objective, they will have to be different in substance in order to cope with the diverse problems and situations with which the government must deal. Thus, to ensure adequate progress of military and space technology, the federal government, which is almost the sole customer for the finished product, has to support military and space R & D in a different way than it should, for instance, R & D on items for consumer use. Still different solutions must be found for ensuring adequate R & D on major systems for acquisition by public bodies (for example, waste reuse and disposal systems) or by regulated "public utility" industries (for example, nuclear power reactors). In this planning activity, COST should make full use of the in-house technical and planning staff in the Executive Branch by organizing interagency study groups to formulate proposals for specific technological projects and for broader policies governing them and their like. Watching over these groups, COST should try to eliminate the parochialism that might creep into some proposals; it should identify the best proposals and then make the greatest efforts to see that these are heard sympathetically at the highest levels. Needless to say, it is essential that the Council of Economic Advisors (if it be populated by enlightened individuals) and relevant parts of OMB be involved in this activity. Furthermore, this activity should not be hermetically sealed from the outside (through restricted interpretation

of "privilege"), and use should be made of the resources of the Office of Technology Assessment and such non-governmental organizations as the National Academy of Sciences-National Research Council. These innovative activities, however, should be firmly anchored in the Executive Branch. COST should be a regular component of the presidential staff, while it would be using the resources of the nationwide science and technology community, it should not think of itself as a "bridge" to this community—any more than other parts of the White House staff are bridges to their related elements in the population. This point is not of negligible importance: PSAC and OST appeared to some critics as protagonists of the "special interests" of the research-oriented community, and COST will be more effective if it does not appear in the same light. Franklin D. Roosevelt once spoke with pride of his staff's "passion for anonymity"—and that might not be a bad model for COST to follow.

One more point, perhaps superfluous: the world of Washington being what it is, COST would need to have an influential role in shaping the technology-related parts of the President's budget, to be in the position of exercising forceful leadership of the suggested interagency study groups concerned with long-range objectives. The fiasco of 1971-1972 is a case in point.

Possible Organization of COST

The organization of COST can, of course, be decided only by the incoming President. Already mentioned was a Council on Science and Technology (analogous to the durable Council of Economic Advisors), which *might* consist of three full-time members, one of whom shall have regular access to the President (on a par with the director of OMB). The responsibilities of COST can be roughly divided into three inter-

related areas. One includes some issues in national security, some aspects of foreign policy, and the space programs. The second covers most civilian technology, such as energy sources, utilization of other nonrenewable natural resources, transportation and housing, and protection and control of the environment. The third is oriented toward the living world, including progress of basic sciences, coupled with the training of scientific-engineering personnel; the biomedical and other applied life sciences; protection, growth, and exploitation of renewable resources; protection of individuals from harmful side-effects of new technologies; and so forth. The way in which these varied domains should be divided among the members of COST will depend on who the individuals chosen by the President are. Each of these three broad areas should have a full-time professional staff, some brought on loan from the federal agencies and others recruited from the outside. Each member of COST should be encouraged to assemble a group of senior part-time advisors from the nongovernmental world, who should be mainly involved in long-range activities. These groups should not, however, become a PSAC. Thus, not being presidential advisors, members could reasonably freely speak out on public issues, although, of course, they would be expected to respect fully the privileged nature of the information they receive in the course of their advisory activities.

One could easily continue to elaborate on the functions and structure of what I have called COST, but it seems premature. What is not premature is for the scientific-technological community to start discussing COST. What is important is that COST, or something like it, properly staffed, be of substantial assistance to the next President in reducing the likelihood of inaction or of technologically ill-conceived projects, which, either by unsound intent or by default, too frequently burden our society.

Committee on Science and Astronautics

Hearings on Federal Policy, Plans, and Organization
for Science and Technology
July 10, 1974

Dr. Wiesner's testimony

Much of what I would say will parallel Dr. Kistiakowsky's statement. He has said very little that I don't agree with. I might change priorities a little. Obviously, I am very pleased, as I am sure my colleagues are, that you are holding these hearings. I am happy to appear before you.

This question of science in the Executive Branch of the Government is a very complicated question. I doubt whether any knowledgeable person who has been involved in these matters would say that there is a single most appropriate set of arrangements for providing the President and Executive Office of the President with the information he needs with regard to scientific and technological questions. The fact has already been emphasized that specific arrangements must be tailored to the style and interest of the President and to the specific issues that happen to be of major concern to the nation at a given time. We know that the past arrangements worked very well when the individuals involved and the issues studied were consonant with the perceived needs of the President and his organization.

The same arrangements obviously were totally inadequate and unsatisfactory when that was not the case.

The Science Advisory mechanism served President Eisenhower extremely well. It was set up in response to his clearly perceived need for assistance and evolved in his service. He knew what he wanted to do. He made it clear at the very beginning. Many of us heard him say that he had learned he could not get objective technical advice on space programs, on military technology, on broader policy matters involving technology such as the nuclear test ban and on more general issues involving arms control matters and on scientific and technical education, all issues he was vitally concerned about.

To meet these needs, he asked Dr. Killian as Special Assistant to the President -- and the Science Advisory Committee to assist him. As you know, Dr. Kistiakowsky succeeded Dr. Killian in the role of Special Assistant.

By the time of the Johnson and Nixon Administrations, Presidential needs with regard to scientific and technical advice, at least as it was perceived by the President, had changed considerably and had somewhat lessened. In addition, blunt judgments from PSAC regarding the weapons systems, the validity of the Vietnam operational assistance and the policies on the ABM were not particularly welcomed. At the same time, problems of health, pollution, economic competition, all involving the impact of technology on the society at large were becoming increasingly urgent. These issues were at the same time more complex and had no clearly-defined clientele within the Federal bureaucracy or within the Congress, for that matter.

So after they had been studied and were understood to some extent and possible ways to deal with them identified, it was difficult to initiate adequate programs to deal with them.

For example, we had extensive study programs in the energy field, but not very much ever got started because we could not find the focus within the government for doing something about these problems.

These problems presented other complications as well for they involved vital economic, political and social aspects as well as technical questions. Those features of the problems still are not easily analyzed. As you think about this problem, the problem that you are facing, I think you must recognize that such problems will become even more central in the years ahead.

Increasingly these questions will involve the need to make value judgments regarding resource allocation, choices among possible life styles, questions of responsibility to other members of the society and people of other nations and important questions of our obligations to unborn future generations.

Before long, too, we will face extremely difficult moral questions stemming from our increasing understanding of life, questions of who shall live and who shall die, perhaps decisions about genetic manipulation undertaken to improve human beings or control individual behavior. Clearly none of these are questions that should be or can be decided solely by technical experts, although experts should be involved.

Perhaps the most important role of the Presidential Science Adviser, as Dr. Kistiakowsky already said, and of the other science mechanisms too, has been to expand the availability of information the President has and to free him from total dependence on advice from the individual Government departments. In fact, President Kennedy once said, when asked what my job was by a newspaper man, that my job was to keep the Government from going all one way. I thought that was a good shorthand way to describe the role we tried to play in expanding his options.

Prior to the availability of the President's Science and Advisory Committee, the President was more or less a captive of the system. It was difficult for him to obtain professional or technical information from any group except the agencies of the Government responsible for the issue in question. This made the President essentially a captive of the agency with the specific responsibility. I believe that I can see that syndrome emerging again in our Government in the debates about foreign policy and military technology.

Furthermore, in those areas where many agencies had responsibility for parts of a given field as, for example, the case of oceanography, where some 13 Government groups had responsibilities, the President frequently was in need of expertise to help him resolve conflicts which arose between different agencies of the Government. Frequently, these conflicts involved matters of technical fact or required judgment about technical questions so the President needed independent technical advice in order to be in a position to make a satisfactory decision.

Finally, in the continuing budget process, as Dr. Kistiakowsky said, the President, with the aid of his advisers, had to choose from an awesome array of programs and proposals, some totally sound and some not and altogether requiring more funds than are available.

The Science Advisory Committee and its many panels of experts provided an ultimate source of information both to the President and to the Bureau of the Budget with a primary allegiance to the President.

I would not go into the budget process in detail because Dr. Kistiakowsky has done that. I personally found nothing wrong with the old arrangement. As I have indicated, I think the National Academy report provides the basis for a satisfactory science organization. I would urge continuation of the advisory system in some form. Perhaps here the two of us would differ some. I also think we could make better use of inside advisers than we did, possibly because of our fear of conflict of interest. PSAC and its panels were the source of great strength providing a level and quality of expertise that could not be attracted into the Government on a permanent basis.

I think that this would still be true today despite the fact that there is probably more expertise within the Government.

A council of three members is clearly better than a single adviser because you would have more help, provided one of them is clearly defined as the Chairman. Actually, the Science Adviser had a deputy for a number of years and sometimes there were two people functioning as deputies but possibly they were not in the same position of power the new proposal would create.

There may be some disagreement about the reestablishment of the OST function and its staff. I believe it is needed to provide coordination and planning and leadership for Government programs. I believe the two functions of advising the President and providing overall guidance, management and supervision to the Federal science and technology programs are both essential. The OST function, I think, should be included in any new organization and perhaps one of the members of the Council should be Director of the OST. The task of judging and coordinating agencies, plans and positions with regard to science and technology is very difficult. It points up what I believe to be a very major weakness in the Executive Branch of the Government that is much more general, particularly in the Executive Office of the President.

I would like to speak about that: I don't think that the present arrangements are structured to handle an enterprise of the scale and complexity of our Government. The proposals that we are talking about have to do with one part of this, the science and technology mechanism. I think it would be safe to say that no modern large-scale business could operate effectively or even survive with the kind of organization that circumstances require the President to use.

When the Government was very much smaller, the Cabinet provided a reasonably effective administrative mechanism for dealing with those problems that required Presidential attention. But as the Government grew in size, the tasks of the individual Cabinet officers have become unmanageable and the Cabinet has ceased to be an effective decision-making body. That is a strong

statement, but in recent years Cabinet officers have largely been captive of their organizations and they function as advocates at the White House and in the Executive Office of the President. To deal with this problem, the Budget Bureau has provided an analytical capability to provide the President information on agency programs and a process of depending on Presidential special assistants has been developed to deal with the day-to-day problems of the Government requiring Presidential attention as well as for considering major policy issues.

To a considerable degree this process has undermined the positions of Cabinet officers and has made it more difficult for the Congress to get information from people who are making the decisions.

Frequently Cabinet officers are required to support decisions they had little part in making. It seems to me that this new layer of governmental authority should be recognized and formalized. President assistants with management responsibility should be approved by the Congress and be allowed to appear before Congressional committees. It was for these reasons that in 1961 we proposed the Office of Science and Technology whose establishment was approved by the Congress.

I frequently appeared before Congressional committees, as did my successors, to testify regarding those scientific and technical problems with which OST was involved. I retained a confidential role with respect to advice to the President on issues of policy.

The needs you are exploring are urgent. The U. S. scientific and technical institutions are suffering from years of neglect, decreasing real support and sudden thoughtless actions. The level and quality of research in many fields has been suffering. Urgently needed new research and development programs cannot get started. An R&D program in the energy field I think is a prime example of this. Many students are reluctant to choose careers in science and engineering because of problems they see.

The years ahead will probably see serious shortages in most categories of advanced graduates. Industry and Government will suffer. It will take years to undo the effects of the present mood of discouragement. Science at the moment needs encouragement, stimulation and leadership. It needs it now. Vannevar Bush, the great engineering scientist who died two weeks ago, called science the endless frontier. Science made possible the greatness of our democracy. Science and technology are essential for any meaningful future for mankind. We have learned painfully that technology can be a double-edged tool and it must be exploited with great care. At this time in our world the lack of following our scientific opportunities will have tragic consequences. I would like to thank you for your interests and efforts in this area.

THE WHITE HOUSE

WASHINGTON

LOG NO.: *Science*

ACTION MEMORANDUM

Date: October 1, 1974

Time:

FOR ACTION: Jack Marsh
Phil Buchen
Jack Marsh
Brent Scowcroft
Ken Cole
FROM THE STAFF SECRETARY

cc (for information):

DUE: Date: Thursday, October 3, 1974

Time: 2:00 p.m.

SUBJECT:

Ash memo (9/30/74) re: Action to
Strengthen the Presidential Science
Advisory Apparatus

ACTION REQUESTED:

For Necessary Action

For Your Recommendations

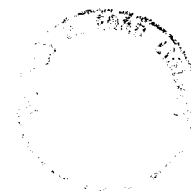
Prepare Agenda and Brief

Draft Reply

For Your Comments

Draft Remarks

REMARKS:



PLEASE ATTACH THIS COPY TO MATERIAL SUBMITTED.

If you have any questions or if you anticipate a delay in submitting the required material, please telephone the Staff Secretary immediately.

Jerry H. Jones
Staff Secretary

THE WHITE HOUSE
WASHINGTON

SEP 30 1974

ACTION

MEMORANDUM FOR THE PRESIDENT

FROM: ROY L. ASH

SUBJECT: ACTION TO STRENGTHEN THE PRESIDENTIAL SCIENCE
ADVISORY APPARATUS

Background

A number of spokesmen from the science community objected strongly when the science advisory apparatus in the Executive Office of the President (EOP) was abolished in July 1973 and its functions were transferred to the National Science Foundation (NSF) in the civilian area and to the National Security Council (NSC) in the national security area. Concern in Congress over this action has been exhibited mainly in the science committees which have held hearings and are considering legislation to establish new advisory arrangements. There have also been proposals from the scientific community for reinstating a science apparatus in the EOP, including a recommendation from the Academy of Sciences for a three-member council. Because of science community and congressional interest and because designation by the President of the Director of the NSF as Science Adviser lapsed with the change in Administration, there is need to consider reaffirming or strengthening the present arrangement or else replacing it.

Alternatives

- I. Maintain the present arrangement:
 - A. redesignating Dr. Stever as "Science Adviser," or
 - B. visibly strengthening it by formally appointing NSF Director as Science Adviser to the President.
- II. Appoint a full-time Science Adviser to the President with a small White House staff.
- III. Reinstitute a statutory science agency in the EOP headed by a Science Adviser or a three-man council.



Discussion

There is every reason to believe that the present arrangement can be made to work effectively in providing you and your senior staff with independent advice on scientific aspects of major policy issues. Moreover, the present arrangement has the advantages that it:

- makes use of the considerable policy staff resources of NSF
- recognizes more fully the increased capabilities of Cabinet Departments and Agencies to provide advice on technical matters
- does not increase the size of the White House staff.

Furthermore, as Dr. Stever indicated to you, he is taking further steps to improve the present arrangement.

Potential legislative action and scientific community pressure for a major reorganization can be deterred by creating a more visible tie of the Science Adviser to the White House by designating him as Science Adviser to the President, by publicly assigning him substantive tasks, and by your occasional meeting with representatives of the scientific community. These actions, I believe, can demonstrate that there is an effective channel for scientific advice to the President.

Actions to establish either a full-time Science Adviser to the President or to establish a statutory agency in the EOP are not warranted in our view because they:

- overly represent in your immediate office the clientele interests of science and scientists
- emphasize science and technology as ends in themselves rather than means of achieving national objectives
- do not recognize the necessity of integrating science advice with that from other fields.



Recommendation

Because the present advisory arrangement can be effective, it should be continued, but with some strengthening of the tie to the President. Accordingly, I recommend Alternative IB. If you agree, I recommend you discuss this approach with selected members of the scientific community, and indicate to them that you are committed to exploring additional measures to strengthen scientific input in the EOP.

I should emphasize that this alternative may not be considered sufficient by the science community, but it does have the advantage that it does not preclude any future consideration of other organizational arrangements which would more fully integrate science advice into the White House decisionmaking process.

Agree _____

Disagree _____

See Me _____

10/3/74

To: Warren Rustand

From: Phil Buchen



October 1, 1974

Dear Dr. Wiesner:

Thank you so very much for your kind letter of September twentieth, concerning the forthcoming meeting of the Association of American Universities on October 22 and 23.

I have forwarded your request for a meeting with the President to Mr. Warren Rustand, Director of Scheduling, for consideration.

Please be assured I will personally do everything possible to assist you in this matter.

Most sincerely yours,

Philip W. Buchen
Counsel to the President

Dr. Jerome B. Wiesner
President
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

cc: Warren Rustand





OFFICE OF THE PRESIDENT

CAMBRIDGE, MASSACHUSETTS 02139

September 20, 1974

The Honorable Philip W. Buchen
Counsel to the President
The White House
Washington, D. C.

Dear Mr. Buchen:

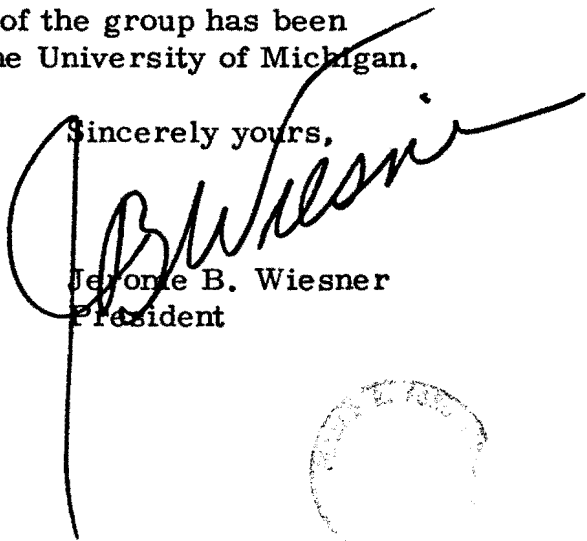
The Association of American Universities, an association of the major graduate (and research) universities of the United States, meets in Washington on October 22 and 23. The meeting is attended by the presidents of the member universities.

In the past, the President of the United States has occasionally invited the group to the White House for a discussion about national higher education and research problems. It has occurred to me that President Ford might find an opportunity to meet with this group both interesting and extremely useful.

The AAU has a Washington Office and an Executive Secretary, Mr. Charles Kidd.

Incidentally, the recent Chairman of the group has been Dr. Robben W. Fleming, President of the University of Michigan.

Sincerely yours,


Jerome B. Wiesner
President

JBW/jh



Science

Monday 10/7/74

11:30 Dr. Ed David (former Science Adviser to the President) (312) 693-2555
would appreciate a call.

He left to become Executive Vice President for Research
at Gould, Inc., Chicago.

He's a good friend of Tom's

Secretary: Many Ann

