

Y4
.L 11/4

1043

96974
L 11/4
N 72
980-11

N 72/980-11

NOMINATION

GOVERNMENT
Storage

DOCUMENTS

DEC 15 1980

F. H. REEL LIBRARY
UNIVERSITY

ATL 1600 732953



HEARING
BEFORE THE
COMMITTEE ON
LABOR AND HUMAN RESOURCES
UNITED STATES SENATE
NINETY-SIXTH CONGRESS
SECOND SESSION

ON

JOHN BROOKS SLAUGHTER, OF WASHINGTON, TO BE DIRECTOR OF THE NATIONAL SCIENCE FOUNDATION

AUGUST 1, 1980



Printed for the use of the Committee on Labor and Human Resources

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1980

AY
A/11 J.
11-089/SP N

COMMITTEE ON LABOR AND HUMAN RESOURCES

HARRISON A. WILLIAMS, Jr., New Jersey, *Chairman*

JENNINGS RANDOLPH, West Virginia
CLAIBORNE PELL, Rhode Island
EDWARD M. KENNEDY, Massachusetts
GAYLORD NELSON, Wisconsin
THOMAS F. EAGLETON, Missouri
ALAN CRANSTON, California
DONALD W. RIEGLE, Jr., Michigan
HOWARD M. METZENBAUM, Ohio

RICHARD S. SCHWEIKER, Pennsylvania
JACOB K. JAVITS, New York
ROBERT T. STAFFORD, Vermont
ORRIN G. HATCH, Utah
WILLIAM L. ARMSTRONG, Colorado
GORDON J. HUMPHREY, New Hampshire

LETITIA CHAMBERS, *Staff Director*
STEVEN J. SACHER, *General Counsel*
MARJORIE M. WHITTAKER, *Chief Clerk*
DAVID A. WINSTON, *Minority Staff Director*

NOMINATION

FRIDAY, AUGUST 1, 1980

U.S. SENATE,
COMMITTEE ON LABOR AND HUMAN RESOURCES,
Washington, D.C.

The committee met, pursuant to notice, at 10:55 a.m., Senator Harrison A. Williams, Jr. (chairman) presiding.

Present: Senator Williams.

The CHAIRMAN. The committee will come to order.

Today, the committee considers the nomination of Dr. John Brooks Slaughter to be Director of the National Science Foundation. He would replace Dr. Richard C. Atkinson, who has resigned to become chancellor of the University of California at San Diego.

I will put some of the biographical material in and a few other comments, as if I had read them, without any objection, and turn to the Senator from Washington, Senator Jackson, for an introduction of Dr. Slaughter.

[The material referred to follows:]

(1)

STATEMENT FOR COMPLETION BY PRESIDENTIAL NOMINEES

PART I: ALL THE INFORMATION IN THIS PART WILL BE MADE PUBLIC

Name: Slaughter (LAST) John (FIRST) Brooks (OTHER)

Position to which nominated: Director, National Science Foundation Date of nomination: 2 July 1980

Date of birth: 16 (DAY) March (MONTH) 1934 (YEAR) Place of birth: Topeka, Kansas

Marital status: Married Full name of spouse: Ida Bernice Johnson Slaughter

Name and ages of children: John, Jr 21
Jacqueline 15

Education:	Institution	Dates attended	Degrees received	Dates of degrees
	<u>Washburn Univ.</u>	<u>1951-53</u>		
	<u>Kansas State Univ.</u>	<u>1953-56</u>	<u>B.S.E.E.</u>	<u>1956</u>
	<u>UCLA</u>	<u>1958-61</u>	<u>M.S. Engr.</u>	<u>1961</u>
	<u>UCSD</u>	<u>1966-71</u>	<u>Ph.D.</u>	<u>1971</u>

Honors and awards: List below all scholarships, fellowships, honorary degrees, military medals, honorary society memberships, and any other special recognitions for outstanding service or achievement.

Whiting Scholarship, Washburn University, (1951-53); Republic Aviation Award for Best Speech on Airpower, (1955); Sigma Tau, (1954); Eta Kappa Nu, (1954); NELC Scientist of the Year, (1965); NELC Fellowship, (1966); IEEE Community Service Award, (1972); Who's Who Among Black Americans, (1973); American Men and Women of Science, (1976); Who's Who in Engineering, (1977); Fellow, IEEE, (1977); UCLA Engineering Alumnus of the Year, (1979); Fellow, AAAS, (1978); NSF Distinguished Service Award, (1979); Tau Beta Pi, (1980).

Memberships: List below all memberships and offices held in professional, fraternal, business, scholarly, civic, charitable and other organizations for the last five years and any other prior memberships or offices you consider relevant.

Organization	Office held (if any)	Dates
(IEEE) Inst of Electrical and Electronics Engineers	Chairman, Minority Committee	1976 -
IEEE External Awards Comm.	Member	1978 -
National Medal of Science Award Comm.	Member	1979 -
Amer. Assn of Advancement of Science	Member	1976 -
National Urban League	Pres., San Diego	1961
Comm on Minorities in Engineering	Member	1976
Alpha Phi, Alpha Fraternity	Pres., San Diego Chapter	1954 -

Employment record: List below all positions held since college, including the title or description of job, name of employer, location of work, and dates of inclusive employment.

- (i) General Dynamics ^{San Diego, CA} Astronautics, 1956-1960, Electronic Engineer
- (ii) Naval Electronics Laboratory Center, San Diego, CA, 1960-75, Physical Science Administrator and Head, Information Systems Technology Department
- (iii) California Western University, ^{San Diego} 1961-63, Instructor (part-time)
- (iv) UCLA Extension, San Diego, 1963, Instructor (part-time)
- (v) San Diego State College, 1964-66, Lecturer (part-time)
- (vi) Applied Physics Laboratory, University of Washington, Seattle, 1975-77, Director and Professor of Electrical Engineering
- (vii) National Science Foundation, 1977-79, Assistant Director for Astronomical, Atmospheric, Earth and Ocean Sciences
- (viii) Washington State University, Pullman, WA, 1979 - , Academic Vice-President and Provost

Government
experience:

List any advisory, consultative, honorary or other part-time service or positions with Federal, State, or local governments other than those listed above.

- Member, National Medal of Science Award Committee
- Member, Board of Directors, San Diego Transit Corporation
- Member, Citizens Advisory Committee, Seattle Metropolitan Transit Commission

Published
writings:

List the titles, publishers and dates of books, articles, reports or other published materials you have written.

- Twin-T Compensation Using Root Locus Methods, IEEE Transactions, 1963
 - Digital Control of a Tactical Weapon with a Shipboard GP Computer, 1963
 - Quantization Errors in Digital Control, IEEE, Jan. 1964
 - Compensating for Dynamics in Digital Control, Control Engineering, 1964
 - The Application of Separable Programming to Optimal Control Problems with Quadratic Cost and Convex Constraints, Hawaii Systems Science, 1971
 - A Linear Programming Approach to the Controllability of Constrained Linear Systems, Midwest Symposium on Circuit Theory, 1972
- (see attached vita for remainder)

Political
affiliations
and activities:

List all memberships and offices held in or financial contributions and services rendered to all political parties or election committees during the last five years.

None

Future employment relationships:

1. Indicate whether you will sever all connections with your present employer, business firm, association or organization if you are confirmed by the Senate.

I will be on unpaid leave of absence

2. State whether you have any plans after completing government service to resume employment, affiliation or practice with your previous employer, business firm, association or organization.

No plans but option will exist if I remain on leave

3. Has a commitment been made to you for employment after you leave Federal service?

No

4. Do you intend to serve the full term for which you have been appointed or until the next Presidential election, whichever is applicable?

Yes

Potential conflicts of interest:

1. Describe any financial arrangements, deferred compensation agreements or other continuing financial, business or professional dealings with business associates, clients or customers who will be affected by policies which you will influence in the position to which you have been nominated.

None

2. List any investments, obligations, liabilities, or other financial relationships which constitute potential conflicts of interest with the position to which you have been nominated.

None

3. Describe any business relationship, dealing or financial transaction which you have had during the last five years whether for yourself, on behalf of a client, or acting as an agent, that constitutes a potential conflict of interest with the position to which you have been nominated.

None

4. List any lobbying activity during the past 10 years in which you have engaged for the purpose of directly or indirectly influencing the passage, defeat or modification of any Federal legislation or of affecting the administration and execution of Federal law or policy.

None

5. Explain how you will resolve any potential conflict of interest that may be disclosed by your responses to the above items.

NA

CURRICULUM VITAE

NAME: JOHN BROOKS SLAUGHTER, PH.D.

HOME ADDRESS: S. W. 870 Alcora Drive, Pullman, Washington 99163
XXXXXXXXXXXXXX

OFFICE ADDRESS: French Administration Building
Washington State University, Pullman, Washington 99164
(509) 335-5581

BIRTHDATE: March 16, 1934

BIRTHPLACE: Topeka, Kansas

MARITAL STATUS: Married - August 31, 1956, to Ida Bernice Johnson of
Kansas City, Kansas

CHILDREN: John Brooks, Jr. (II), April 14, 1959
Jacqueline Michelle, September 11, 1964

PROFESSION: University Administration and Physical Science/Engineering
Research and Development Management

EDUCATION: Topeka High School, 1948-1951
Washburn University, Topeka, 1951-1953
Kansas State University, 1953-1956, B.S. in Electrical
Engineering
University of California, Los Angeles, 1958-61, M.S. in
Engineering
University of California, San Diego, 1966-1971, Ph.D. in
Engineering Sciences (Engineering Physics)

EMPLOYMENT: - General Dynamics Astronautics, 1956-1960, Electronic Engineer
Naval Electronics Laboratory Center, 1960-1975, Physical
Science Administrator and Head, Information Systems
Technology Department
California Western University, 1961-1963, Instructor in
Engineering (part-time)
UCLA Extension, 1963, Instructor in Engineering (part-time)
San Diego State College, 1964-1966, Lecturer in Engineering
(part-time)
Applied Physics Laboratory/University of Washington 1975-1977,
Director and Professor of Electrical Engineering
National Science Foundation, 1977-1979, Assistant Director
for Astronomical, Atmospheric, Earth and Ocean Sciences

CURRENT TITLE: Academic Vice-President and Provost, Washington State University

OTHER
PROFESSIONAL
ACTIVITIES:

Editor, Computers and Electrical Engineering, an International Journal

Registered Professional Electrical Engineer, No. 16088, State of Washington

Chairman, IEEE Minority Committee, 1976 -

Member, IEEE External Awards Committee, 1978 -

Member, National Medal of Science Award Committee, 1979

PROFESSIONAL
AND SCHOLASTIC
HONORS:

Whiting Scholarship, Washburn University, 1951-1953

Republic Aviation Award for Best Speech on Airpower, 1955

Sigma Tau Honorary Engineering Society, 1954

Eta Kappa Nu Honorary Engineering Society, 1954

NELC Scientist of the Year Award, 1965

Recipient of NELC Fellowship, 1969

IEEE Region Six Community Service Award, 1972

Who's Who Among Black Americans, 1975

American Men and Women of Science, 1976

Who's Who in Engineering, 1977

Fellow, Institute of Electrical and Electronic Engineers, 1977

UCLA Engineering Alumnus of the Year, 1978

Fellow, American Association for the Advancement of Science, 1978

Distinguished Service Award, National Science Foundation, 1979

Tau Beta Pi Honorary Engineering Society, 1979

PUBLIC
SERVICE:

Dr. Slaughter served as charter president of Zeta Sigma Lambda Chapter of Alpha Phi Alpha Fraternity, Inc., San Diego, from 1957 to 1959. This Chapter, comprised of predominantly black college graduates, participates in cultural, social, and educational activities directed toward the enhancement of the Black community in San Diego. While president of the undergraduate group of the fraternity in Topeka, Kansas, Dr. Slaughter initiated a program for his college chapter of visiting and entertaining children hospitalized with polio.

Dr. Slaughter served as president of the congregation of Golden Hills United Presbyterian Church in 1958. He also served as president of the Board of Trustees of that church for two years.

Dr. Slaughter received an award from the Southeast San Diego YMCA in 1961 for his service during the YMCA membership campaign.

Dr. Slaughter was elected to the Board of Directors of the San Diego Urban League in 1962. From March 1964 to February 1966, he was president of the Board of Directors. This organization is concerned with providing equal opportunities in education, employment, housing, and social services. During his tenure as president, the League expanded its programs in

these areas for the betterment of the minority community. He was honored in 1973 by the League for his past service.

As president of the NELC Science Achievement Club, Dr. Slaughter initiated programs of scientist/student seminars at high schools with large minority enrollments. The programs were designed to acquaint students with scientific phenomena and research, encourage their study of science and engineering, and to provide them with information about the pursuit of scientific careers. These programs have been extremely successful and have been acclaimed by the schools as being highly desirable as a means of encouragement and enrichment for the students.

In 1967 Dr. Slaughter received the Gentleman of Distinction Award for his work in Human Relations. This award was made by the Women's Auxiliary of Temple Emmanuel in honor of his contributions toward better race relations in San Diego.

He served as Chairman of the San Diego area Navy Equal Employment Opportunity Council in 1967 and 1968. The Council developed programs to improve the minority employment situation in the Navy activities in San Diego.

In March 1968 he was appointed by the Mayor and the City Council to serve as a member of the Board of Directors of the San Diego Transit Corporation. He was reappointed to the Board in January 1970 for a four-year term and in January 1972, he was elected to serve as Vice-Chairman of the Board.

In 1969 Dr. Slaughter was chosen by the National Junior Chamber of Commerce as one of the "Outstanding Young Men of the Year."

He has also served on boards of citizens groups concerned with education and environmental protection. He was a member of the San Diego Chamber of Commerce Energy Task Force which was formed at the apex of the energy crisis in early 1974.

In October 1974 Dr. Slaughter was elected to the Board of Directors of the San Diego County Chapter of the American Cancer Society.

In January 1976, Dr. Slaughter was appointed to serve on the Citizens' Transit Advisory Committee by the Metropolitan Council (Municipality of Metropolitan Seattle).

In October 1976, he was appointed to the National Academy of Engineering Committee on Minorities in Engineering.

POSITION RESPONSIBILITIES: Responsible for the overall guidance and administration of the University's academic (teaching, research, public service) programs including the management of the operations and capital budgets. The University has an enrollment of 17,000 students and a faculty of 1,700 and offers undergraduate and graduate programs in eight major colleges: Agriculture, Business and Economics, Education, Engineering, Home Economics, Pharmacy, Sciences and Arts and Veterinary Medicine in addition to the Intercollegiate Center for Nursing Education, Spokane and the Joint Center for Graduate Studies, Richland.

PROFESSIONAL SOCIETIES: Institute of Electrical and Electronic Engineers (IEEE)
American Association for the Advancement of Science (AAAS)

PROFESSIONAL PUBLICATIONS: "Twin-T Compensation Using Root Locus Methods," (co-author) IEEE Transactions, Pt. II, January 1963

"Digital Control of a Tactical Weapon with a Shipboard G-9 Computer," (co-author), Proceedings of the National Conference on Military Electronics, September 1963

"Quantization Errors in Digital Control," IEEE Prof. Tech. Group on Automatic Control, January 1964

"Compensating for Dynamics in Digital Control," Control Engineering, May 1964

"The Application of Separable Programming to Optimal Control Problems with Quadratic Cost and Convex Constraints," Proceedings of Fourth Hawaii International Conference on Systems Sciences, January 1971

"A Linear Programming Approach to the Controllability of Constrained Linear Systems," Proceedings of the 15th Midwest Symposium on Circuit Theory, May 1972

"Understanding of Software Problem," Proceedings of 1974 National Computer Conference, Vol. 43, May 1974

"Interactive Displays for Tactical Command Control," Computers and Electrical Engineering, Vol. 3, No. 3, September 1976

"A Relevant Look at the Environmental Sciences," The Black Collegian, Vol. 9, No. 4, Mar/Apr. 1979

Senator JACKSON. Thank you, Mr. Chairman.

I am very pleased to introduce and recommend to you and the committee, Dr. John Slaughter, to be Director of the National Science Foundation.

Dr. Slaughter, as you may know, Mr. Chairman, is currently the academic vice president and provost at Washington State University in Pullman, Wash.

While I know that Washington State University would like to keep Dr. Slaughter at Pullman and continue with the fine job he is doing at the University, both President Terrell and I are fully supportive of Dr. Slaughter returning to Washington, D.C. to direct the National Science Foundation.

Dr. Slaughter has a long list of honors and awards which have been conferred upon him, as his résumé attests. He, in addition, is well-published. He is a scientist and an administrator of note. He has already made his mark on the National Science Foundation by serving as the Assistant Director for Astronomical, Atmospheric, Earth and Ocean Sciences for 2 years.

Incidentally, I might say here that he will assure us that he will solve the Mount St. Helen's problem at the same time. [Laughter.]

I make this very brief, Mr. Chairman, because of my assurance and faith in his ability to do, I think, an outstanding professional job for the National Science Foundation.

I am very pleased, therefore, to present him to you and to the committee at this time.

The CHAIRMAN. Thank you, Senator Jackson. We appreciate your statement. Dr. Slaughter has been over this road before, as you indicated, in this committee, and his confirmation was accomplished with great speed and great enthusiasm greeted his appointment to the other position. We are very pleased that the President has persuaded Dr. Slaughter to return to service in this position.

We will now receive a statement by Senator Magnuson.

[The prepared statement of Senator Magnuson follows:]

Prepared for the August 1, 1980 Record

Labor and Human Resources Committee

Mr. Chairman:

It is with a degree of mixed emotion that I add my wholehearted endorsement to the sentiments expressed by my colleague, Senator Jackson about the nomination of Dr. John B. Slaughter.

John Slaughter is once again a resident of the State of Washington, where he occupies a most important position at our State University in Pullman. He was sought out by the Regents, the faculty and the administration of that educational institution just over a year ago. In his relatively brief tenure as Provost, he has proven out the wisdom of that selection. Students and citizens, everyone at WSU will miss Dr. Slaughter -- in fact they hate to see him leave -- and I certainly join in expressing their misgivings.

At the same time, the National Science Foundation is in need of his highly professional abilities and good services. I am certainly the last member of the Congress who would ever willingly slight the needs and best interests of the NSF.

It was over 35 years ago, during World War II, that I first discussed the need for an NSF with Dr. Vannevar Bush who was then heading up the Office of Scientific Research and Development. Others in the academic-scientific world, like Drs. Detlev Bronk and Isaiah Bowman worked with us after the war, but it was Van Bush and his report to the President -- "Science, the Endless Frontier" -- that gave the real push towards establishing that Federal agency.

From 1945 through 1950, those of us advocating the establishment of an NSF had to march up and down the legislative hill a number of times before we achieved success. Starting in 1950, I worked with Dr. Alan Watterman, the first director, and watched this new agency

become a vital force in helping to build the foundation of scientific knowledge, in helping to train those who might engage in basic research and in helping to improve the teaching of science in classrooms and elsewhere across our land.

The early promise of an NSF has truly been accomplished. But those same missions that were only a vision to so many 35 and 40 years ago, are just as vital today -- if not more vital -- in meeting highly important national goals. The choice of a Director for the NSF is one of the most important that any President has to make. President Carter has done exceptionally well in selecting Dr. Slaughter and securing the acceptance of such a highly qualified individual.

Dr. Slaughter has a distinguished career which includes highly responsible positions in the academic community, the business world and scientific activities undertaken by Federal agencies. He is experienced and enjoys a professional reputation in the fields of basic and applied research, and he is respected across the wide spectrum of scientific disciplines. You have his record before you and all of this must be equally apparent to you. I would hope you'd join me in complimenting him for accepting this challenging assignment.

Mr. Chairman, and Members of the Committee, I commend John Slaughter to you. Without hesitation or any reservation, I join my colleague in heartily recommending John Slaughter for the position of Director, National Science Foundation, and would urge his early confirmation to that post.

The CHAIRMAN. Dr. Slaughter, do you have a statement?

Dr. SLAUGHTER. Yes, sir.

I would like to thank Senator Jackson before he leaves for introducing me to you again, Senator Williams. I appreciate that very much.

Senator JACKSON. Thank you, Dr. Slaughter, and thank you, Mr. Chairman.

Dr. SLAUGHTER. Mr. Chairman, I have a short statement I would like to read, with your permission.

I am very pleased and privileged to appear before you today as President Carter's nominee to be Director of the National Science Foundation. I feel fortunate to have this opportunity to express both my comprehension of the responsibilities and challenges of the position, as well as my objectives for the continued improvement of the Foundation if I am confirmed. I feel extremely honored to have been nominated to follow in the steps of the five outstanding scientists who have directed the Foundation in its 30-year history. I am humbled by the mere mention of their names, but I am confident that I can provide the leadership so vital to the NSF's future at this pivotal time in its history.

I am very conscious of the responsibility of the NSF to strengthen U.S. science and engineering through a balanced program of support to basic and applied research and through a broad effort in science education.

I am also mindful of the roles of the Congress and the executive branch in the development and enhancement of the Nation's scientific resources and potential. I have always been impressed by the high degree of commitment, knowledge, and experience demonstrated by those governmental agencies and offices charged with the responsibilities for guiding, overseeing and insuring the continued vitality and effectiveness of our country's research efforts. Science benefits, in part, because it evokes no partisanship. Its contribution to our Nation's strength and future are recognized and supported throughout all segments of Government.

As you have already mentioned, I previously served for a period as the Assistant Director of NSF for Astronomical, Atmospheric, Earth and Ocean Sciences. During that time, I became thoroughly imbued with the understanding that science, by its very nature, is inexhaustible. I came to realize what was meant when I once read that, " * * * compared to the pond of knowledge, our ignorance remains atlantic. Indeed, the horizon of the unknown recedes as we approach it."

The study of black holes in space, for example, or any of the innumerable galaxies that populate the cosmos is proof of this fact. The eruptions of Mount St. Helens in my own backyard in the State of Washington provides me with a firsthand set of experiences with a very vast body of geological and geophysical laws, all of which are understood imperfectly.

Through the efforts of scientists and engineers supported by the National Science Foundation, our knowledge about the presently unknown will continue to increase. As new technologies are developed and become available for use in observation and experimentation, we greatly increase our abilities to penetrate deeper into the frontiers of our knowledge. Most of the advances of science within

the recent past have occurred as a result of the concomitant advances of technology. Our abilities to probe, measure and identify previously unexplored phenomena are inextricably related to the technological achievements that make it possible. I am reminded of that fact whenever I look at the small computer that I wear on my wrist.

NSF has a responsibility to see that our country's science and engineering resources are supported at the levels required for continued progress.

I am concerned, Mr. Chairman, about the well-being of the science and engineering educational programs in the elementary and secondary schools of our Nation. A recent editorial in the American Journal of Physics pointed out the poor state of our secondary school science and mathematics instruction relative to that provided students in the U.S.S.R. All high school graduates in the Soviet Union are required to complete a comprehensive program in biology, chemistry, physics, and calculus while in our own country, only 2 or 3 percent of the high school graduates have followed such a curriculum. I believe we have a national crisis that the National Science Foundation, along with other governmental agencies and the private sector, must address in a comprehensive and systematic fashion. To fail to do so would be unconscionable in view of the importance of scientific literacy today.

Of great concern to me is the fact that racial minorities, women, and persons from economically disadvantaged backgrounds remain underrepresented in science and engineering in our Nation. I believe that the Government and, in particular, NSF has a responsibility to help rectify this situation. Programs designed to address parts of this problem have been underway for some time. Many of those have been the result of congressional initiatives. But much more needs to be done if the Nation is to benefit from the creativity, insight, and enthusiasm that will be infused if all barriers, real or perceived, to participation in the fields and disciplines of science and technology are lowered.

I pledge my energies and those of the NSF to this important cause.

I look forward with great anticipation, Mr. Chairman, to the challenges and opportunities ahead for the National Science Foundation. The charter of the Foundation is a vital and serious one that demands the best from those entrusted with its care. I will do my best to see that it has been placed in good hands.

Thank you.

The CHAIRMAN. Thank you very much, Dr. Slaughter. I know we started late, and we have another nomination to consider after yours. I wonder if you could just give us a sense of some of your feelings about two areas that I think would be helpful to members, not in terms of the confirmation, but just to know you better.

The absence of the members is an indication they have already voted for you, you know; you start with all the votes.

But as we look at two areas of great interest here we are reminded that science in the United States is divided, perhaps artificially, into the general camps of basic science and applied science. I would suggest that your background in engineering and your experience in applications of science to real world problems identifies you as a

person who understands applied science. But on the other side of this situation, your service in universities and government indicates your familiarity with basic science.

I wonder if you could share with us your views and perspectives on this split between the two branches of science?

Dr. SLAUGHTER. Yes, Mr. Chairman, I think that is an exceedingly appropriate question. I think that one of the major problems facing our country today is the fact that we have allowed very artificial barriers to be developed between what we refer to as basic or fundamental research, applied research, and engineering, and many dollars have been spent in attempting to take the results of our basic research and trying to carry it through the phases of applied technology and into a product. The Department of Defense is a good example of an agency that has been continually frustrated by the difficulty and, in fact, in many cases, the inability to make that blend work. I think the problem is the fact that people have tended to view them as totally separate entities.

I think it is very important to recognize that there has to be a continuum, there has to be a recognition that fundamental research, while it has a certain beauty and importance all its own, can in fact lead in a natural way into applied science and perhaps ultimately into an engineering product. Artificial separation that forces communication to take place between disparate groups is not the way to accomplish that. I believe the Foundation is recognizing that, and I would anticipate some reexaminations of the way in which we move, even within the Foundation, in making applied research an integral part of the activities of the Foundation. I believe that that is a very critical and important issue.

The CHAIRMAN. Do you have any predictions of the future of applied science and basic science in our country?

Dr. SLAUGHTER. I think that we are going to find it absolutely necessary, if for no other reason than the models that have been presented to us by other countries in the world, to realize that broader support of applied science will be necessary by agencies such as the Foundation, but also by other governmental organizations. The Department of Defense is a good example.

I think that we are going to do a better job in determining the appropriate balance of support for both fundamental research and applied research than we have in the past.

The CHAIRMAN. Then, one way to look at this is through the application of resources to the Directorate for Engineering and Applied Science and those accounts. Only about 6.6 percent of NSF's nearly \$1 billion appropriation for fiscal 1980 will be expended in this area. In your view will the applied sciences require either increases or decreases in expenditures in future years?

Dr. SLAUGHTER. I think that it is very difficult to draw too much of a conclusion from those numbers, but I believe that a greater amount of support should go to applied research than currently exists. But I think it would be support which would be in much closer consonance with the basic research that is underway. I think having separate entities is, perhaps, not the best way to provide meaningful support of that activity.

The CHAIRMAN. Now, another matter of great concern to all is productivity in our country. We are told weekly that productivity is

declining rapidly, and that such decline handicaps our Nation economically. I know there is a great deal of controversy over the precise meaning of the term, "productivity". Most knowledgeable people seem to agree that the advance of technology is an indispensable condition for improving productivity and the health of our economy generally.

Would you indicate your view of the role of the National Science Foundation in the years ahead in stimulating technological development in this context?

Dr. SLAUGHTER. Again, Mr. Chairman, that is a very important issue for the Foundation. I believe that there is a relationship between science and technology that is really a bilateral one. As I indicated in my statement, much of the progress that we have made in science has resulted from the fact that technological developments have occurred that allow us to do things, measure things, to calculate things that we were unable to do two decades ago. But we also have to recognize that those technological achievements grew out of scientific results that occurred in the laboratories in our universities and in other research organizations in the country. I think that the relationship between science and technology needs to be strengthened, and the Foundation does have a very definite responsibility, in my opinion, to not only articulate that relationship but to help support improvements in technology. There certainly is a strong tie between our scientific creativity, the initiation of the new technological developments and devices, and the productivity of our country. There is a strong relationship, and there is no way in the world that the Foundation will not be involved in continuing to strengthen that.

The CHAIRMAN. Many agencies of our Federal Government are concerned with technology development—the Department of Energy, NASA, the Environmental Protection Agency, the National Bureau of Standards, the Department of Commerce, and I am sure there are others. What distinctive role do you perceive for NSF in technology development when considered as one among a large number of Federal agencies so concerned?

Dr. SLAUGHTER. Mr. Chairman, one of the strong thrusts of Dr. Atkinson when he served as Director of the Foundation was stressing the importance of a pluralistic approach to supporting science and technology in our country. I believe in that very strongly, and will continue that if I am confirmed.

I think, though, that NSF has a key and unique role in that, other agencies that you have mentioned are mission agencies. Each of them has a defined, a particular responsibility. There is a tendency to orient the research and the technology programs that they support to address the particular mission responsibility, spelled out in the charter of their organizations. NSF, because it does not have that same kind of mission alignment, has the opportunity to do those things that are not necessarily so tightly coupled to a specific mission or specific application. We have the opportunity to look at the higher risk kinds of programs. We have the opportunity to focus on creativity and to support those programs that we believe can have a longer range influence on technology development in the future of the country.

I think that NSF is very vital as a part of the ongoing development of technology in the country because of this unique role it plays.

The CHAIRMAN. Another matter. In 1979, I introduced an amendment to the National Science Foundation Authorization Act, calling for a feasibility study of orbiting solar satellites constructed from asteroidal material in space. NSF contracted with the National Academy of Science for the conduct of the study, and I understand there will be a report later this summer. This is work that followed the ideas of the Princeton professor, Gerald O'Neal, and the ideas are described in his book, "The High Frontier".

Did you have any connection with this study when you were Assistant Director of NSF for Atmospheric, Astronomic and Ocean Sciences?

Dr. SLAUGHTER. No; I did not, Mr. Chairman. It occurred after I left, I believe.

The CHAIRMAN. Do you have any view of projects such as that suggested by this amendment?

Dr. SLAUGHTER. I believe that conceptually, that represents the kind of high-risk program that I just mentioned. The specifics of that particular program, I would be very happy to obtain for you, in terms of status and provide an answer for you for the record. I have not had any direct association with it.

The CHAIRMAN. I would appreciate that.

[The following was received for the record.]

NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550

October 27, 1980

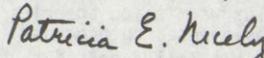
Honorable Harrison A. Williams, Jr.
Chairman
Committee on Labor and Human Resources
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

Enclosed are responses to additional questions for the record in connection with the confirmation hearing on Dr. John B. Slaughter's nomination as Director of the National Science Foundation. These answers reflect Dr. Slaughter's views on the subjects contained in your questions.

Your assistance and that of your staff in the recent confirmation of Dr. Slaughter by the United States Senate are greatly appreciated.

Sincerely yours,



Patricia E. Nicely, Head
Congressional Liaison

Enclosure

ADDITIONAL QUESTIONS SUBMITTED BY SENATOR HARRISON A. WILLIAMS, JR.

Question 1. As you noted in your remarks before the Committee, the National Science Foundation has three major goals: fostering science education and supporting basic as well as applied research. There has been a trend over the past two years, however, to emphasize basic research at the expense of applied research. Although the support of basic research is necessary for the development of new understandings of fundamental phenomena, the social benefits of scientific research are most readily felt from technological innovation. During your tenure as Director of the National Science Foundation, what will be the relative emphasis of basic versus applied research?

Answer: The Foundation's legislative history makes it clear that maintaining U.S. scientific strength through the support of basic research is the dominant NSF mission. I expect that basic research will continue to be the prime focus of NSF funding. But applied research and science education are also critical elements in the Foundation's support of science. In the past two years, the Foundation has submitted programs to the Congress urging strong support for both basic and applied research. In fiscal year 1979 and again in fiscal year 1980, the Congress reduced funding below the requested amount for the applied research portion of NSF's Engineering and Applied Science Activities. In fact, Congress has not only cut but also included a ceiling on Applied Science in six out the last seven Administration budget requests. The Senate Committee on Labor and Human Resources called attention to the fact, in its report accompanying the FY 1981 authorization bill, that the relative percentage of NSF funds going to applied as compared to basic research shows a drop in the past few years. The Foundation is taking action to strengthen applied research, and I am confident that these efforts will meet the concerns of the Appropriation Committees and permit NSF to obtain increased funding for applied research. I should emphasize that basic research need not be supported at the expense of applied research, nor does applied research have to be supported at the expense of basic research. In fact, stressing applied research may require an expansion of basic research support. For example, a few years ago, the National Science Board, the Foundation's policymaking body, urged mission agencies of the Federal Government to strengthen their basic research programs to better underpin their applied research efforts. This call expected that the mission agencies would bolster both their research and their applied research programs so that each would benefit. In a growing budget, it would be possible for basic and applied research to show real growth while their relative percentages of total NSF research funds might rise or fall.

To meet the increasing challenge of international competition, especially in our high technology industries, we must take full advantage of both the Nation's basic and applied research capabilities wherever they exist. It

is my hope that the Congress will approve NSF proposals for expanded applied research efforts and for significantly augmented engineering research support. For example, The Administration request for Engineering support in Fiscal Year 1981 is about three times what it was ten years ago. At the same time, the Foundation--having the principal Federal responsibility for the health of basic science--must continue to emphasize basic research in all science disciplines and fields.

Question 2. Up to now, the main education functions of the National Science Foundation have included the support of special programs and services for science students and of some programs to stimulate an appreciation of science among the public. Today, local governments are being hard pressed by spiraling energy, service delivery and housing costs, management problems, and a host of other problems. Many of these problems are amenable to technological solutions. Unfortunately, many local government officials are unaware of the development of creative solutions employed in other municipalities. Do you see any role for the National Science Foundation in the transfer of technology among local governments?

Answer: The National Science Foundation is already involved in this area. The need for mechanisms to assist in technology transfer among local governments was recognized by NSF several years ago. It was found that many local governments were experiencing unprecedented demands to expand decision-making and management responsibilities on a broad range of complex issues (e.g. energy, environment, etc.), many involving major scientific and technical components. The Foundation recognized that new approaches were required to strengthen the capacity of local governments to identify their needs and to ensure that scientific and technical expertise, new information, research results, and new technologies are appropriately targeted to these important problems. In response to this need, NSF established the Local Government Program as a major segment of its Intergovernmental Program.

The major focus of the Local Government Program is support for national networks and statewide and regional innovation groups. There are three national networks:

- The Urban Consortium for Technology Initiatives, composed of the 28 American cities and 9 large urban counties with more than 500,000 population.
- The Urban Technology System, composed of 31 cities and counties in the 50,000 to 500,000 population range; and
- The Community Technology Initiatives Program composed of 32 cities, counties and townships with populations of under 50,000.

All these networks bring together local governments dedicated to finding and using new ways to improve productivity and the quality of services. The networks develop research and development agendas, involve member

jurisdictions in research, and provide a system to disseminate and replicate research findings. These national networks, along with 14 statewide and regional innovation groups, provided the primary input into the R&D needs assessment conducted by the President's Office of Science and Technology Policy.

In addition to these national networks and innovation groups, the Foundation's Local Government Program provides support to the local government public interest associations, including the International City Management Association, the National League of Cities, the U.S. Conference of Mayors, and the National Association of Counties. These public interest associations act as intermediary organizations between NSF and the 39,000 units of general purpose local governments through the country. Projects supported by the Local Government Program with these associations include efforts to:

- o assist members in understanding the potential of using scientific and technical resources in policy management and program operations;
- o disseminate information about approaches that have been successful in applying scientific and technological resources in local government;
- o provide technical services to members regarding approaches that might be employed to strengthen their capacity to use scientific and technological resources; and
- o aggregate the scientific and technological needs of local government.

Question 3. Representative George Brown has recently introduced a bill to create a National Technology Foundation to assume the technology-related responsibilities of the National Science Foundation. Do you think that a National Technology Foundation would allow the NSF to concentrate and provide more effective support for pure research?

Answer: The National Technology Foundation proposed by Representative Brown would, in my opinion, weaken NSF science programs. Science and Technology are close partners. The importance of this coupling was, I believe, recognized earlier by the Congress. Prior to 1968, NSF did not have the authority to support applied research. Following an extensive review of the Foundation's activities and role, the Congress recognized the benefits of bringing applied and basic research closer together, and expanded the agency's mission to include applied research support. Our experience over the years has demonstrated clearly the power of this combination in such areas as chemistry, materials research, and bioengineering.

Not only does applied research flow from the results of basic research, but frequently applied research efforts identify the need for additional basic research to resolve a particular problem. This is particularly true in technology-related areas. There is no way to neatly bundle in separate packages pure research and technology-related or applied research. Agencies with research programs must be free to support both categories of research.

There is not simple "continuum" running from "basic" to "applied" to "development" on which a given piece of research may be unambiguously placed. In part the distinction involves timing -- the extent to which the utility of the research is apparent when it is undertaken. In part it also involves the extent to which the research addresses a wide range of phenomena. In this latter sense, "basic" research may be far more useful than more narrowly focused "applied" research.

Most of the major mission agencies, such as the Departments of Transportation, Defense, Commerce, Agriculture, and others, have long-established and sizable research programs which are technology-oriented. As a practical matter, it would be difficult, if not impossible, to gather together in any single Federal agency or foundation the technology-related responsibilities of these agencies or those of the National Science Foundation without damaging the overall research programs of the affected agencies. Taking away the Foundation's engineering and technology-related research support activities, as proposed in the National Technology Foundation Bill, would not enhance NSF's ability to provide more effective support for pure research. To the contrary, it would weaken NSF research support programs by isolating them from the mechanisms and efforts needed to carry the basic research results along the continuum toward practical application.

Question 4. The Intergovernmental Science Program has been threatened over the past few years with proposed cutbacks. Do you think this program should be sustained at the National Science Foundation with urban participation, and, if so, how?

Answer: The Objectives of the Intergovernmental Science Program (IP) are important, and well within the Foundation's legislative mandate. It is true that the IP budget has been reduced from \$5.0 million in FY 1979 to \$3.5 million in FY 1980, but an amount of \$4.0 million was requested for FY 1981. This reduction has been largely offset by the initiation of the State Science, Engineering, and Technology Program which is funded at \$1.5M in FY 1980 and at a planned level of \$1.6M in FY 1981.

From the earliest days of the program, the Intergovernmental Program has actively sought local participation. In fact, one of the reasons for the success of the Intergovernmental Program has been the involvement of State and local officials in the planning phase of the projects. A similar involvement of State officials has existed in the State Government Program Component.

Recently, NSF established an Intergovernmental Program Advisory Subcommittee. It consists of State and local officials and is a further example of urban participation in the planning and shaping of projects funded through the Intergovernmental Science Program.

In addition to participation by the governmental user community in program development efforts, most projects supported by the Intergovernmental Program--particularly in the Local Government Program - have advisory bodies composed of local government officials. These advisory groups help ensure that issues addressed are of sufficient significance to merit Federal support. Moreover, the Local Government Program supports national networks such as the Urban Technology Groups, Mid-Atlantic Innovation Group and local government public interest associations. Recently; the International City Management Association and U.S. Conference of Mayors have come together into a new organization called the National Innovation Network. This National Innovation Network, itself, has a policy council consisting of local government officials. The Foundation is involved in all these activities. The present methods of participation seem to be effective and should be continued and consideration should be given to expanding them where appropriate.

The CHAIRMAN. Dr. Slaughter, are you familiar with the bill that was recently passed here, the National Science Foundation and Women in Science and Technology Equal Opportunity Act?

Dr. SLAUGHTER. Yes, I am.

The CHAIRMAN. Could you give us your view of the adequacy of the authorization levels to counteract the steady decline in government investment in science support?

Dr. SLAUGHTER. And in particular as it relates to the women in science question, sir, or just in general?

The CHAIRMAN. In general and specifically, too, if you could.

Dr. SLAUGHTER. Well, I believe in general that the authorization for the Foundation is a sound one; that the major areas that were included in the Foundation's budget were addressed.

I do feel, very strongly, as I indicated in my statement, that we have to do those things in the arena of improving the participation of women, minorities, and the economically disadvantaged in the fields of science.

It is my belief, however, that the approach has to be one of starting very early in the development of scientists, and that what we need to do is broaden the aperture, so that a larger number of persons who have been traditionally excluded for a variety of reasons have an opportunity to become exposed to, become bitten by the scientific bug. And any program either initiated by the Foundation or initiated by the Congress that addresses that kind of an approach is one that I will fully subscribe to and will do all that I can to help support. I think it is a very, very critical issue facing our country right now.

The CHAIRMAN. Is it true that young people in getting direction, particularly in science, most likely are those who are stimulated at an early age to an interest in science they are not late arrivals on the scene of the world of science.

Dr. SLAUGHTER. By and large, that is true. Of course, there is no one rule that applies to all persons. But what you said is largely true, that students are exposed to, become excited by science at an early stage. And I think one of the critical issues on this is the fact that a role model is a very, very important part of this activity. And for a woman scientist, or a Chicano scientist, or a black scientist, or a person who has risen from an environment in which science and engineering has not been an ordinary part of the milieu, that sort of an individual plays a very key role in serving as a model to a young person who is wondering whether an opportunity exists for him or her. That is the reason that I think it is so critical for us to begin to take more aggressive steps in that direction.

The CHAIRMAN. I do not know whether there is any relationship with NSF and that generation of early appreciation for opportunities in science. There are institutional ways of bringing information to young people of opportunities, excitement, and all that goes with it.

Dr. SLAUGHTER. The science education efforts at the Foundation have, through the years, in large part been directed in that way. There has been concern that the kinds of exposure, the curriculum available to our students today, has not been the same kind of curriculum necessary to light that fuse and to ignite that enthusiasm on the part of the young student, and that continues to be a point of some interest to us.

The CHAIRMAN. I think the reports show that the National Air and Space Museum has replaced the FBI as the visitors' No. 1 interesting place to see in Washington. I find that very interesting.

Dr. SLAUGHTER. Yes; that is the positive side.

The CHAIRMAN. It is No. 1 as visitors come to my office, particularly the young people.

Dr. SLAUGHTER. That is very good. I think that is a very positive side.

The CHAIRMAN. Now, a little housekeeping here. Dr. Slaughter, you will be on leave from the university during your service as NSF Director. Could you give us the conditions attached to your leave and the provisions you have made to avoid conflicts of interest with respect to your NSF role?

Dr. SLAUGHTER. Yes, Mr. Chairman. I have discussed with President Terrell at Washington State University the possibilities that might exist if I am confirmed to become Director of the Foundation. He has agreed that it would be in the best interest of all of us if I were to go on leave of absence from the university in a fully unpaid status. My position would not be held open for me. I would just remain as a member of the faculty. The position would be filled by someone else on a permanent basis. I think this is consistent with the conflict of interest rules and is precisely the same format under which I took leave from the University of Washington when I served as Assistant Director before.

The CHAIRMAN. All right, I appreciate that. What is your situation now? Is your academic work finished for this period?

Dr. SLAUGHTER. Yes. I am still on duty this summer, and after the process of confirmation and so forth has been completed, then I

will work with the Foundation in making the necessary steps for the transition.

The CHAIRMAN. Your availability is immediate?

Dr. SLAUGHTER. Yes; that is correct.

The CHAIRMAN. I hope that we can deliver you to your job. There are problems here right now.

Dr. SLAUGHTER. Yes; I understand.

The CHAIRMAN. I have no further questions, so that concludes it, with our thanks. You have been very responsive, and we appreciate it.

Dr. SLAUGHTER. Thank you, Mr. Chairman.

The CHAIRMAN. Dr. Langenberg, do you have a statement to make in behalf of Dr. Slaughter?

Dr. LANGENBERG. Yes, Mr. Chairman, if I may. I am Don Langenberg, Deputy Director of the National Science Foundation.

I would simply like to comment that it is a particular pleasure for me to have been here today in support of Dr. Slaughter. I have known John since 1977 and have come to recognize him as an extremely able and talented scientist, engineer, administrator, and a very valued friend.

All of us at the Foundation, from top to bottom, are looking forward with great anticipation and great expectation to John's arrival at the helm. This is an exciting and a propitious time for the Foundation, and we commend him to your favorable consideration.

Dr. Lewis Branscomb, Chairman of the National Science Board, regrets that he was unable to be here today. Dr. Branscomb has written a letter in support of Dr. Slaughter, Mr. Chairman, and I would like to request that his letter be included as a part of the official record.

The CHAIRMAN. It certainly will be.

Thank you very much. We will move as rapidly as we can to confirmation.

[The following was received for the record.]

NATIONAL SCIENCE BOARD

WASHINGTON, D.C. 20550

July 23, 1980

Honorable Harrison A. Williams, Jr.
Chairman, Committee on Labor and
Human Resources
United States Senate
Washington, D.C. 20510

Dear Senator Williams:

As Chairman of the National Science Board of the National Science Foundation and on behalf of my colleagues, I wish to transmit to you and the Members of the Committee on Labor and Human Resources the Board's unqualified support for the President's nomination of Dr. John B. Slaughter as the sixth Director of the National Science Foundation.

During his tenure at the Foundation as Assistant Director for Astronomical, Atmospheric, Earth, and Ocean Sciences, the Board had numerous opportunities to work with Dr. Slaughter on policy issues of importance to the future of the Foundation. His understanding of the value of research and science education are critical to the role he will assume as Director.

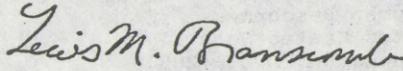
He also appreciated the fact that the Foundation, as a public agency, has an obligation to explain the relationship between the research it supports and the general welfare. He also gained a well-deserved reputation as a good manager of people and a prudent administrator of public resources.

In the future, as in the past, the National Science Foundation faces issues in science, engineering, technology, and related education that will require outstanding technical competence and breadth of vision on the part of its Director. Fostering the linkage between fundamental scientific knowledge and its ultimate utilization is critical to the continued improvement of the quality of life of our citizens. Decisions concerning Federal support for much of our Nation's scientific research and engineering and education will continue to require the thoughtful consideration and counsel of leaders in science and engineering. Dr. Slaughter is such a leader and will relate well to his

peers. His background in computer sciences and engineering and in environmental sciences equip him well to direct the Foundation's efforts in discharging its important role in these areas.

The Board believes Dr. John B. Slaughter will fill with distinction the position of Director of the National Science Foundation.

Sincerely,



Lewis M. Branscomb
Chairman

Copy to:

— Senator Edward M. Kennedy
Chairman, Subcommittee on Health
and Scientific Research

Senator Richard S. Schweiker
Subcommittee on Health and
Scientific Research

The CHAIRMAN. The committee is adjourned.
[Whereupon, at 12 p.m., the committee was adjourned.]

○

