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FOIA MARKER

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Record Group/Collection: George H.W. Bush Presidential Records
Collection/Office of Origin: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: Organization Files - NSF

OA/ID Number: 62075
Folder ID Number: 62075-004

Folder Title:
LA - National Science Foundation (NSF) [1990]

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Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01a. Memo	Allan Bromley to John Sununu RE: NSF Directorship (2 pp.)	6/21/90	(b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: Alphabetical Subject Files
WHORM Cat.:
File Location: LA - National Science Foundation (NSF)

Date Closed: 10/22/2009	OA/ID Number: 08715
FOIA/SYS Case #: 2005-0332-F	Appeal Case #:
Re-review Case #:	Appeal Disposition:
P-2/P-5 Review Case #:	Disposition Date:
AR Case #:	MR Case #:
AR Disposition:	MR Disposition:
AR Disposition Date:	MR Disposition Date:

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

P-1 National Security Classified Information [(a)(1) of the PRA]
P-2 Relating to the appointment to Federal office [(a)(2) of the PRA]
P-3 Release would violate a Federal statute [(a)(3) of the PRA]
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P-5 Release would disclose confidential advice between the President and his advisors, or between such advisors [(a)(5) of the PRA]
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C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Removed as a personal record misfile.

Freedom of Information Act - [5 U.S.C. 552(b)]

(b)(1) National security classified information [(b)(1) of the FOIA]
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(b)(9) Release would disclose geological or geophysical information

THE WHITE HOUSE
WASHINGTON
June 21, 1990

*Check
Quick check*

MEMORANDUM FOR JOHN H. SUNUNU

FROM: D. ALLAN BROMLEY *DB*

SUBJECT: NSF DIRECTORSHIP

(b)(6)

As you know, Erich Bloch is coming to the end of his six year appointment as Director of the National Science Foundation. In my opinion, he has done an outstanding job [REDACTED]

[REDACTED]

That concluded, in April I asked Dr. Mary Good, Senior Vice President for Technology of Allied Signal, and Chairman of the National Science Board, to chair a search committee for Erich's replacement. This approach is in accordance with the National Science Foundation's Organic Act, (42 U.S.C. 1864), Section 5(a) which states that "The Director of the Foundation (referred to in this Act as the "Director") shall be appointed by the President by and with the advice and consent of the Senate. Before any person is appointed as Director, the President shall afford the Board an opportunity to make recommendations to him with respect to such appointment.

As part of the search the NAS, NAE, and AAAS were asked to provide recommendations. Recommendations were also received from a number of the major scientific societies and from a wide spectrum of individual scientists and engineers.

From this input the search committee has winnowed the list to four persons. They are the following:

[REDACTED]

[REDACTED]

Walter E. Massey Vice President
University of Chicago

[REDACTED]

(b)(6)

I have known all four of these candidates for many years and would note that two of them, [REDACTED] and Massey, are [REDACTED].

My recommendation is that the President nominate Walter E. Massey to the NSF Director with [REDACTED] as the alternate, if one should be required. I am enclosing their curriculum vitae herewith. [REDACTED] while Massey's field is condensed matter physics.

While I have a high regard for [REDACTED], I do not believe that either would be as successful in leading the NSF in the critical years ahead as would [REDACTED] or Massey.

Massey did his graduate work in condensed matter physics and from 1958 through 1979 pursued an outstanding academic career in this area ending as Professor of Physics and Dean of the College at Brown University. From there he was recruited to be the Director of the Argonne National Laboratory and to an adjunct appointment as Professor of Physics at the University of Chicago. In 1982 he relinquished the Directorship of the Argonne Laboratory to take over as Vice President for Research of the University of Chicago and as the University of Chicago officer responsible for exercising the University's management of the Argonne Laboratory under contract with the U.S. Department of Energy. Concurrently he serves as Chairman of the Board of the Argonne National Laboratory/University of Chicago Development Corporation.

Walter Massey has also played a very active role in U.S. science policy. He served as a member of the National Science Board from 1978 through 1984; he was President and then Chairman of the Board of the American Association for the Advancement of Science in 1988-1990 and has recently been named as President-elect of the American Physical Society.

As his curriculum vita indicates he has had broad experience in a variety of state, national and international activities and serves on a number of major corporate Boards of Directors.

He is widely considered to be the Nation's most distinguished black scientist.

Enclosures

CURRICULUM VITAE -- WALTER E. MASSEY

May 1990

Born: Hattiesburg, Mississippi, April 5, 1938

Marital Status: Married -- Shirley Ann Streeter
Children -- Keith and Eric

Address: 4950 Chicago Beach Drive
Chicago, Illinois 60615

Telephone: Offices -- 312/702-6021 or 708/972-5330

Present Position: Vice President for Research
and for Argonne National Laboratory
and
Professor of Physics
The University of Chicago
5801 Ellis Avenue
Chicago, Illinois 60637

Education:

<u>Institution</u>	<u>Inclusive Dates</u>	<u>Degree and Date</u>
Royal Street High School Hattiesburg, Mississippi	1952-1954	(Did not graduate; entered college from 10th grade.)
Morehouse College Atlanta, Georgia	1954-1958	B.S., Physics and Math, 1958
Columbia University New York, New York	Summer 1958	None
Howard University Washington, D.C.	1959-1960	None
Washington University St. Louis, Missouri	Sept. 1960-Jan. 1966	M.A., Ph.D., January 1966

Ph. D. Research:

Development of a theory and the calculations of the ground state properties of liquid helium.

Thesis Title:

"Ground State of Liquid Helium: Boson Solutions for Mass 3 and 4." Available at Olin Library,
Washington University, St. Louis, Missouri.

Research Supervisor: Dr. Eugene Feenberg
Washington University
St. Louis, Missouri

Fellowships and Scholarships:

1. Ford Foundation Early Admission Scholarship: Morehouse College, 1954
2. National Defense Act Fellowship: Howard University, 1959
3. National Science Foundation Fellowship: Washington University, 1961
4. Academic Administration Fellow: American Council on Education, 1975

Professional Organizations:

1. American Association for the Advancement of Science
2. American Association of Physics Teachers
3. American Nuclear Society
4. American Physical Society
5. New York Academy of Sciences
6. Society of Sigma Xi

Honors and Awards:

1. "Outstanding Educator of America" Award, 1974
2. "Distinguished Service Citation" of the American Association of Physics Teachers (AAPT) for "Exceptional Contributions to the Teaching of Physics," 1975
3. University of Illinois College of Engineering Alumni Honor Award for "Distinguished Service in Engineering," 1988
4. Honorary Fellow Award, Society for Technical Communication, 1989
5. Listed: Who's Who in the East and Who's Who in America
6. Doctor of Science Honorary Degree, Lake Forest College, Lake Forest, Illinois, 1981
7. Doctor of Science Honorary Degree, Williams College, Williamston, Massachusetts, 1981
8. Doctor of Science Honorary Degree, Elmhurst College, Elmhurst, Illinois, 1982
9. Doctor of Science Honorary Degree, Atlanta University, Atlanta, Georgia, 1982
10. Doctor of Science Honorary Degree, Rutgers University, New Brunswick, New Jersey, 1984
11. Doctor of Science Honorary Degree, Morehouse College, Atlanta, Georgia, 1984
12. Doctor of Science Honorary Degree, Marquette University, Milwaukee, Wisconsin, 1987
13. Doctor of Science Honorary Degree, Boston College, Boston, Massachusetts, 1987
14. Doctor of Science Honorary Degree, Northern Illinois University, DeKalb, Illinois, 1989
15. Doctor of Science Honorary Degree, Rensselaer Polytechnic Institute, Troy, New York, 1989

Employment History:

- | | |
|--|---|
| 1. <i>Morehouse College</i>
1958-1959 | Instructor of Physics |
| 2. <i>Atlanta University</i>
Summer 1959 | Instructor of Physics |
| 3. <i>Howard University</i>
Summer 1960 | Instructor of Physics |
| 4. <i>Washington University</i>
1960-1961
January 1966-July 1966 | Teaching Assistant
Postdoctoral Research Associate |
| 5. <i>Argonne National Laboratory</i>
July 1966-June 1968
June 1968-September 1968 | Postdoctoral Fellow
Staff Physicist |
| 6. <i>University of Illinois</i>
September 1968-January 1970 | Assistant Professor of Physics |

Employment History (contd.):

- | | | |
|-----|--|---|
| 7. | <i>Brown University</i>
1970-1975
1975-July 1979 | Associate Professor
Professor of Physics and Dean of the College |
| 8. | <i>Argonne National Laboratory</i>
July 1979-1984 | Laboratory Director |
| 9. | <i>The University of Chicago</i>
July 1979- | Professor of Physics |
| 10. | <i>The University of Chicago</i>
1982-1984 | Vice President for Research and Laboratory
Director, Argonne National Laboratory |
| 11. | <i>The University of Chicago</i>
1984- | Vice President for Research and for Argonne
National Laboratory |
| 12. | <i>Argonne National Laboratory /
University of Chicago Development
Corporation</i>
August 1986- | Chairman of the Board |

Other Relevant Experience:A. National Science and Science Policy Experience:

1. *Commission on College Physics*
Member of study group to develop proposals for the improvement of the teaching of physics in high schools and colleges, 1971, 1972
2. *American Physical Society*
Executive Committee, New England Section, 1971, 1972;
Councillor-at-Large, 1980-1983; Vice President, 1990
3. *American Institute of Physics*
Executive Committee on "Physics in the Predominately Black Colleges," 1971, 1972
4. *Aspen Center for Physics*
Participant, 1971, 1976, 1979
5. *National Academy of Sciences -- National Research Council*
Member, Physics Review Committee, 1972-1975
6. *National Academy of Sciences*
Advisory Committee on Eastern Europe and the USSR, 1973-1976
7. *American Association of Physics Teachers*
Committee on Physics in Higher Education, 1974-1977
8. *National Science Foundation*
Advisory Panel, Division of Physics, 1975-1977
Advisory Committee Directorate for Science and Engineering Education, 1985-1989

National Science and Science Policy Experience (contd.):

9. *National Science Board*, 1978-1984
10. *American Association for the Advancement of Science*
Fellow, 1962; Board of Directors, 1981-1985; President-Elect, 1987-1988;
President, 1988-1989; Chairman, 1989-1990
11. *Scientists' Institute for Public Information*
Board of Trustees, 1989-
12. *President's Council of Advisors on Science and Technology*
Member, 1990-

B. Other Academic and Educational Experience:

1. *Graduate Records Examination Board*
Advanced Physics Examination Committee, 1974, 1975
2. *United States Department of Health, Education and Welfare*
Fund for the Improvement of Postsecondary Education
Board of Advisors, 1976-1979
3. *Association of American Universities*
Energy Advisory Committee, 1979-1980
4. *American Association of Colleges*
Commission on Institutional Development and National Affairs
1979-1981
5. *Science Research Institute, Atlanta University Center*
Advisory Board, 1979-1981
6. *Washington University*
Board of Trustees, 1980-1981
7. *Brown University*
Board of Trustees, 1980-
8. *Northwestern University*
Visiting Committee of the College of Arts and Sciences, 1982-1985
9. *Massachusetts Institute of Technology*
Department of Physics Corporation Visiting Committee, 1982-
10. *Harvard University*
Committee to Visit the Department of Physics, 1985-1989

C. Civic, Cultural and Community Affairs:

1. *Urban League of Rhode Island*
Board of Directors, 1973-1975
2. *KQED Television, Inc., San Francisco*
Project Advisory Committee, 1977-1980

Civic, Cultural and Community Affairs (contd.):

3. *World Book-Childcraft International, Inc.*
Advisory Board, 1979-1982
4. *Chicago Museum of Science and Industry*
Board of Trustees, 1980-1989
5. *Mayor's Task Force on High Technology Development, City of Chicago*
Chairman, 1981-1982
6. *Governor's Commission on Science and Technology, State of Illinois*, 1982-1989
7. *Chicago High Tech Association*
Chairman, Board of Directors, 1984-
8. *Chicago Symphony Orchestra*
Board of Trustees, 1984-1989
9. *Illinois Mathematics and Science Academy (high school)*
Board of Trustees, 1985-88
10. *United Way of Chicago*
Board of Directors, 1985-88
11. *Chicago Council on Foreign Relations*
Board of Directors, 1985-
12. *Institute for Illinois*
Board of Directors and Treasurer, 1986-
13. *Governor's Science Advisory Committee, State of Illinois*,
Executive Committee, 1989-
14. *Illinois Coalition*
Board of Directors, 1989-

D. International Experiences:

1. *American Nuclear Society, Scientific Exchange to the People's Republic of China*,
September/October 1980
2. *United States-South African Leadership Exchange Program, Study of South African Universities, Republic of South Africa*, August/September 1981
3. *Conference on Physics in Latin America, Rio de Janeiro, Brazil -- Planning Committee*,
July/August 1983
4. *United States-South African Leadership Exchange Program -- Council Member*, 1983-1989
5. *American Association for the Advancement of Science, African Regional Symposium on the Role of Scientific and Engineering Sciences in Development -- Co-chairman*, Mbanne, Swaziland, March 1984, and Grand Bassam, Ivory Coast, December 1984
6. *American Association for the Advancement of Science, Project to Strengthen Scientific and Engineering Infrastructure in Sub-Saharan Africa -- Co-chairman*, 1984-

International Experiences (contd.):

7. National Science Foundation -- Advisory Committee on International Programs, 1985-88
8. American Association for the Advancement of Science, Annual Meeting of the Continuing Committee on the Role of Scientific and Engineering Societies in Development, Finland, 1989
9. American Association for the Advancement of Science, Board Planning Meeting for Cooperative Programs Between Soviet Academy of Sciences and the AAAS, USSR, 1989

E. Corporate and Not-for-Profit Organizations:

1. *Analytic Services, Inc.*
Trustee, 1980-1981
2. *Corporation of Woods Hole Oceanographic Institution*
1980-1983; 1986-1989
3. *Research-Cottrell, Inc.*
Board of Directors, 1982-1987
4. *Amoco Corporation*
Board of Directors, 1982-
5. *Continental Materials, Inc.*
Board of Directors, 1982-1990
6. *The First National Bank of Chicago*
Board of Directors, 1983-
7. *Rand Corporation*
Board of Trustees, 1983-
8. *Motorola, Inc.*
Board of Directors, 1984-
9. *Chicago Tribune Company*
Board of Directors, 1987-
10. *MacArthur Foundation*
Board of Directors, 1990-

Withdrawal/Redaction Sheet

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01b. Paper	Curriculum vita (2 pp.)	nd	(b)(6)	

Collection:

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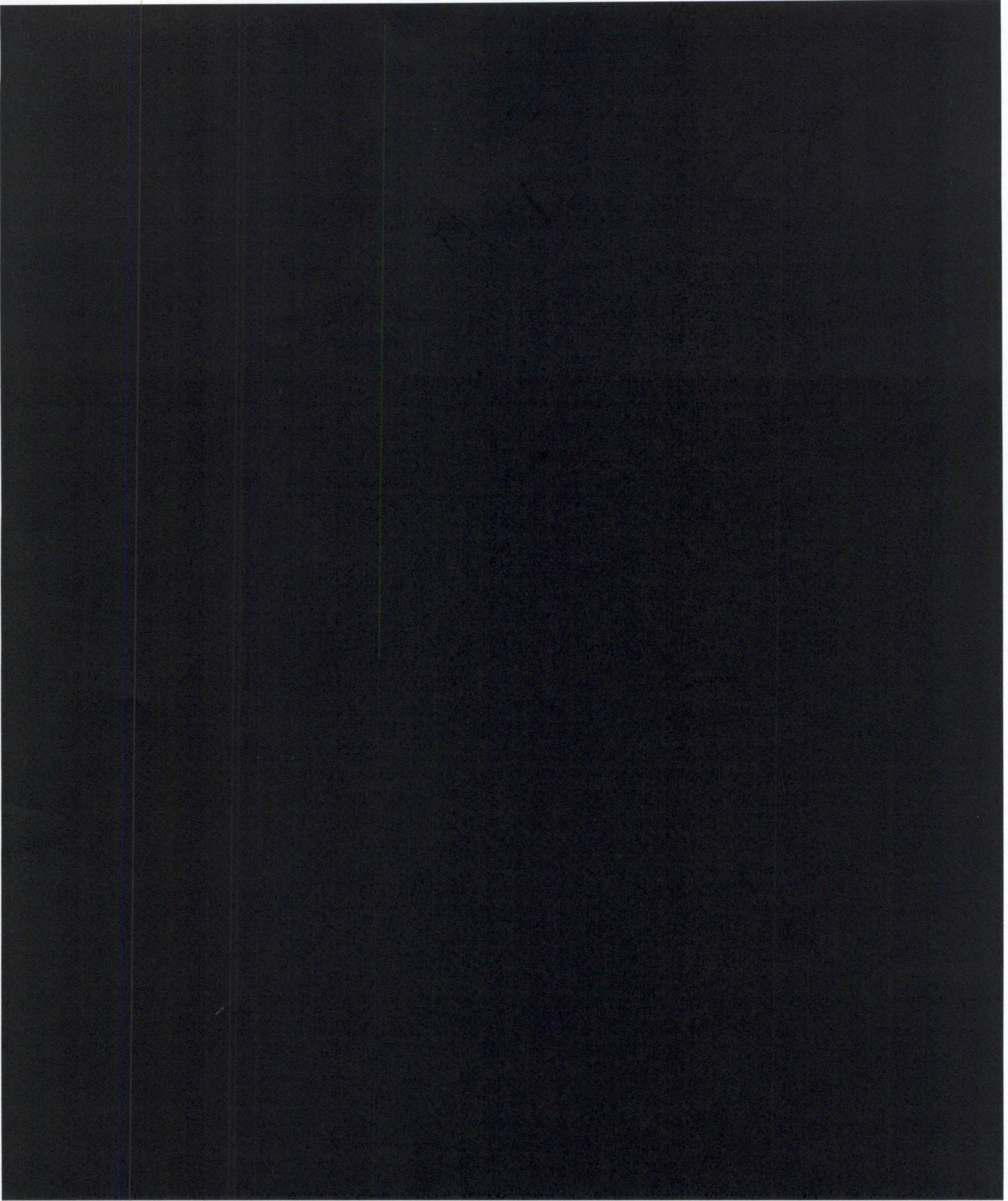
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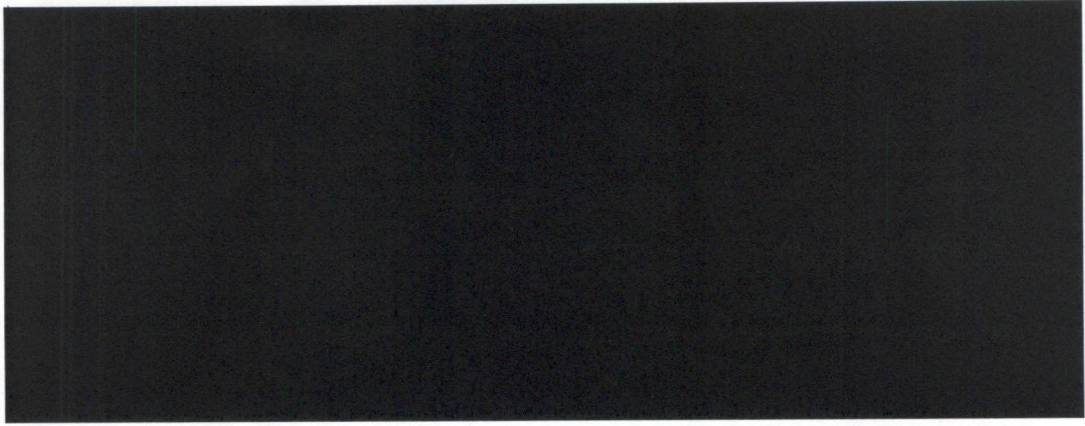
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(b)(6)



(b)(6)



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02. Memo	Allan Bromley to Governor Sununu RE: Associate Director of OSTP For Life Sciences (2 pp.)	6/22/90	(b)(6)	

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THE WHITE HOUSE
WASHINGTON

June 22, 1990

MEMORANDUM TO GOVERNOR SUNUNU

FROM: D. ALLAN BROMLEY *Dulan*

SUBJECT: ASSOCIATE DIRECTOR OF OSTP FOR LIFE SCIENCES

Associate As you know, James Wyngaarden, who has served during this past year as the OSTP Assistant Director for the Life Sciences, has agreed to accept election as the Foreign Secretary of the National Academy of Sciences.

As soon as his election was announced in April I undertook an extensive search for a suitable replacement who could cover the broad range of biological and medical issues that come to OSTP and replace Wyngaarden in such other roles as Chairman of the biotechnology working group for the Competitiveness Council, as an example.

In this search I consulted with the Institute of Medicine, the NAS, FASEB, and the Deans of a number of the major medical schools. One name came to the top of some three quarters of all the lists of possible candidates. That name was:

Donald A. Henderson M.D., M.P.H.
Dean, School of Public Health
Johns Hopkins University, Baltimore

Other persons who were suggested by a number of consultants included:

[REDACTED]

[REDACTED]

[REDACTED]

(b)(6)

(b)(6)

My Associate Directors and I met with all four of these individuals. [REDACTED] subsequently withdrew because of deteriorating health.

We were unanimously in agreement among ourselves and with the majority of our consultants that it would represent a very real coup were we able to bring Henderson to OSTP.

He is considered, worldwide, as the one person who deserves credit for the total eradication of smallpox. He is considered the dean of public health activities in the United States and has the confidence of the biomedical community.

He is a member of the National Academy of Sciences and was awarded the National Medal of Science; this and his other awards, listed on the accompanying curriculum vita, attest to his reputation both nationally and internationally.

The only basis upon which we have a possibility of attracting him is that he is just retiring from the Johns Hopkins Deanship, a position that he has held with distinction since 1977.

My colleagues in OSTP and I have met with him on several occasions for lengthy discussions and are enthusiastic about the possibility of his joining us. He would be a more than worthy successor to James Wyngaarden and would bring a significantly broader range of experience and interest to OSTP.

My recommendation is that the President nominate him as Associate Director for the Life Sciences of the Office of Science and Technology Policy.

APRIL 1990

CURRICULUM VITAE

DONALD AINSLIE HENDERSON

BORN: September 7, 1928
Lakewood, Ohio

OFFICE ADDRESS: 615 N. Wolfe Street
Baltimore, MD 21205
301-955-3540

MARRIED: Nana Irene Bragg
Rochester, New York
September 1, 1951

HOME ADDRESS: 3802 Greenway
Baltimore, MD 21218
301-889-2880

CHILDREN: Leigh Ainslie, 1954
David Alexander, 1956
Douglas Bruce, 1960

EDUCATION:

A.B., Oberlin College, 1950
M.D., University of Rochester School of Medicine, 1954
M.P.H., Johns Hopkins University School of Hygiene and Public Health, 1960

Honoris causa:

M.D., Universite de Geneve (1980)
LL.D., Marietta College (1978)
L.H.D., State University of New York (1981)
Sc.D., University of Rochester (1977);
Oberlin College (1978);
University of Illinois (1979);
University of Maryland (1980);
Yale University (1986)
Albany Medical College (1989)

APRIL 1990

POSITIONS HELD:

Mary Imogene Bassett Hospital, Cooperstown, New York, Intern in Medicine, 1954-1955; Resident in Medicine, 1957-1959
Communicable Diseases Center, Department of Health, Education, and Welfare, Assistant Chief, Epidemic Intelligence Service, 1955-1956; Chief, Epidemic Intelligence Service and Assistant to Chief, Epidemiology Branch, 1956-1957; Assistant Chief, Epidemiology Branch and Chief, Epidemic Intelligence Service, 1960-1961; Chief, Surveillance Section, Epidemiology Branch, 1961-1965; Chief, Smallpox Eradication Program, 1965-1966
World Health Organization, Chief Medical Officer, Smallpox Eradication, 1966-1977
Johns Hopkins University School of Hygiene and Public Health, Dean and Professor of Epidemiology and International Health, 1977-

PROFESSIONAL SOCIETIES:

American Board of Preventive Medicine, 1963-
American College of Epidemiology, Fellow, 1990-
American College of Preventive Medicine, Fellow, 1978-
American Epidemiological Society, 1963-
American Public Health Association, 1956; Fellow, 1961-
American Society of Tropical Medicine and Hygiene, 1981-
Association of Schools of Public Health, Treasurer, 1978; Vice-President, 1981-1982; 1987-1988; President, 1988-
Indian Society for Malaria and Other Communicable Diseases, Fellow, 1975-
International Epidemiological Association, 1965-
Royal College of Physicians (Edinburgh), Fellow, 1986-
Royal Society of Tropical Medicine and Hygiene, Fellow, 1976-

APRIL 1990

SCIENTIFIC AWARDS AND RECOGNITIONS: (United States)

National Medal of Science, 1986
 National Academy of Sciences - Public Welfare Medal, 1978
 Charles S. Dana Foundation Award for Pioneering Achievement in Health, 1986
 American Academy of Arts and Sciences, Fellow, 1986-
 Institute of Medicine, National Academy of Sciences, Member, 1978-
 Albert Schweitzer International Prize for Medicine, 1985
 American College of Physicians - James D. Bruce Memorial Award, 1978
 American Public Health Association - Rosenhaus International Award for Excellence, 1975
 American Academy of Pediatrics - Honorary Fellow, 1980
 Johns Hopkins University - Distinguished Alumnus Award, 1982
 Michigan State University - Walter F. Patenge Medal of Public Service, 1984
 Vanderbilt University School of Medicine Medal, 1990
 Ohio Foundation of Independent Colleges, Hall of Fame, 1990
 Blue Cross-Blue Shield - 50th Anniversary Distinguished Service Award, 1979
 U.S. Association for the United Nations - Joseph C. Wilson Award in International Affairs, 1978
 U.S. General Accounting Office - Comptroller General's Special Recognition, 1986
 U.S. Department of Health and Human Services
 - Superior Service Award, 1964
 - Sustained Superior Performance Award, 1966
 U.S. Public Health Service - Distinguished Service Medal, 1976
 - Commendation Medal, 1962
 Delta Omega Honorary Public Health Society - Member, 1979
 - Outstanding Alumnus Award, 1980
 Sigma Xi - Member, 1956

SCIENTIFIC AWARDS AND RECOGNITIONS: (Other Countries)

The Japan Prize, 1988
 Republic of China - Health Medal of the First Grade, 1988
 Government of Uruguay - Medal of Abnegation, 1988
 Universidad Peruana Cayetano Heredia, Honorary Professor, 1988
 Commemorative Award of Seventh World Congress of the International Physicians for the Prevention of Nuclear War, 1987
 Gairdner Foundation (Canada) - International Award of Merit, 1983
 Royal Colleges of Physicians of the United Kingdom - Faculty of Community Medicine - Honorary Fellow, 1981
 Royal Society of Medicine
 Richard T. Hewitt Award, 1986
 Honorary Member, 1980
 London School of Hygiene and Tropical Medicine and Royal Society of Tropical Medicine and Hygiene - George McDonald Prize and Medal, 1976
 Government of Ethiopia - Medal for Contributions to Health, 1979
 Government of Afghanistan - *Roghtya Neshan* (Health Medal), 1976
 Ernst-Jung Foundation, (Germany) - *Ernst-Jung Preis für Medizin*, 1976
 Government of India - Special Award, 1975
 Indian Society for Malaria and Other Communicable Diseases - Special Award, 1975
 Lahore, Pakistan - Certificate of Merit, 1977

APRIL 1990

AWARD TO WHO FOR SMALLPOX ERADICATION:

Special Albert Lasker Public Health Service Award, 1976

SPECIAL LECTURESHIPS:

- Alumni Reunion Lecture, Oberlin College, 1990
- Cleveland City Club Forum Speaker, 1990
- Vanderbilt University World Health Week, Keynote Speaker, 1990
- Kathryn Boucot Sturgis Lecture, 1990
- Alumni Reunion Lecture, University of Rochester, 1989
- John P. McGovern Lecturer, Baylor College of Medicine, 1989
- Annual Banquet Address, Clinico-Pathological Society of Washington, 1989
- Phyllis Lewander Memorial Lecture - Children's Hospital National Medical Center, Washington, D.C., 1989
- American Pediatric Society - Washington, DC, 1988
- Bloomfield Lecture - Case-Western Reserve University, 1987
- Joseph Mountin Lecture- Centers for Disease Control, 1987
- Agaard Lecture - University of Washington, 1987
- Frontiers of Science Lecture - University of Florida, 1987
- Eighteenth International Pediatric Congress - Keynote Speaker, 1986
- Chief Guest and Keynote Speaker, 30th Anniversary of Indian Public Health Association - Calcutta, India, 1985
- National Convention on the Management of Health Systems - Convention Orator; Jaipur, India, 1985
- P.D. Agarwal Memorial Oration - Calcutta, India, 1985
- Oberlin College Sesquicentennial Speaker - 1983
- Harvard Medical School Bicentennial Speaker - 1982
- Rameshwar Sharma Oration - School of Medicine, Jaipur, India, 1981
- Harben Lecture - Royal Institute of Public Health and Hygiene, London, 1980
- Stephens Lecture - Oberlin, Ohio, 1980.
- V.W. Scully Distinguished Lecture - Hamilton, Ontario, Canada, 1979
- Joseph C. Wilson Lecture - Rochester, New York, 1979
- Julia M. Jones Memorial Lecture - American Lung Association and American Thoracic Society, 1979
- Merck Sharpe and Dohme Lecture - Canadian Public Health Association, Ottawa, Canada, 1977
- James Bordley III Lecture - Mary Imogene Bassett Hospital, Cooperstown, New York, 1977
- Jenner Memorial Lecture - Bristol (UK) Royal Infirmary, 1973
- Commencement and Convocation Addresses:
 - San Diego State University School of Public Health - 1988
 - University of California (San Diego) School of Medicine - 1984
 - Michigan State University School of Medicine - 1984
 - University of Southern California School of Medicine - 1978

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PROFESSIONAL COMMITTEES: (Present)**World Health Organization**

Expert Advisory Panel on Virus Diseases, 1976-

Committee on Orthopoxvirus Infections, 1981-

Consultant Group on Poliomyelitis Eradication, Chairman, 1988-

Pan American Health Organization

Technical Advisory Group on Immunization, Chairman, 1985-

American Journal of Epidemiology,

Board of Overseers, Associate Editor, 1965-1977; Chairman, 1984-

Editorial Advisory Board - Bibliography of Bioethics, 1979-

International Association for Maternal and Neonatal Health, Scientific Council, 1981-

Rotary Foundation of Rotary International, Polio Plus Advisory Committee, 1985-

Government Accounting Office

Advisory Board, Program Evaluation and Methodology Division, 1988-

U.S. Department of State

Advisory Committee on Oceans, Environmental and Scientific Affairs, 1988-

Department of Health and Human Services

National Vaccine Advisory Committee, 1988-1989; Chairman, 1990-

Secretary's Council on Health Promotion and Disease Prevention, 1989-

Association of Academic Health Centers

Task Force on Health Promotion /Disease Prevention, 1989-

"AIDS Patient Care" magazine - Editorial Advisory Panel, 1987-

United Fresh Fruit and Vegetable Association, Scientific Advisory Panel, 1988-

Institute of Medicine, Board on International Health, 1988-

Charles A. Dana Foundation Awards Jury, 1990-

Foundation for Development of International Health (Japan), Scientific Consultant, 1990-

BOARD OF DIRECTORS/TRUSTEES:

Indian Institute of Health Management Research, 1985-

Maryland Society for Medical Research, Inc., 1978-

Population Crisis Committee, 1981-

International Center for Diarrheal Disease Research (Dhaka), 1988-

Medical Alumni Association, Mary Imogene Bassett Hospital, 1989-

BIOGRAPHICAL LISTINGS:

Who's Who in the World

The International Who's Who

Who's Who in America

Who's Who in Frontiers of Science and Technology

American Men and Women in Science: Medical and Health Sciences

Dictionary of International Biography

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PROFESSIONAL COMMITTEES: (Past)**American Public Health Association**

Committee on Hepatitis, Chairman, 1961-1965

Multiple Antigen Committee, 1964-1966

Epidemiology Section Council, 1965-1967

Surgeon General's Advisory Committees on:

Influenza, Secretary, 1961-1963

Measles Vaccines, Secretary, 1963

Immunization Practice, Secretary, 1964-1966

World Health Organization

Special Committee on Measles Vaccine, Consultant, 1963

Scientific Group on Human Virus Vaccines, Member, 1965

Global Commission for the Certification of Smallpox Eradication, 1978-1980

Program Advisory Group for the Prevention of Blindness, 1978-1982

Programme for Research and Training in Tropical Diseases - Scientific and Technological Advisory Committee, 1982-1984

Caribbean Epidemiology Center - Scientific Advisory Committee, 1980-1983

National Research Council, National Academy of Sciences

Board on Science and Technology in International Development, 1981-1983

Committee on Research Grants, 1982-83

National Academy of Sciences, Institute of Medicine,

AID Health Strategy Study, Steering Committee, 1978

Steering Committee for the Study on Clinical Investigations in Developing Countries, 1978-1980

Advisory Committee on Health, Biomedical Research and Development, Chairman, 1981-1983

Steering Committee, Study of Tropical Diseases, 1984-1987

Government Accounting Office

Research and Education Advisory Panel to the Comptroller-General, 1977-1986

Department of Health and Human ServicesPHS Hospitals *ad hoc* Advisory Committee, 1978

Secretary's Committee on Influenza, Vice-Chairman, 1979

National Ethics Advisory Board, 1977-1980

CDC Programs and Policy Advisory Committee, 1978-1980

Immunization Practices Advisory Committee, Centers for Disease Control, 1982-1986

Chairman, Mayor's Task Force on Environmental Carcinogens (Baltimore), 1977-1978

NASA - Planetary Protection Study Group, 1978**Executive Office of the President, Office of Science and Technology**

Task Force for Science and Technology in Foreign Assistance, Chairman, 1980

Advisory Committee on Science, Technology and Development, 1978-1979

Consultant, 1978-1982

Harvard University,

Visiting Committee, University Health Services, 1981-1985

Burroughs-Wellcome Fund - Pharmacoeconomics Awards Committee, 1983-1987

City University of New York Medical School, National Visiting Council, 1986-1989

Institute of Medicine, National Academy of Sciences,

Committee on the Evaluation of Poliomyelitis Vaccine, 1987-88

U.S. Agency for International Development

Research Advisory Committee, 1983-1990

PUBLICATIONS:

More than 100 scientific publications dealing primarily with smallpox eradication, epidemiology and immunization.

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Book

Fenner, F, Henderson, DA, Arita, I, Jazek, Z, and Ladnyi, ID.
Smallpox and Its Eradication, published by World Health
Organization, 1988.

Book-Chapters (BC)

- (1) Karzon, DT, Henderson, DA
Current Status of Live Attenuated Vaccines.
Advances in Pediatrics Volume XIV, 1966, pp. 121-200.
Year Book Medical Publishers, Inc.
- (2a) Henderson, DA
Smallpox.
Maxey-Rosenau Preventive Medicine and Public Health, 10th
edition, edited by Sartwell, P.E.
Appleton-Century-Crofts, 1973, pp. 104-116
- (2b) Henderson, DA
Smallpox.
Maxey-Rosenau Preventive Medicine and Public Health, 11th
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Appleton-Century-Crofts, 1980, pp. 95-110.
- (2c) Henderson, DA
Smallpox.
Maxey-Rosenau Preventive Medicine and Public Health, 12th
edition, edited by Last, J.M. Appleton-Century-Crofts,
1985, pp. 129-138.
- (3a) Henderson, DA
Smallpox.
Epidemiology and Community Health in Warm Climate
Countries. Edited by Russell and Standard. Churchill
Livingstone, Edinburgh, 1976, pp. 160-167.
- (3b) Henderson, DA
Smallpox.
Epidemiology and the Community Control of Disease in Warm
Climate Countries, edited by Robinson. Churchill
Livingstone, Edinburgh, 1985, pp. 249-261.
- (4a) Henderson, DA
Variola and Vaccinia.
Cecil Textbook of Medicine, 16th edition, edited by
Wynngaarden, J.B. and Smith, L.H. W.B. Saunders,
Philadelphia, 1982, pp. 1658-1663.
- (4b) Henderson, DA
Variola and Vaccinia.
Cecil Textbook of Medicine, 17th Edition, edited by
Wynngaarden, J.B. and Smith, L.H. W.B. Saunders,
Philadelphia, 1985, pp. 1724-1728.

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Variola and Vaccina. . . .
Cecil Textbook of Medicine, 18th Edition, edited by
Wynngaarden, J.B. and Smith, L.H., W.B. Saunders,
Philadelphia, 1988 (in press).
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Smallpox: Eradication of a Killer.
Encyclopedia Britannica, Medical and Health Annual -
1979, pp. 125-144.
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Explicit Goals for Prevention and Public Health.
Working for a Healthier America, edited by McNerney,
W.J., pp. 87-94. Ballinger Publishing Co., Cambridge,
1980.
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Lessons from The Smallpox Eradication Experience in Medicine,
Science, and Society, edited by K.J. Issalbacher, John Wiley
and Sons, New York, pp. 715-726.
- (8) Foege, WH and Henderson, DA
Management Priorities in Primary Health Care in Selective
Primary Health Care Intervention, edited by Walsh, J.A.,
Warren, K.S. The University of Chicago Press, Chicago and
London, pp. 313-321.
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Smallpox and Vaccinia in Vaccines, edited by Plotkin, S. and
Mortimer, T., pp. 8-30. W.B. Saunders Company, 1987.
- (10) Warren, KS, Bundy, DAP, Anderson, RM, Jamison, DT, Davis, A,
Senft, A, Prescott, NM, Henderson, DA
Helminth Infections.
Chapter in Evolving Health Sector Priorities in
Developing Countries, December, 1989.

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Scientific Papers

- (1) Armijo, R, Henderson, DA, Timothee, R, Robinson, HB
Food Poisoning Outbreaks Associated with Spray-Dried Milk - An Epidemiological Study.
Am. J. of Public Health 47:1093-1100, 1957.
- (2) Poskanzer, DC, Henderson, DA, Kunkle, EC, Kalter, SS, Clement, WB and Bond, JO
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New Eng. J. Medicine 257:356-364, 1957.
- (3) Clement, WB, Henderson, DA, Lawrence, JW and Bond, JO
Epidemic Neuromyasthenia, An Outbreak in Punta Gorda, Florida - An Illness Resembling Iceland Disease.
J. Florida State Med. Assoc. 45:422-426, 1958.
- (4) Henderson, DA and Shelokov, A
Medical Progress: Epidemic Neuromyasthenia-Clinical Syndrome.
New Eng. J. Med. 260:757-764, 814-818, 1959.
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The Epidemiology of Antibiotic-Resistant Staphylococci in the Community.
Surg. Clinics of North America, 40:971-982, 1960.
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Asian Influenza in the United States, 1957-1958.
Am. J. Hyg. 70:34-50, 1959.
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First International Conference of Live Poliovirus Vaccine, Scientific Publication No. 44, Pan American Sanitary Bureau, 1959, pp. 510-513.
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Monovalent Asian Influenza Vaccine. Evaluation of Its Use during Two Waves of Epidemic Asian Influenza in Partly Immunized Penitentiary Population.
J. Amer. Med. Assoc. 172:1223-1229, 1960.
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Am. J. Pub. Health 53:1623-1629, 1963.
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Am. J. Pub. Health 52 (Supp.):1-3, 1962.

- (11) Guinea, VF, Casey, HL, Ruthig, DW, Henderson, DA, et al.
A Collaborative Study of Measles Vaccines in Five United States Communities.
Am. J. Pub. Health 53:645-651, 1963.
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J. Amer. Med. Assoc. 190:41-48, 1964.
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Am. J. Pub. Health 54:563-571, 1964.
- (14) Henderson, DA
Viral Hepatitis: Experience in the United States.
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Part 2:404-411, 1965.
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Kemp, CH
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Pub. Health Reports 80:60-64, 1965.
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An Outbreak of Hepatitis Traced to Food Contamination.
New Eng. J. Med. 273:188-194, 1965.
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Henderson, DA
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1. Characteristics of Cholera El Tor in Negros Occidental Province, November 1961 to September 1962.
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Henderson, DA
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Montague, T, Dizon, JJ, Henderson, DA
Studies of Cholera El Tor in the Philippines.
3. Transmission of Infection among Household Contacts of Cholera Patients.
Bull. Wld. Hlth. Org. 33:645-649, 1965.
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Montague, T, Dizon, JJ, Henderson, DA
Studies of Cholera El Tor in the Philippines.
4. Transmission of Infection among Neighborhood and Community Contacts of Cholera Patients.
Bull. Wld. Hlth. Org. 33:651-660, 1965.

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Efficacy. II. Serological Studies.
Pediatrics 37:649-665, 1966.
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Am. J. Epidemiology 83:189-195, 1966.
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Surveillance of Poliomyelitis in the United States, 1962-1965.
Pub. Health Reports 82:417-428, 1967.
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the United States, 1963.
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Millar, JD, Henderson, DA
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by Four Statewide Surveys.
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Controlled Double Blind Comparison.
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Central Africa - Theoretical and Practical Approaches and
Problems.
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throughout West Africa.
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Smallpox and Monkeypox in Non-Human Primates.
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Bull. Wld. Hlth. Org. 41:749-760, 1969.
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September, 1969.
Proceedings of Symposium on Smallpox, Yugoslav Academy of
Arts and Sciences, Zagreb, 23-35.
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Freeze-dried Vaccine for the Smallpox Eradication Programme.
Proceedings of Symposium on Smallpox, Yugoslav Academy of
Arts and Sciences, Zagreb (1969), 39-50.
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Tropical Doctor 1:33-35, 1970.
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Smallpox Surveillance in the Strategy of Global Eradication.
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An Airborne Outbreak of Smallpox in a German Hospital and its
Significance with Respect to Other Recent Outbreaks in Europe.
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International Conference on the Application of Vaccines
against Viral, Rickettsial and Bacterial Diseases of Man.
PAHO (Washington) (1971) 139-143.
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Eradication Program.
J. Communicable Dis. 6:155-159, 1974.
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Global Smallpox Eradication Programme.
Swasth Hind 19:116-118, 1975.
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Bull. Wld. Hlth. Org. 53:347-353, 1976.
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The History of Medicine), edited by A.M. Lilienfeld,
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The Saga of Smallpox Eradication: An End and a Beginning.
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American Philosophical Society, 126:461-471, 1982.
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Pediatrics. 61:770-774, 1981.
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Session I: Strategies for Vaccine Delivery: Introduction
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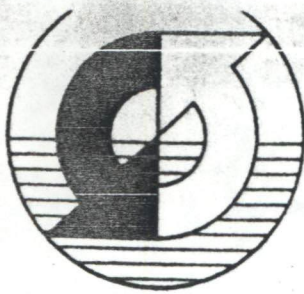
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 Surveillance Systems and Intergovernmental Cooperation
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World Health (October 1973) pp. 8-16.
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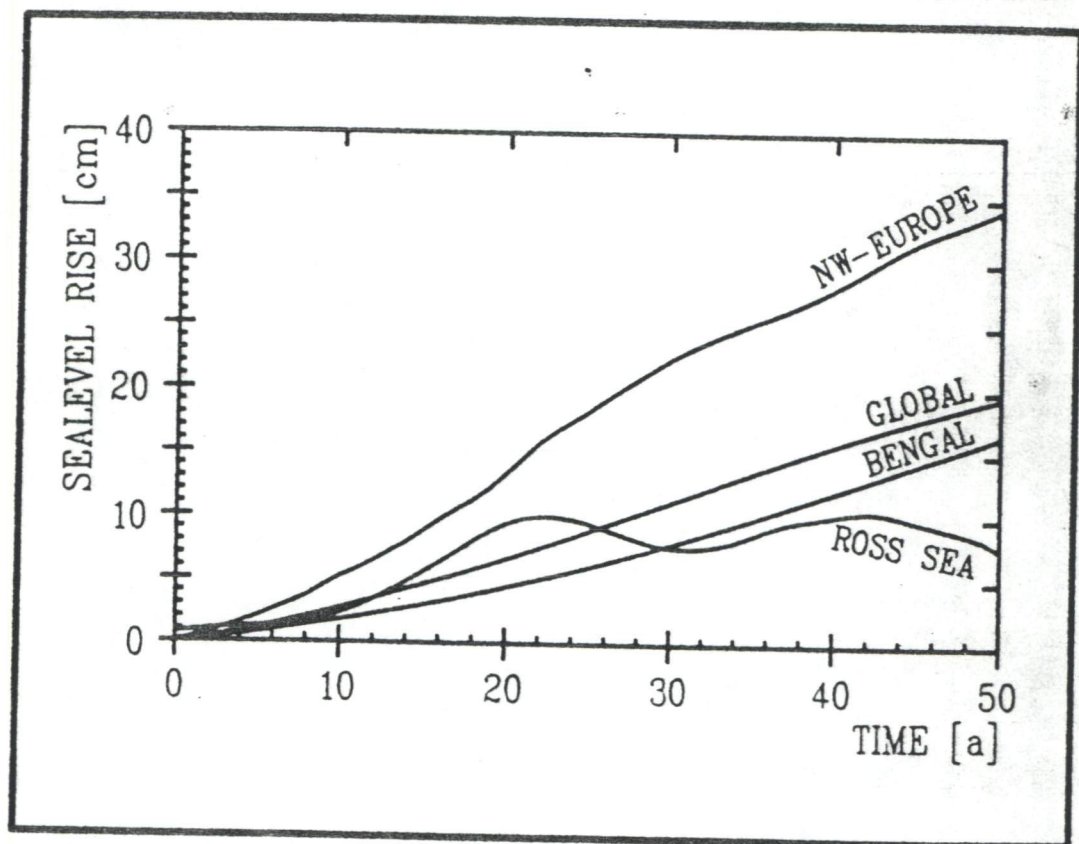
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Max-Planck-Institut für Meteorologie

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OCEAN RESPONSE TO GREENHOUSE WARMING

by

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Ocean Response to Greenhouse Warming

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Abstract

An ocean general circulation model is used to simulate the sea level change resulting from a rapid greenhouse warming. The changes in sea level and sea surface temperature are regionally strongly variable. The projected global mean sea level rise due to thermal expansion alone is 19 cm in 50 years. However, regional values can vary between 40 cm and even a decrease in sea level due to changes in ocean circulation. The simulated oceanic change patterns are compared with measurements.

1 Introduction

An increase in sea level is likely to be a first order impact of greenhouse-gas-induced climate change. Even moderate changes in sea level (less than 50 cm) can have tremendous societal and economic impacts, particularly in heavily-populated regions of the world which are close to sea level. Projecting regional changes in sea level is therefore extremely important.

Several recent studies have considered the transient response of coupled ocean-atmosphere models to time-dependent CO_2 and greenhouse-gas forcing (1,2,3), but have not discussed sea level changes. Virtually all studies which have examined the sea level response have used simple 1-D pure diffusive or upwelling-diffusive models (4,5) in which only thermal expansion is treated. These investigations cannot simulate the regional distribution of sea level change. The only study which has attempted to do this, including both thermal expansion and extremely simplified ocean dynamics, yielded spatially homogenous sea level changes (6). Here we consider both thermal effects and the full dynamic effects associated with changes in oceanic general circulation.

In the present study we isolate the purely oceanic response to a 'pseudo-transient' atmospheric forcing consisting of monthly mean surface air temperature anomalies ($2\times\text{CO}_2$ minus $1\times\text{CO}_2$) derived from atmospheric general circulation model (AGCM) equilibrium response experiments. We examine the robustness of certain features of the coupled models' oceanic response (such as inter-hemispheric asymmetry in the sea surface temperature (SST) changes) in a simpler uncou-

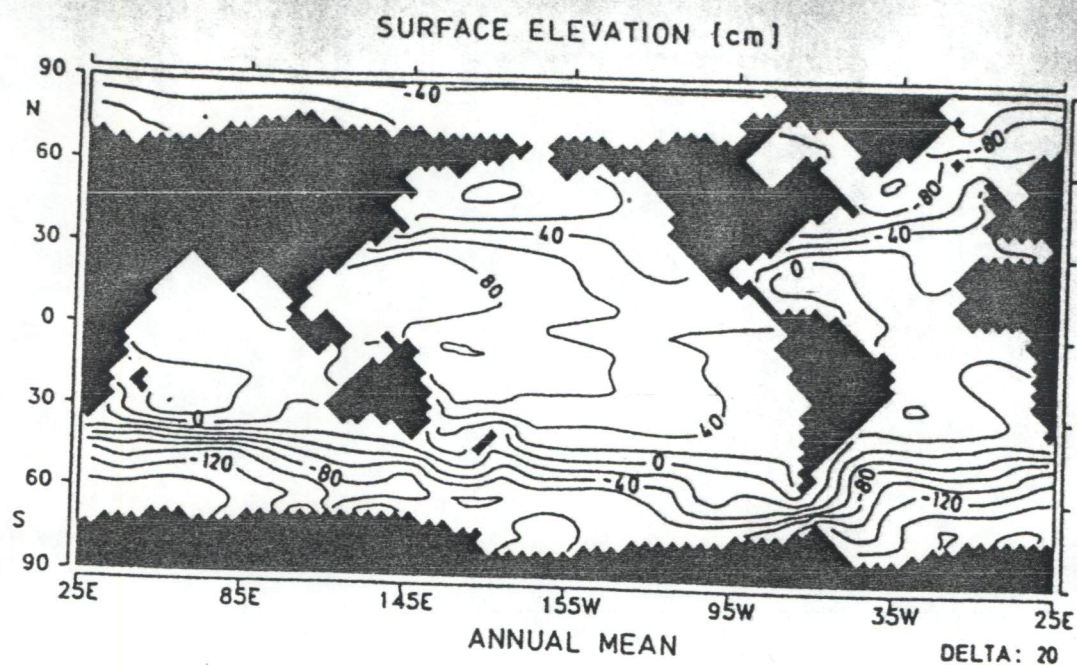


Figure 1a: Annual mean distribution of sea surface elevation of the control experiment.

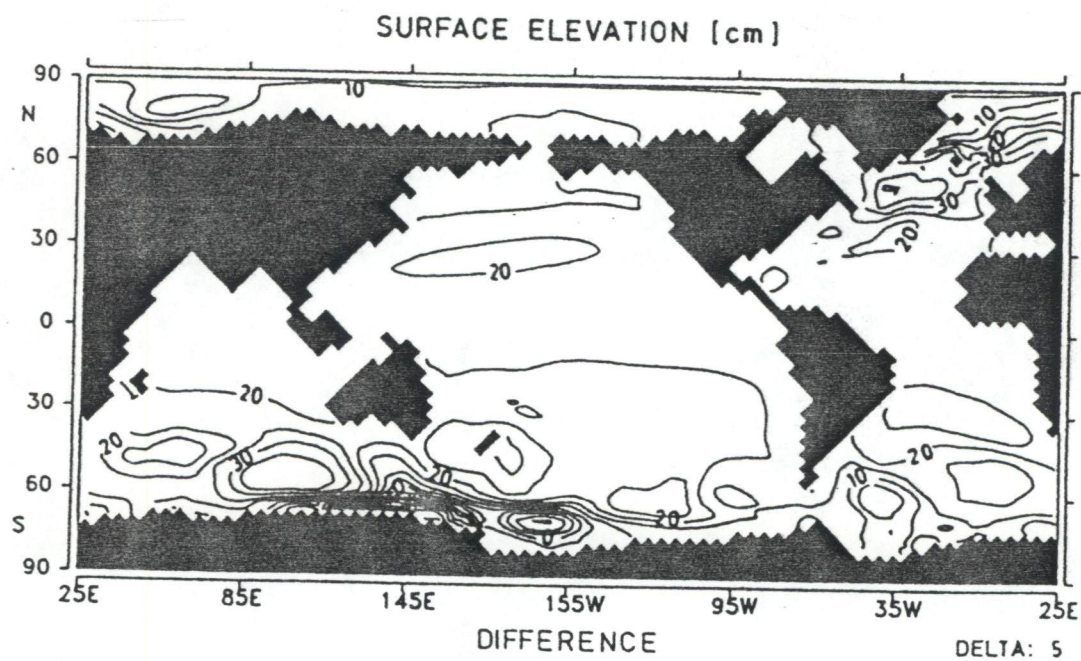


Figure 1b: Pattern of changes in sea surface elevation for year 50 relative to the control experiment. Note that changes in the Ross Sea area are negative.

pled experiment using an ocean general circulation model (OGCM) with realistic thermohaline circulation.

2 The model

We use the Hamburg large-scale-geostrophic OGCM (7). The model is based on the conservation laws for heat, salt and momentum (the latter in a linearized form) and uses the hydrostatic assumption. The flow field is divided into a vertically-averaged barotropic component and the residual baroclinic components. The model has a dynamically active sea surface elevation. Changes in the surface elevation are due to divergence of flow, thermal expansion and fresh water fluxes. The formulation of the model is fully implicit, so that a time step of 30 days can be used, as compared with a few hours typical for explicit integration schemes. A one-layer thermodynamic sea ice model with advection is included.

The horizontal resolution is 3.5×3.5 degrees on an E-type grid (8). The model has 11 vertical layers (centered at 25, 75, 150, 250, 450, 700, 1000, 2000, 3000, 4000 and 5000 m).

The model was spun up from an initially homogeneous state and integrated for 10000 years to steady state with climatological forcing (monthly mean wind stress (9) and air temperature (10) and annual mean climatological surface salinity (11)) coupled to the top layer with Newtonian time constants of approximately 2 months. During the last 500 years of spin up the fresh water fluxes required to restore the salinity to climatology were stored and used as forcing in a control run, for which the surface salinity was no longer prescribed but computed from the fresh water fluxes. Initially the model showed a slight drift with this type of forcing, but after a further 4000 years of integration the model again reached a steady state which was very close to the state attained before switching to fresh water flux forcing.

The model exhibits a realistic mean thermohaline circulation (12) with a flow of 17 Sverdrup (10 tons/sec) of North Atlantic deep water (NADW) leaving the Atlantic at 30°S to the Southern Ocean. At 24°N the strength of the meridional overturning is 20 Sverdrup compared to 17 Sverdrup derived from observations (13). The strength of the Antarctic Circumpolar current (ACC) is 122 Sverdrup, compared to $123 \text{ Sverdrup} \pm 10$ from pressure gauge measurements (14). The annual mean sea surface elevation of the control run is displayed in figure 1a, showing the well-known subtropical gyres and the ACC. The equilibrium circulation fields attained after this procedure were used as initial conditions for the following experiment.

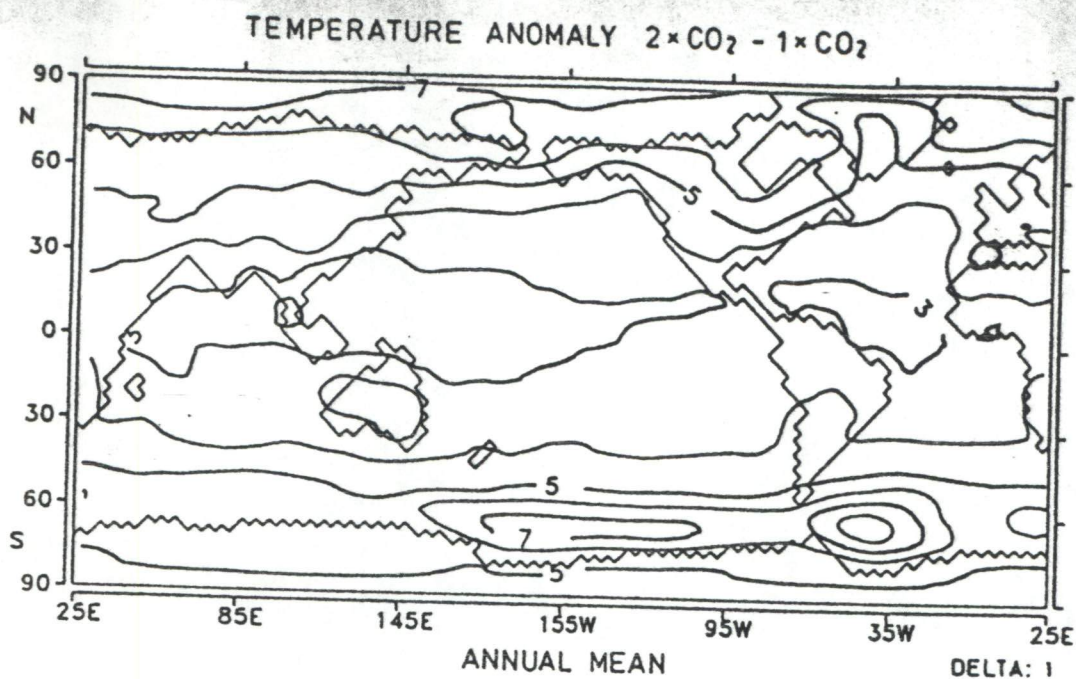


Figure 2a: Pattern of annual mean "model average" surface air temperature anomaly used as forcing for the simulation. The global mean of this temperature anomaly is 4°C (computed over ocean points only). For sources of model data see text.

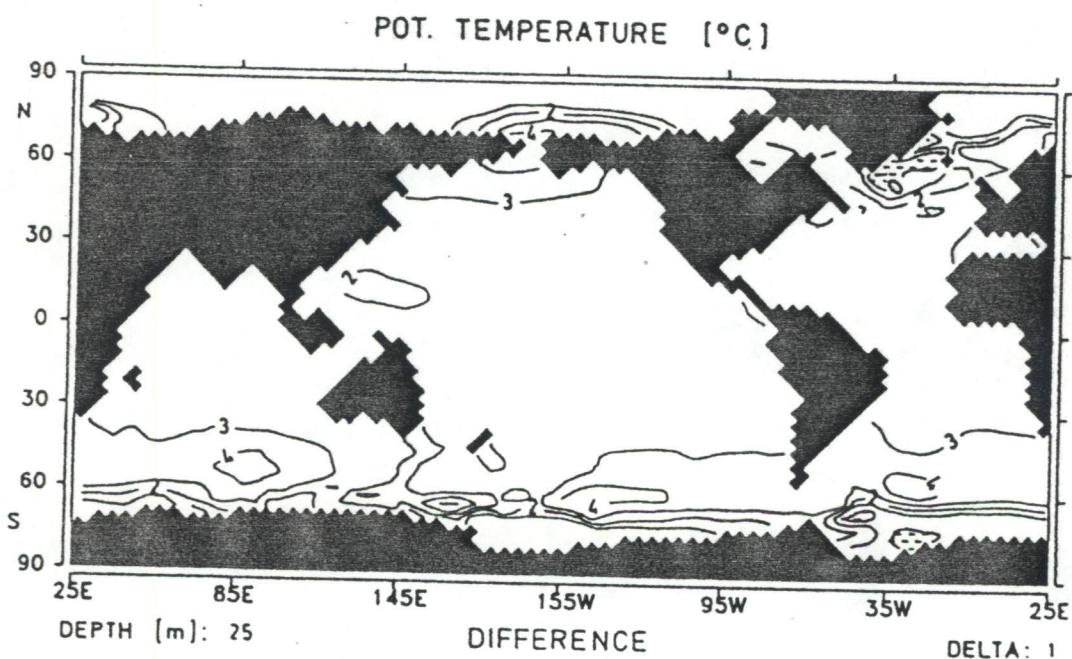


Figure 2b: Geographical distribution of changes in SST in year 50 relative to the control experiment. Shading indicates negative values.

3 The experiment

The ocean model was driven by monthly mean surface air temperature anomalies ($2\times\text{CO}_2$ minus $1\times\text{CO}_2$) derived from four equilibrium response experiments conducted with the Goddard Institute for Space Studies (GISS), Geophysical Fluid Dynamics Laboratory (GFDL), Oregon State University (OSU) and United Kingdom Meteorological Office (UKMO) AGCMs (15,16,17,18). All AGCMs were coupled with mixed-layer oceans. Rather than using results from a single model only, surface air temperature changes for the four models were interpolated to the OGCM grid and averaged. The resulting model average anomaly fields, defined as an annual cycle over 12 months, utilize all published equilibrium response results from models with comparable levels of atmosphere-ocean interaction, except for results from the National Center for Atmospheric Research (NCAR; 19), which were not available.

The patterns of $2\times\text{CO}_2$ minus $1\times\text{CO}_2$ surface temperature changes were very similar for the four models, with poleward amplification of the temperature change in the winter hemisphere due to ice-albedo feedback effects. The major inter-model differences were in the amplitudes of the surface temperature changes. Thus our averaging procedure should not significantly smooth the response patterns while being less biased by individual model sensitivities. The averaged monthly mean anomaly fields were positive everywhere with a mean warming of 4°C over the oceans. The annual mean spatial pattern of the applied temperature anomaly is shown in figure 2a.

We assumed that the model-average patterns are time-invariant, only the amplitude varying during the transition from $1\times\text{CO}_2$ to $2\times\text{CO}_2$. To simulate the expected transient temperature increase in response to time-dependent greenhouse-gas forcing, the amplitude evolution was described by the linear exponential function $f(t) = 1 - e^{-(t-t_0)/a}$ with a time constant $a = 40$ years. The initial time t_0 was set to January 1st for year 0. The time evolution of the mean forcing temperature changes over the oceans is shown in figure 3a; by the year 50 the projected warming is 2.9°C . The forcing due to possible changes in the wind stress and fresh water fluxes relative to the control run was not considered.

The neglect of atmospheric feedback, anomalous wind stress and fresh water flux forcing, and the assumption of time-invariant patterns of the surface temperature change in the forcing fields clearly represent major idealizations in our experimental design. Recent evidence from the few GCM experiments which have been performed with time-dependent greenhouse-gas forcing suggests in fact that important differences may exist between the equilibrium and transient response patterns (1,3,20). We stress that the experiment performed here must be regarded only as a zeroth order test of the sensitivity of the ocean circulation to a specified forcing, and not a prediction. However, we feel that such a test can give valuable insight into typical sea level response properties which may not have been generally appreciated and which would also apply to a more realistic coupled ocean-atmosphere

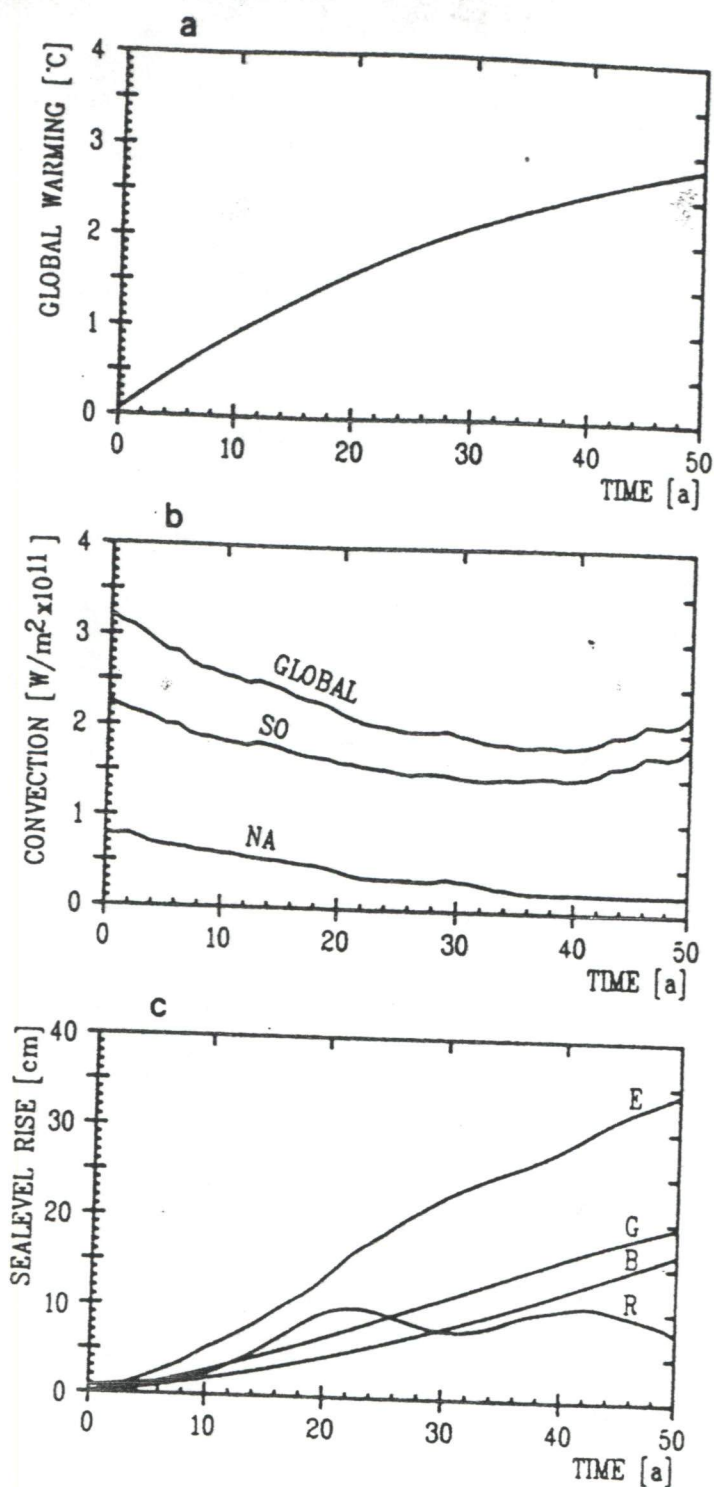


Figure 3a: Time evolution of annual mean globally averaged surface air temperature anomaly imposed on the OGCM.

Figure 3b: Time evolution of global, North Atlantic (NA) and Southern Ocean (SO) deep water formation, measured as rate of loss of potential energy due to convection.

Figure 3c: Sea level rise as a function of time: global mean (G), North West Europe (E), Ross Sea (R) and Bay of Bengal (B).

simulation.

4 Results

The time evolution of the deep water production (measured as the rate of loss of potential energy by convection) is shown in figure 3b. The global deep water production decreases initially and attains a minimum in year 40 (approximately 2/3 of its original value). The fractional reduction is stronger in the North Atlantic than in the Southern Ocean. After the year 40, the global deep water formation increases again. This can be attributed exclusively to increased formation of Antarctic Bottom water (AABW). Generally there is a trend in the deep water formation to a higher fraction of AABW compared to NADW.

Figure 2b displays the changes in SST for the year 50 relative to the control. Although the average surface air temperature anomalies are consistently positive throughout, for all space and time, with the largest values in the winter hemisphere at ice margins (see figure 2a), negative SST anomalies appear in the vicinity of the Irminger Sea and in the Weddell Sea. This pattern of local SST decrease (or much weaker increase than the rest of the ocean) is persistent throughout the entire experiment, with the largest decreases occurring in the Irminger Sea. This is the region in which the model produces most of its NADW in the control run. The result can be attributed to the suppressed production of deep water, and to a resultant reduction of the large convective heat flux from lower layers to the surface, which in the control run was responsible for the relatively warm temperatures in this region. The cooling process is accompanied by a freshening of surface waters in the North Atlantic and higher surface salinities at lower latitudes (figure 4).

A section through the western Atlantic (figure 5) shows the penetration of the warming signal into the deep ocean for the year 50. Except for polar regions, where the suppression of the upward deep convective heat flux is an efficient mechanism for warming the deep ocean, the warming is confined to the upper 1000 m. In the deep Atlantic, a cooling is seen. This is due to changes in the relative contribution of the different deep water sources, with an increased ratio in the production of cold, fresh AABW to warm, salty NADW.

The time evolution of the global mean sea level rise caused by thermal expansion is shown in figure 3c. In year 50 the global mean sea level rise is 19 cm. This is almost completely due to effects above the thermocline. The steady state sea level rise after 2000 years of integration is 51 cm. Whereas the prescribed atmospheric warming in year 50 has reached 72% of the equilibrium value, the response in global mean sea level is only 38.4%. Eighty years were required for the sea level to reach 50% of its equilibrium level, and 210 years to reach 75%. This clearly demonstrates the long time scales involved in the downward penetration of the

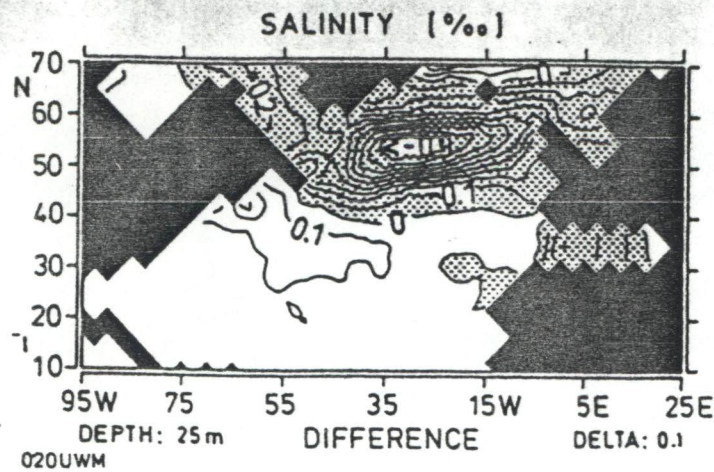


Figure 4: Geographical distribution of changes in the surface salinity in the North Atlantic in year 20 relative to the control experiment. Shading indicates negative values.

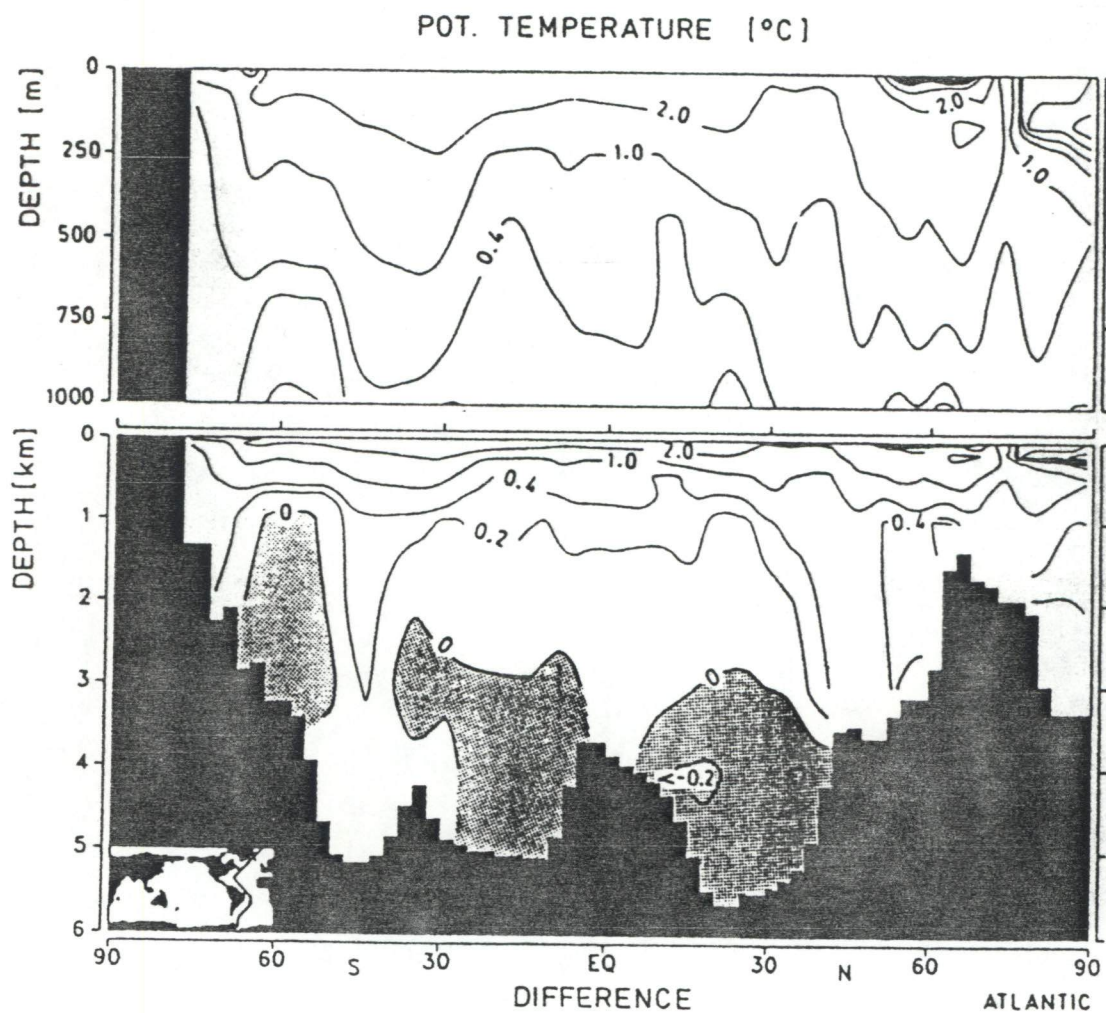


Figure 5: Pattern of change of potential temperature on a meridional section through the Atlantic in year 50 relative to the control experiment. The location of the section is shown in the insert. Shading indicates negative values.

warming signal.

The curves for selected locations differ considerably (figure 3c). The sea level increase of 35 cm in North-West Europe is almost twice as large as the global mean sea level change, while for example the increase in the Ross Sea is much smaller than the global mean. In general, the local sea level changes due to changes in the ocean circulation pattern are of the same magnitude as the changes due to the local thermal expansion, and both vary regionally.

The horizontal distribution of the sea level change for the year 50 is shown in figure 1b. The largest increases in sea level occur in the North Atlantic, as a result of the reduced NADW formation and reduced surface density, and on the northern edge of the ACC, through the southward displacement of the ACC. The increased gradient of sea level across the ACC is due to the larger fraction of bottom water produced at this location, as expressed by the increased vertical homogeneity of water mass properties.

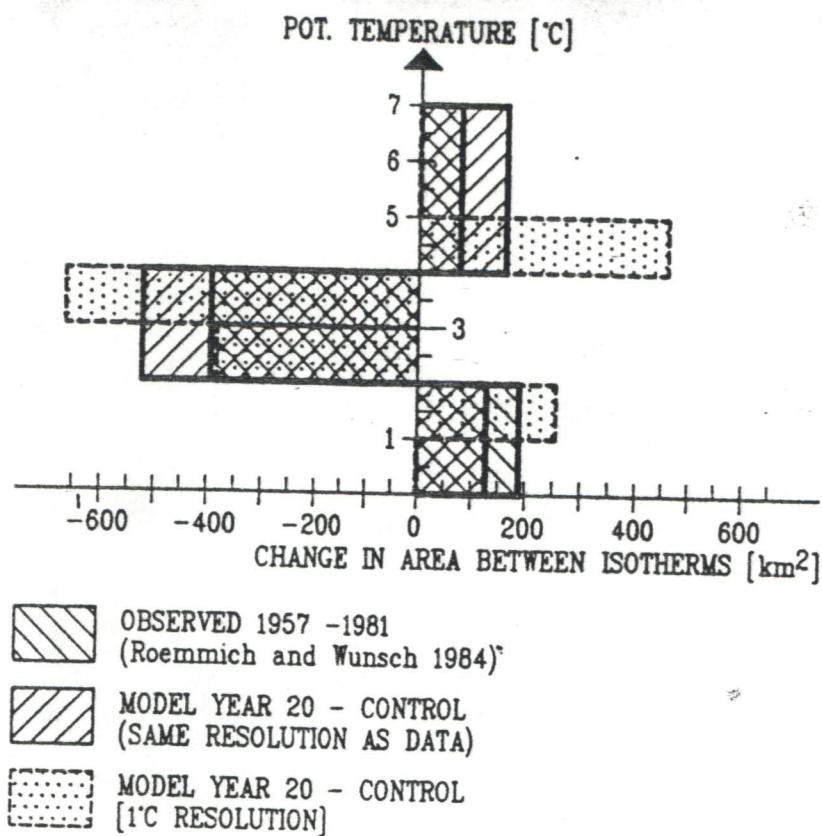
5 Discussion

Coupled ocean-atmosphere models have not been used to investigate the sea level response to greenhouse-gas forcing (1,2,3). We are therefore restricted to comparing our sea level changes with results from simpler models.

Wigley and Raper (21) used an upwelling diffusive energy balance model to estimate the global sea level rise due to thermal expansion alone. For a comparable climate sensitivity ($\Delta T_{2x} = 4.5^\circ\text{C}$) to that used here and "best guess" model parameters, they obtained an estimated global sea-level rise of 23 cm from 1985 to 2050. This is in good agreement with the global mean value obtained here (19 cm after 50 years).

With a simple model based on linear concepts of ventilation of the thermocline and Sverdrup balance, Godfrey et al.(6) arrived at a global sea level rise due to thermal expansion of between 13 and 30 cm after 60 years for an assumed global warming of 3°C in the first 40 years. This model also provides information on the spatial patterns of projected changes in sea-level. The authors obtain an almost uniform increase, with slightly weaker values around Antarctica. The disagreement with our results can be attributed to their neglect of changes in the deep water formation and the associated changes in the convective heat flux, which was found to be the most important effect in our experiment.

The circulation changes obtained here can be compared with those obtained in recent experiments with coupled ocean-atmosphere GCMs. A characteristic feature of our experiment, the cooling or reduced warming of SST in zones where deep water is produced, has been found also in a GFDL coupled AGCM-OGCM simulation with sector geography (1). The model's equilibrium response to CO_2 -



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Figure 6: Observed vs. simulated relative changes in area between isotherms for a zonal Atlantic section at 24°N. In order to normalize the curves to the same bottom water temperature, 1°C has been subtracted from the model data. For the model results, two different resolutions have been plotted.

doubling yielded a cooling around Antarctica, with maxima located at the positions of strongest deep water formation in the control experiment. Due to an almost complete lack of NADW formation in this simulation, however, there was no equivalent cooling in the Northern Hemisphere.

The recent GFDL coupled AGCM-OGCM (3) simulation with a transient CO_2 increase of 1%/year (compound) shows similar results to those obtained in the present simulation. After 60 years of integration, the production of AABW is increased relative to NADW and in the zonal average a cooling is found in the deep ocean centered at 30°N (c.f. our figure 5). There is a relatively weak (compared to the zonal average) warming in the North Atlantic and a cooling around Antarctica. This pattern of SST changes generally corresponds to that obtained here, except for a discrepancy between our strong North Atlantic cooling and the weaker warming in the GFDL experiment. This discrepancy may be related to differences in the production of NADW, which is considerably weaker in the control run of the GFDL experiment than in our control run. The surface freshening which we obtain in the North Atlantic is also present in the GFDL simulation. The authors attribute this to a regional increase in runoff and precipitation minus evaporation, an explanation which cannot apply in our case.

The reduced production of NADW and the related cooling offers a possible explanation for the observed trend of decreasing marine air temperatures in the North Atlantic during the last 20 years, in contrast to the increase in Northern Hemisphere and Southern Hemisphere annually-averaged surface air temperature (22). Support for this conjecture is found in the observation of a strong negative salinity anomaly in the North Atlantic during the seventies. This anomaly was accompanied by suppression of convection and surface cooling (23). During this period the surface salinity further south (at ca. 40°N) was increased relative to the late fifties (24). A similar feature is found in the model response (figure 2b).

The simulated cooling in the deep Atlantic is consistent with the trend inferred from a comparison of temperature data taken in 1957 and 1981 for two transatlantic sections at 24°N and 36°N (25). Figure 6 shows the changes in areal coverage for observed (1981 minus 1957) and simulated (year 20 minus Control) isotherms for the section at 24°N . As the simulated deep water is roughly one degree warmer than the observations, the simulated curve has been reduced to the observed potential temperature in the bottom water by subtracting one degree from the simulated temperatures. The similarity between the two curves is striking.

However, although there are some striking similarities between the observed changes from the late fifties to the seventies and early eighties and the pattern which the model produces in response to the imposed warming, we stress that the observed anomalies could well be generated by other effects - for example, anomalous atmospheric circulation patterns (26). In the eighties the surface salinity in the North Atlantic was returning to its former values (23) and the relative cooling trend abated.

6 Conclusions

Significant changes are induced in the ocean circulation in response to an imposed forcing in surface air temperature corresponding to GCM equilibrium response results for a CO_2 doubling. In regions where deep water formation was formerly active, the projected increase in SST is small or even decreases relative to the zonal average. The formation of NADW is more strongly suppressed than the formation of AABW. The subsequent changes in deep water temperatures and salinities result in an effective cooling of the deep Atlantic. This signal may be useful in the detection of CO_2 -induced climate change, although signal-to-noise problems are even more serious in the deep ocean than for surface data due to the sparseness of observations. Recently, the measurement of acoustic travel times has been proposed as a technique for monitoring deep ocean temperature changes associated with a CO_2 warming (27). The present experiment stresses the need for reliable ocean circulation response studies to compute the magnitude (and even sign!) of the expected temperature changes.

The projected atmospheric warming of ca. 3°C by the year 50 leads to a global sea level rise of 19 cm due to thermal expansion effects alone. Thermal expansion, however, is only one component of the simulated sea level response. Regionally-specific changes in the dynamic topography of the sea surface are of the same magnitude, with the strongest increases predicted in the North Atlantic, and the weakest increases (or even a decrease) predicted for the Ross Sea. Simpler models without a dynamic ocean cannot treat such effects in a realistic way. This shows the need for using an OGCM with realistic ocean circulation (particularly for the deep ocean) to simulate the regional sea-level changes in response to greenhouse-gas forcing.

The decrease in global deep water formation rates must be expected to have a strong impact on the atmospheric CO_2 content. At present, a significant fraction of the emitted CO_2 is transported with the newly-formed deep water to the deep ocean, thus limiting the increase in atmospheric pCO_2 (7). If the efficiency of this marine transport and storage mechanism is reduced, the increase in atmospheric pCO_2 will be amplified. This positive feedback can have important consequences for the evolution of future atmospheric pCO_2 concentrations.

Acknowledgements

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(or octet) rule because there are only eight valence electrons around carbon, their geometries cannot be explained in terms of the tetrahedral sp^3 hybrid orbitals shown in figure *a*. The distances between the gold atoms in the complex are much longer than those in the parent metal and so these compounds cannot be dismissed simply as interstitial metal carbides.

Grohmann *et al.*¹ now demonstrate that the same gold-phosphine unit can also create unusual coordination environments for nitrogen. The ammonium ion, NH_4^+ , is isoelectronic with CH_4 and is also tetrahedral, but the corresponding ions NH_2^{2+} and NH_3^{3+} are unknown. The authors find that the isolobal gold compound $[N(AuPPh_3)_3]^{2+}$ has a trigonal bipyramidal geometry (similar to that in *b*) and briefly mention that another German group have made $[N(AuPPh_3)_6]^{3+}$ which is analogous to structure *c*.

The compound $[C(AuPPh_3)_6]^{2+}$ is very closely related to $[Au(P(tol)_3)_6]^{2+}$ (*tol* = para-tolyl, 4-Me- C_6H_4), which was formulated as an octahedral cluster without an interstitial carbon atom in 1973⁴. But molecular orbital calculations on this cluster⁵ indicated that such a formulation was unlikely because it violated the octet rule. In $[Au_6(P(tol)_3)_6]^{2+}$ there are only four valence electrons involved in bonding because each $AuP(tol)_3$ fragment contributes one electron and the cluster carries a total charge of 2+. I proposed in 1976 that if this compound were reformulated as $[C(Au(P(tol)_3)_6)]^{2+}$ the additional four electrons donated by the carbon would make it conform with the requirements of the octet rule. The work of Schmidbaur's group has realized this theoretical prediction and confirmed that $[Au_6(P(tol)_3)_6]^{2+}$ is more correctly formulated as $[C(AuP(tol)_3)_6]^{2+}$. So, although these compounds do not conform to the rigid principle that all carbon atoms must have four tetrahedral bonds, their formulae can easily be predicted within a more delocalized description of the bonding derived from molecular orbital theory. New theoretical calculations⁶ have defined the closed shell requirements of analogous compounds with two carbon atoms at their centre. It will be interesting to see whether these predictions turn out to be as accurate as the previous ones. □

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Taking a cool look at iron

Anthony G. Davies

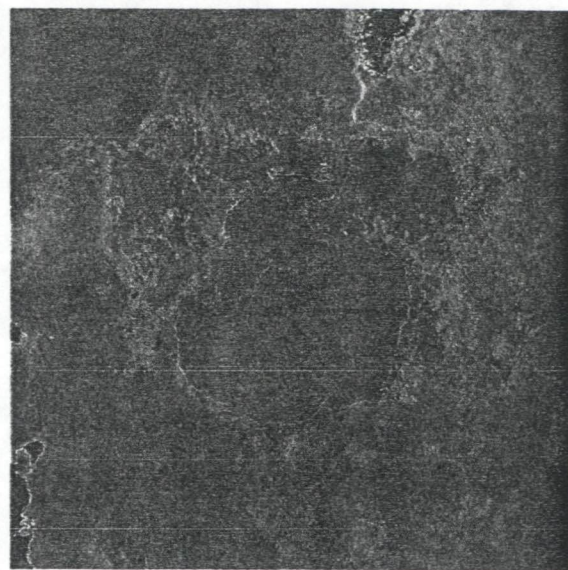
THE rate of photosynthetic carbon fixation by marine phytoplankton is normally controlled by light, temperature and the 'fertilizers' nitrate, phosphate and (for diatoms) silicate. But results of a study by Martin *et al.*, reported on page 156 of this issue¹, suggest that in the open Antarctic Ocean photosynthesis is restricted by a shortage of iron. Iron is a particularly important micronutrient because it is instrumental in the biosynthesis of chlorophyll, and is a main component of ferredoxin which facilitates the intracellular transfer and storage of photosynthetically incorporated energy. Martin *et al.* speculate that, in glacial periods of the Earth's history, iron transported to the Antarctic in wind-borne dust from other continents may have alleviated the iron deficiency. This, they argue, could have stimulated phytoplankton growth thereby increasing the amount of carbon dioxide drawn into the ocean from the atmosphere and contributing to global cooling.

The Antarctic Ocean is unusually rich in nutrients. Concentrations of nitrate, phosphate and silicate are 15–30, 1–2 and 40–90 μmol per kg sea water, respectively² (up to three times the corresponding maximum concentrations in the Atlantic water entering the English Channel). On the other hand, chlorophyll *a* concentrations (measures of the phytoplankton biomass) are low (0.1–1 μg per kg sea water³); with a conservative estimate of 1 g chlorophyll *a* per g atom nitrogen in phytoplankton⁴, consumption of the nitrate in a bloom would be expected to produce at least 15 μg chlorophyll *a* per kg sea water. Similarly, carbon fixation — typically 0.1 g carbon $\text{m}^{-2} \text{d}^{-1}$ (ref. 3) — is as slow as that in severely nutrient-depleted oligotrophic regions of the Earth's oceans.

It was suggested as long ago as 1942 that the high productivity of the coastal areas relative to the open Antarctic Ocean is due to the presence of iron or manganese derived from the land⁵. Most of the subsequent attempts to demonstrate that a shortage of trace elements limits phytoplankton productivity have been inconclusive, mainly because of problems in obtaining uncontaminated samples of sea water. When anticontamination techniques have been used, some metal concentrations in the oceans have been shown

to be less than previously believed⁶. In particular, for the Gulf of Alaska, another nutrient-rich region, iron concentrations are low enough to limit phytoplankton growth^{7,8}. With their new study, Martin *et al.* now extend these results to the Antarctic Ocean.

Iron in sea water is present mainly in colloidal-sized particles of aged hydrous ferric oxide, essentially finely dispersed rust. On the basis of its solubility, the concentration of iron in true solution



False colour satellite image of Antarctic Ocean's summer phytoplankton distribution (red, most dense; blue, least dense).

should be less than 0.1 nmol per kg sea water⁹. Martin *et al.* find that 'dissolved iron' concentrations for the Gulf of Alaska⁸ and the open Antarctic Ocean¹ are mostly higher, especially in the deep water. Here the authors use the term 'dissolved' to describe the fraction of iron that passes through 0.4- μm pores of a polycarbonate membrane filter. Whether this iron is truly in solution is central to the debate because there is uncertainty over whether phytoplankton can assimilate iron directly from particles. Although some species produce siderophores — chelating substances with high affinities for iron — to mobilize iron from particles¹⁰ adhering to cell surfaces, it is believed that phytoplankton incorporate only soluble iron produced by the dissolution of the particulate form¹¹.

Martin *et al.* give no information on total particulate iron in the Antarctic Ocean. In the Gulf of Alaska, concentrations of iron up to 2.4 nmol per kg sea water were present in the top 100 m (ref. 8). Most of this was refractory (unleachable even by 25 per cent acetic acid), so it is not a large source of iron for phytoplankton. The atmosphere therefore

probably supplies the iron necessary for maintaining the little growth actually occurring^{7,8}. It is not clear, though, why the biological availability of aeolian iron settling on the ocean should be any greater than that already in it. In any case, the remoteness of the Antarctic Ocean from the continents results in very low deposition rates, unless, as postulated for the glacial periods, unusual weather conditions prevail⁷.

Martin *et al.* hint at the possibility of counteracting global warming by using iron fertilization of the Antarctic Ocean to stimulate phytoplankton growth and thus increase the removal of carbon dioxide from the atmosphere. Assuming (1) that the volume of illuminated nutrient-rich water in the Antarctic Ocean is 3.2 million km³, (2) that the nitrate concentration is 25 µmol per kg sea water, and (3) the Redfield value of 6.6 for the carbon to nitrogen atomic ratio in phytoplankton, use of all the nitrate should draw down 6.4 × 10¹⁰ tonnes of carbon (as carbon dioxide) from the atmosphere. This is roughly the same as the annual input of carbon to the atmosphere as a result of fossil-fuel consumption and deforestation¹². Much of the fixed carbon would initially be carried down into deeper water in moribund phytoplankton and zooplankton faeces.

ASTROPHYSICS

Astronomical jet engines

Philip Hughes

OBSERVATIONS made over the past two decades have shown that a remarkable number of astronomical objects display jets — apparently well-collimated (beam-like) outflows of mass and energy¹⁻³. Such flows are associated with active galaxies (and perhaps our own Galaxy), young stars and stellar remnants such as neutron stars. They present the theorist with many challenges, not least of which is to explain their initial collimation. The great majority of current models invoke a disk or torus, tied gravitationally to some massive body, and the collimation is a consequence of a 'funnelling' of material along the system's rotation axis — either by the disk material, or an associated magnetic field. In a novel approach to this problem described on page 136 of this issue, Bell⁴ suggests that collimation might be achieved by the anisotropic propagation of radiation through the environment of a 'central engine'.

In early models⁵, jets resulted from the formation of bubbles of hot plasma, each with a radius of tens of light years, breaking out of an active galactic nucleus along 'the path of least resistance', namely, the rotation axis of the system. But at that time radio interferometers such as the Very Large Array (VLA) and the Multi-Element Radio-Linked Interferometer

There, decomposition of the organic matter and movement of the deep Antarctic water northwards to warmer areas would eventually return the carbon dioxide to the atmosphere. The effectiveness of such a project would clearly depend on the time-scales of these processes — not to mention a method for uniformly dispersing at least a million tonnes of iron in a usable form. □

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Network (MERLIN) had yet to provide the astronomical community with the images (see Fig. 1) that now form the observational core of the field, and intercontinental baseline interferometry had yet to reveal a direct link between intergalactic-scale jets and their associated galactic nuclei. With these advances came the realization that extragalactic jets must originate on scales much smaller than previously imagined.

It has long been realized that the accretion of matter by any object must involve the formation of an accretion disk or torus. Infalling material will possess significant angular momentum, which must be transported away from the inflow by viscous or magnetic stresses in the disk. Although many models assume that the disks are geometrically thin, general arguments suggest that they will become 'bloated'; if the mass accretion rate is low, the disk density will be low, and the disk might not be able to radiate away the energy released by the stresses that enable the transport of angular momentum. The result is a high internal ion pressure which gives rise to an 'ion-pressure-supported torus'. But the survival of such a structure depends critically on whether or not some plasma process can couple the ions and

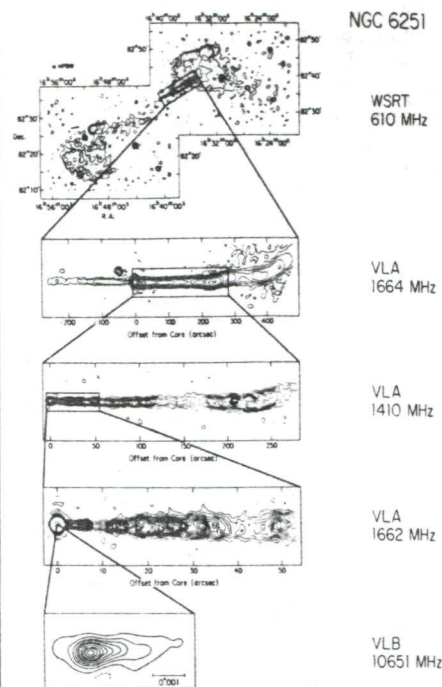


FIG. 1 Maps of the galaxy NGC6251 showing contours of radio brightness at a range of linear scales¹. The structure in the top panel spans several million light years — much larger than the associated optical galaxy; (whereas the lowest panel covers only a few light years). The 'jet' may be traced continuously from intergalactic to nuclear scales. (Courtesy of A.H. Bridle¹.)

electrons despite the low density — if coupling occurs, the ions' energy can be transferred to the electrons, radiated away, and the disk will not inflate. If the mass-accretion rate is high, the disk density will be high, and the disk will radiate strongly. But in this case, the radiation pressure will cause a bloating of the structure and so a 'radiation-pressure-supported torus' will form. It has become clear that such tori may be unstable⁷ and it is quite possible that the same will be true for ion-pressure-supported tori.

To compensate for the uncertainty over the stability of different structures, theorists have constructed models for the generation and collimation of energy for *all* of the recognized classes of disk structure. For geometrically thin disks, collimation can be achieved through the action of a large-scale magnetic field threading the disk, or through the influence of a wind from the upper and lower surfaces of the structure. Particles trapped in the 'funnel' of a radiation-pressure-supported torus are accelerated by the outwardly directed radiation pressure (although the effectiveness of this process seems to be severely limited). In contrast, the inner edge of an ion-pressure-supported torus can sustain electric currents whose associated magnetic field can thread the event horizon of the putative central black hole of an active galaxy and extract its rotational energy (see Fig. 2).

Disks (thick or thin) are natural candidates for the energy-generating and colli-

sian region would have encountered the prominent Arnhem Land escarpment on moving inland. Malakunanja II occupies a strategic location along its base and may have been brought into use within a few thousand years of first landfall. Any delay is probably accommodated within the estimates of uncertainty about the TL dates. The absence of artefacts in deposits older than 60 kyr at this key site suggests an upper limit on the time of arrival of modern humans in Australia. □

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Iron in Antarctic waters

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WE are testing the hypothesis that Antarctic phytoplankton suffer from iron deficiency^{1–3} which prevents them from blooming and using up the luxuriant supplies of major nutrients found in vast areas of the southern ocean. Here we report that highly productive⁴ ($\sim 3 \text{ g C m}^{-2} \text{ day}^{-1}$), neritic Gerlache Strait waters have an abundance of Fe (7.4 nmol kg^{-1}) which facilitates phytoplankton blooming and major nutrient removal, while in low-productivity⁴ ($\sim 0.1 \text{ g C m}^{-2} \text{ day}^{-1}$), offshore Drake Passage waters, the dissolved Fe levels are so low ($0.16 \text{ nmol kg}^{-1}$) that the phytoplankton are able to use less than 10% of the major nutrients available to them. The verification of present-day Fe deficiency is of interest as iron-stimulated phytoplankton growth may have contributed to the drawing down of atmospheric CO_2 during glacial maxima^{2,3}; it is also important because oceanic iron fertilization aimed at the enhancement of phytoplankton production may turn out to be the most feasible method of stimulating the active removal of greenhouse gas CO_2 from the atmosphere, if the need arises (J.H.M., manuscript in preparation).

Seawater samples were collected using Teflon-coated, 30-litre Go-Flo bottles suspended on Kevlar line. After filtering through $0.4 \mu\text{m}$ Nucleopore filters, metals were pre-concentrated from the water by organic extraction⁵ or, in the case of Mn, Chelex-100 ion exchange⁶. Small chunks of floating ice were gathered and placed in acid-cleaned plastic bags. After allowing the outer surfaces to melt away, the remaining ice was rinsed with Milli-Q water; meltwater was then collected in bottles and acidified with 4 ml of 6M HCl l^{-1} . As the ice samples were not filtered, the values reported here represent the metals dissolved in the melted water plus the metals that dissolved from particulates when the

acid was added and pH lowered to ≈ 1.9 – 2.0 . Analyses were performed by graphite furnace atomic absorption spectrophotometry. All procedures were carried out using stringent anti-contamination techniques⁷.

In the offshore waters of the Drake Passage (Station 2), Fe concentrations in 10 samples ranged from $0.16 \text{ nmol kg}^{-1}$ near the surface to $1.55 \text{ nmol kg}^{-1}$ at 1,850 m (Table 1). However, when the Fe data were plotted against depth, a 'saw-toothed' profile was observed. It was subsequently determined that in spite of rigorous cleaning, all samples taken from Go-Flo bottle No. 1 had an extra half nmol or so of Fe as well as excess Mn and Co. Nevertheless, the five remaining 'clean' Drake Passage samples are sufficient for initial comparisons of concentrations with those from other offshore waters with an excess of major nutrients, such as the Gulf of Alaska, as well as comparisons with Antarctic neritic waters, such as those from the Gerlache Strait.

Very similar Fe depth distributions were observed in the Drake Passage and the Gulf of Alaska (Ocean Station 'PAPA'; 50°N ; 145°W), that is, very low (≈ 0.10 – $0.16 \text{ nmol kg}^{-1}$) surface values and increasing concentrations with depth (Fig. 1). As was the case with the Alaska data, increasing Fe values in Drake Passage more or less go along with increasing major nutrient concentrations and decreasing oxygen levels (Table 1); there are not enough data for meaningful regression analysis, however.

Surface Co concentrations ($\approx 25 \text{ pmol kg}^{-1}$) were about the same in both regions; however, the subsurface maximum found in Alaska was not observed here. The Mn maximum commonly found in association with northeast Pacific oxygen minima was also missing (Fig. 1), as would be expected, as subsurface Drake Passage oxygen concentrations do not fall below $180 \mu\text{mol kg}^{-1}$. The surface Mn concentration, $0.08 \text{ nmol kg}^{-1}$, is markedly lower than that observed at 'PAPA' ($0.52 \text{ nmol Mn kg}^{-1}$). Depth profiles of other elements such as Cu, Cd and Zn (Table 1) were similar to those observed in the northeast Pacific.

Neritic Gerlache Strait concentrations of Fe and Mn were 50–60 times higher than those measured in the open-ocean waters of the Drake Passage (Table 1, Fig. 2). Assuming that the Fe requirement of phytoplankton in relation to nitrogen is about 5000N:1Fe (ref. 2), the $7.4 \text{ nmol Fe kg}^{-1}$ is more than enough to support the removal of the $\approx 24 \mu\text{mol NO}_3 \text{ kg}^{-1}$ occurring in the Gerlache. Clearly, there is no Fe limitation, a fact that we believe helps to explain the very high productivity rates reported here ($3 \text{ g C m}^{-2} \text{ day}^{-1}$) (ref. 4) and in other shallow southern ocean coastal regions that should be equally rich in Fe (for example, South Georgia⁸ and Deception Island⁹).

In contrast to Fe-rich, shallow, inshore waters, it is apparent that very little Fe is available in offshore Drake Passage waters. For example, if we use an upwelling rate of 0.25 m day^{-1} (ref. 9), the NO_3 upwelling to the surface each day ($25 \text{ mmol NO}_3 \text{ m}^{-3} \times 0.25 \text{ m day}^{-1} = 6.25 \text{ mmol m}^{-2} \text{ day}^{-1}$) would be enough to support rates of new phytoplankton productivity of the order of $40 \text{ mmol C m}^{-2} \text{ day}^{-1}$ ($6.25 \text{ mmol NO}_3 \times \text{C:N Redfield ratio of } 6.6$). With the same upwelling rate, and assuming a phytoplankton C:Fe demand ratio of 33,000:1 (ref. 2), the $\approx 0.10 \mu\text{mol Fe m}^{-3}$ upwelling with the NO_3 would support only about $1 \text{ mmol C m}^{-2} \text{ day}^{-1}$. Even using the highest C:Fe ratio¹⁰ for iron-starved phytoplankton (100,000:1) would result in little more than $3 \text{ mmol C m}^{-2} \text{ day}^{-1}$; that is, less than 10% of the carbon that could be fixed with the upwelled nitrogen.

Clearly, insufficient Fe is introduced by upwelling; and as this station is well offshore (230 km from the Antarctic Peninsula), the Fe necessary for phytoplankton growth would have to come from an alternative source such as fallout of atmospheric dust. But, this region is known for having the lowest atmospheric dust loads in the world: Prospero¹¹ reports only 0.5 ng Fe for the South Pole in comparison to 9 and 90 ng Fe m^{-3} for offshore islands such as Oahu and Bermuda.

The low rates of atmospheric dust input are exemplified by the surface Mn concentration observed at this station,

TABLE 1 Hydrographic, nutrient and trace metal data from the March/April 1989 Polar Duke cruise

Depth (m)	Potential temperature (°C)	Salinity (‰)	σ_θ (g l ⁻¹)	O ₂	NO ₃	PO ₄	SiO ₃	Fe	Mn	Co	Cu	Cd	Zn
Station 1, 56°38'S; 65°20'W, 27 March 1989, North Drake Passage													
50	6.54	34.035	26.72	274	23.0	1.60	2.0	0.16	0.26	27.1	0.71	0.26	0.24
Station 2, 60°46'S; 63°26'W, 28 March 1989, South Drake Passage													
30	2.97	33.798	26.93	314	24.8	1.78	8.8	0.16	0.08	25.4	0.97	0.28	0.63
60	2.96	33.802	26.93	315	25.5	1.76	12.3	(0.52)	(0.20)	(43.3)	1.05	0.28	0.30
110	-0.34	33.928	27.26	341	29.3	2.12	25.7	0.10	0.21	25.8	1.12	0.56	1.49
200	1.51	34.250	27.41	300*	33.9	2.39	51.7	(0.85)	(0.45)	(56.3)	1.46	0.75	3.86
300	1.89	34.399	27.50	225*	35.1	2.54	64.7	0.26	0.25	28.6	1.52	0.81	4.74
400	2.05	34.491	27.56	200*	35.5	2.56	70.2	(0.88)	(0.48)	(47.8)	1.71	0.80	5.10
550	2.11	34.588	27.63	180*	35.4	2.55	89.8	0.40	0.29	27.4	1.68	0.77	5.25
1000	1.92	34.703	27.74	180*	33.3	2.42	96.0	(0.88)	(0.49)	(40.1)	1.90	0.70	5.46
1420	1.56	34.723	27.78	185*	30.3	2.28	101.0	0.76	0.31	21.1	2.07	0.66	5.67
1850	0.80*	34.713*	27.86*	205*	31.6	2.40	108.0	(1.55)	(0.77)	(63.8)	2.38	0.66	6.34
Station 3, 64°55'S; 63°19'W, 1 April 1989, Gerlache Strait													
15	0.92	33.641	26.95	317	23.8	2.19	74.3	7.40	5.05	82.0	2.24	0.56	4.90
50	1.05	33.865	27.13	310	22.9	2.29	81.5	4.70	4.19	58.7	2.09	0.60	5.10
200	0.31	34.389	27.60	272	30.7	2.65	94.0	6.85	3.86	82.0	2.16	0.70	5.90
ice	—	—	—	—	—	—	—	25.9†	—	56.6	0.02	0.02	—

Values for O₂, NO₃, PO₄, SiO₃ are given in $\mu\text{mol kg}^{-1}$, Fe, Mn, Cu, Cd, Zn in nmol kg^{-1} , Co in pmol kg^{-1} .

* Data estimated from GEOSECS Station 78, 61°3'S; 62°58'W, 3 January 1973 (ref. 20). † Total dissolvable Fe. () Contaminated; all taken from Go-Flo No. 1. σ_θ is the density of sea water in g l^{-1} based on salinity and potential temperature.

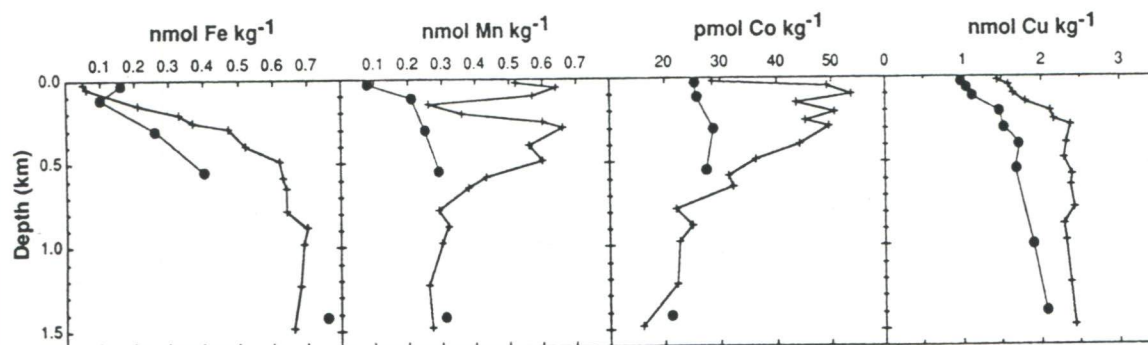


FIG. 1 Drake Passage (Station 2) dissolved Fe, Mn, Co and Cu concentrations

(●) compared with those from the Gulf of Alaska (+) Station 'PAPA' (ref. 2).

0.08 nmol kg^{-1} . In their comprehensive study of Mn in Pacific Ocean surface waters, Klinkhammer and Bender¹² noted that the correlation between Mn and ²¹⁰Pb suggested aeolian control of surface ocean Mn. They also reported that Mn concentrations were lowest in the Southern hemisphere: 0.3 nmol kg^{-1} , a value that is about four times higher than the 0.08 nmol kg^{-1} we measured in the Drake Passage. To our knowledge, this Mn concentration is the lowest yet reported for surface water in the world ocean; it suggests that Mn deficiency may also be a factor contributing to the limitation of phytoplankton growth in the southern ocean.

In addition to the input from Fe-rich sediments in shallow waters and atmospheric dust in offshore waters, a third Fe supply mechanism exists in the southern ocean—Fe released from melting sea ice. On the basis of the amounts of Fe measured in shallow snow pits (0.02 nmol Fe g^{-1}) (ref. 13) and Holocene ice cores (0.03 nmol Fe g^{-1}) (ref. 14), Martin³ estimated that the phytoplankton could fix about 150 mmol C m^{-2} with the Fe made available as sea ice melts during the austral spring and summer (estimates based on 10% available Fe and a C:Fe ratio of 33,000:1). We report here an initial ice Fe concentration of 0.026 nmol g^{-1} (Table 1), an amount that agrees well with the values mentioned above. This was glacial ice of unknown age, however, not annual sea ice. Determining the Fe content of annual sea ice is important in view of the amounts of ice involved: Munk¹⁵, for example estimates that 2.1×10^{19} g of ice forms and melts back each year. Obviously, the biological availability as well as the Fe content of the annual ice will need to

be known if accurate estimates are to be made of new phytoplankton productivity that could be supported by this potentially important Fe input mechanism.

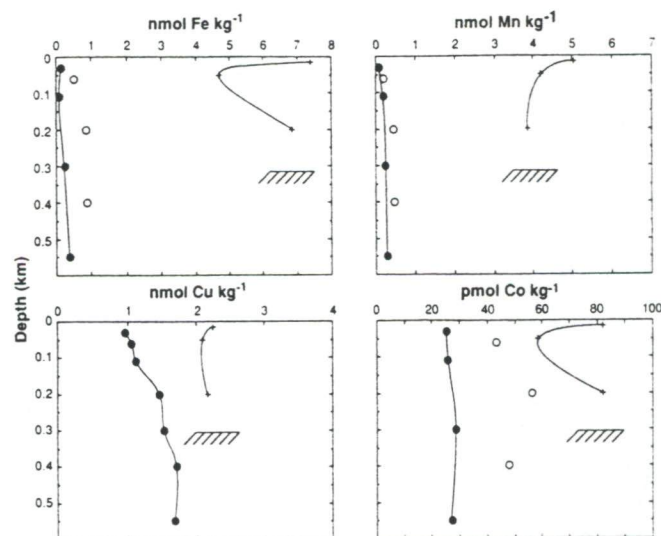


FIG. 2 Drake Passage Fe, Mn, Co and Cu concentrations (●) compared with those (+) from the Gerlache Strait (Station 3). Open circles are contaminated samples collected via Go-Flo No. 1.

In conclusion, the results presented here clearly support the observations of the 1925–27 *Discovery* Expedition scientists—that the neritic areas probably were (and are) rich in phytoplankton because of Fe introduced from land^{8,16,17}. The very low dissolved Fe (and Mn) levels in the Drake Passage provide support for our argument^{2,3} that present-day plant productivity is limited in offshore waters of the Antarctic because of Fe deficiency. Judging by the unused excess of major plant nutrients, this lack of essential Fe (ref. 18) seems to be severely limiting the power of the 'biological pump' and thus contributing to the raised atmospheric CO₂ concentrations typical of previous and present interglacial periods (preindustrial ≈280 p.p.m.) (ref. 19). In contrast, greatly enhanced Fe input from atmospheric dust^{2,3,14} may have stimulated phytoplankton growth and increased the power and efficiency of the biological pump, thus contributing to the drawing down of atmospheric CO₂ during glacial maxima¹⁹.

Note added in proof. We have since shown in experiments in the Ross Sea that Fe will indeed stimulate plankton productivity in the austral spring and summer in amounts that may be relevant to the removal of excess CO₂ from the atmosphere. Further details will be published elsewhere. □

Glucagon stimulates the cardiac Ca²⁺ current by activation of adenylyl cyclase and inhibition of phosphodiesterase

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GLUCAGON exerts positive inotropic and chronotropic effects in the heart^{1,2}. Like its glycogenolytic effect in liver cells³, the cardiac effects of glucagon are often correlated with adenylyl cyclase stimulation^{4–7}. Therefore, cyclic AMP-dependent phosphorylation of L-type Ca²⁺ channels^{8–10} might be involved in the inotropic effect of glucagon. There have been no reports, however, of the effects of glucagon on the cardiac Ca²⁺ current (*I*_{Ca}). Also, the physiological effects of glucagon could involve mechanisms other than stimulation of adenylyl cyclase^{11,12}. Here we show that glucagon enhances *I*_{Ca} in frog and rat ventricular myocytes. The effect of glucagon in rats resulted from a stimulation of adenylyl cyclase. In frogs, however, the effect of glucagon on *I*_{Ca} was smaller and occurred at a concentration tenfold lower than in rats, and adenylyl cyclase was not modified. In addition, cAMP potentiated the effect of glucagon on *I*_{Ca} in frog ventricle, which correlated with the observed inhibition by glucagon of low-*K*_m cAMP phosphodiesterase activity. Therefore, this is an example of a hormone that affects cardiac function in a similar way to a variety of synthetic cardiotonic compounds, such as milrinone and Ro-20-1724 (ref. 13). Inhibition of phosphodiesterase activity by glucagon may be essential in animals in which glucagon increases cardiac contractility but does not effectively stimulate adenylyl cyclase^{7,14,15}.

The effects of 1 and 10 μM glucagon on *I*_{Ca} were recorded from a frog (Fig. 1a) and rat (Fig. 1b) ventricular cell using the whole-cell patch-clamp technique. Glucagon increased *I*_{Ca} in both preparations in a dose-dependent and reversible way. Significant differences were found, however, between the two species. In frog, glucagon increased *I*_{Ca} with a 50% stimulatory

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ACKNOWLEDGEMENTS. We thank Bill Broenkow and Mark Yarbrough for the CTOD data and Sara Tanner for the nutrient analyses. This research was supported by grants from the Biology and Medicine Section of NSF Polar Programs, the ONR Ocean Chemistry Program, and the NSF Marine Chemistry Program.

concentration (EC₅₀) of 41 nM (Fig. 1c), whereas in rat, the EC₅₀ was more than 10 times this value and the maximal stimulation of *I*_{Ca} was more than three times that in frog (Fig. 1d). Furthermore, not all the frog cells responded to glucagon, whereas every rat ventricular cell did. The lack of responsiveness to glucagon in some of the frog cells was probably due to a notably low level of cAMP (see below).

The effects of glucagon in rat quantitatively resembled the effects of isoprenaline, a β-adrenergic agonist. Furthermore, maximal concentrations of isoprenaline and glucagon did not have an additive effect on *I*_{Ca} (data not shown), and the effects of glucagon on *I*_{Ca}, like those of isoprenaline, were strongly antagonized by acetylcholine (ACh) (Fig. 2a). This indicates that glucagon and isoprenaline act through similar mechanisms in the rat. As β-adrenergic stimulation of *I*_{Ca} is essentially due to activation of adenylyl cyclase^{8–10}, we investigated the effects of glucagon on the activity of this enzyme in rat ventricle. As reported previously^{2,4–7}, glucagon increased adenylyl cyclase activity in a dose-dependent way (Fig. 2b), and its effects were antagonized by ACh¹⁶.

In frog, the stimulatory effect of glucagon on *I*_{Ca} was not reduced by ACh (Fig. 2c), in contrast to the activation of *I*_{Ca} by isoprenaline¹⁰. Moreover, maximal activation of *I*_{Ca} by glucagon was about 15 times smaller than that evoked by isoprenaline (Fig. 2c). Finally, whereas isoprenaline enhanced adenylyl cyclase activity in a dose-dependent way in frog ventricle, glucagon was unable to modify either basal or isoprenaline-stimulated adenylyl cyclase activity in this preparation (Fig. 2d). Therefore, we concluded that the stimulatory effect of glucagon on *I*_{Ca} in frog cardiac cells was not mediated by enhanced cAMP production.

Cyclic AMP, however, did seem to be involved in *I*_{Ca} stimulation by glucagon in frog cells. This was suggested by a comparison of the effect of a first application of glucagon to a cell under basal conditions with a subsequent application of the peptide after *I*_{Ca} had been stimulated by isoprenaline or cAMP. In nine cells in which the basal *I*_{Ca} was 169.7 ± 22.2 pA (mean ± s.e.m.), an initial application of 3 μM glucagon for 5–6 min increased *I*_{Ca} by only 7.6 ± 7.2% on average, because five of these nine cells did not respond to the peptide (Fig. 3). After the peptide was washed out, application of submaximal concentrations of isoprenaline (0.1 or 1 μM) or perfusion of the patch pipette^{17,18} with cAMP (1 or 3 μM) enhanced *I*_{Ca} to 969.2 ± 237.1 pA. A subsequent application of glucagon further increased *I*_{Ca} by 36.4 ± 8.8% (Fig. 3). Also, glucagon increased *I*_{Ca} more consistently in frog cells under stimulated conditions

‡ To whom correspondence should be addressed.

THE WHITE HOUSE

WASHINGTON

December 19, 1990

MEMORANDUM FOR JOHN H. SUNUNU

FROM:

D. Allan Bromley



Herewith the latest salvo in GSA-NSF exchange. I remain convinced that forcing NSF to move would represent a very real mistake on many grounds. Your help in preventing this will be much appreciated.

Attachment



Administrator
General Services Administration
Washington, DC 20405

12/19/90

Copy to: Dr. White
Dr. Hays
Ms. MacFarlane

OFFICE OF THE DIRECTOR
1990 DEC 19 P 4 14

Mr. Frederick M. Bernthal
Acting Director
National Science Foundation
1800 G Street, N.W.
Washington, D.C. 20550

Dear Mr. Bernthal:

I am in receipt of your letter dated December 14, 1990, in which you restate your decision not to relocate. After careful review of all information and supporting documentation, including the position stated in your December 14 letter, I have determined that pursuant to section 210(e) of the Federal Property and Administrative Services Act of 1949, 40 U.S.C. 490(e), it is advantageous to the government in terms of economy and efficiency for the National Science Foundation (NSF) to relocate to the location selected by the recent competition and hereby direct NSF to do so.

In your December 14, 1990, letter you maintain that the formal review process cited in Mr. Handley's November 30, 1990, letter directing your agency to relocate was never initiated by NSF and thus your letter is not an appeal of that decision. While I understand your position, it is clear that your refusal to accept the relocation communicated by letter dated November 6, 1990, initiated a review by the Regional Administrator. This resulted in a review of the budgetary concerns and impact on your agency's mission addressed in your letter. No purpose would be served by a further review of your relocation by officials in our Washington regional office. Both the Real Estate Division and the Regional Administrator have evaluated all information presented in support of your determination not to relocate, and have communicated their decisions in prior letters.

Your agency's budgetary issues have been addressed by the General Services Administration (GSA) in various meetings and correspondence. With respect to your concern that you do not, at this time, have an appropriation from which you can expend money for relocation, and therefore cannot authorize GSA to enter into the lease, we point out that it is GSA that is

-2-

responsible for obligations concerning the lease under express statutory authority of the Congress.

The move is not scheduled until fiscal year 1993 and you have time to obtain funds through the budget process. The General Services Administration will provide assistance in obtaining the necessary funds for your relocation in future years from both the Office of Management and Budget and Congress.

It is my view that the statutory requirement for consultation has been met and that the matter must now be decided. The process of finding a suitable site for your relocation was initiated by you several years ago, and as stated above, you are hereby directed to relocate to the site selected by that process.

GSA looks forward to working with you on an efficient and economic relocation of your agency.

Sincerely,



for Richard G. Austin
Administrator

THE WHITE HOUSE
WASHINGTON

July 5, 1990

Jim
Dear Dr. Fletcher:

Thank you for your letter of June 25. I agree with you on the importance of finding good leadership for the National Science Foundation.

Dr. Mary Good has agreed to head the search committee for the Director. I am pleased to pass along your recommendation to her. Nominations such as yours are a valuable resource to assure consideration of the very best candidates for key government positions.

I greatly appreciate your taking the time to write. With best wishes,

Sincerely,

Dylan

D. Allan Bromley
Assistant to the President
for
Science and Technology

Dr. James C. Fletcher
7721 Falstaff Rd.
McLean, Virginia 22100

*I received your letter
GTE Technical Advisory
Committee service! I am
hoping to wind up the NSF
Directorship search very
soon and much appreciate
your input.
DAB.*

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
03a. Memo	Allan Bromley to John Sununu RE: NSF Directorship (2 pp.)	6/21/90	(b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: Alphabetical Subject Files
WHORM Cat.:
File Location: LA - National Science Foundation (NSF)

Date Closed:	10/22/2009	OA/ID Number:	08715
FOIA/SYS Case #:	2005-0332-F	Appeal Case #:	
Re-review Case #:		Appeal Disposition:	
P-2/P-5 Review Case #:		Disposition Date:	
AR Case #:		MR Case #:	
AR Disposition:		MR Disposition:	
AR Disposition Date:		MR Disposition Date:	

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

P-1 National Security Classified Information [(a)(1) of the PRA]
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C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Removed as a personal record misfile.

Freedom of Information Act - [5 U.S.C. 552(b)]

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(b)(9) Release would disclose geological or geophysical information

THE WHITE HOUSE

WASHINGTON

June 21, 1990

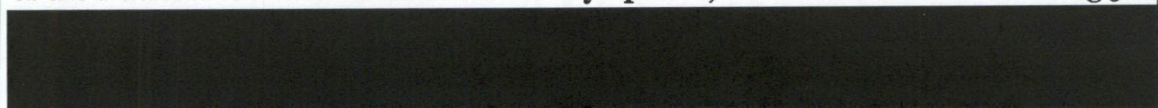
MEMORANDUM FOR JOHN H. SUNUNU

FROM: D. ALLAN BROMLEY 

SUBJECT: NSF DIRECTORSHIP

(b)(6)

As you know, Erich Bloch is coming to the end of his six year appointment as Director of the National Science Foundation. In my opinion, he has done an outstanding job 



That concluded, in April I asked Dr. Mary Good, Senior Vice President for Technology of Allied Signal, and Chairman of the National Science Board, to chair a search committee for Erich's replacement. This approach is in accordance with the National Science Foundation's Organic Act, (42 U.S.C. 1864), Section 5(a) which states that "The Director of the Foundation (referred to in this Act as the "Director") shall be appointed by the President by and with the advice and consent of the Senate. Before any person is appointed as Director, the President shall afford the Board an opportunity to make recommendations to him with respect to such appointment.

As part of the search the NAS, NAE, and AAAS were asked to provide recommendations. Recommendations were also received from a number of the major scientific societies and from a wide spectrum of individual scientists and engineers.

From this input the search committee has winnowed the list to four persons. They are the following:



Walter E. Massey Vice President
University of Chicago



(b)(6)

I have known all four of these candidates for many years and would note that two of them, [REDACTED] and Massey, are [REDACTED].

My recommendation is that the President nominate Walter E. Massey to the NSF Director with [REDACTED] as the alternate, if one should be required. I am enclosing their curriculum vitae herewith. [REDACTED] while Massey's field is condensed matter physics.

While I have a high regard for [REDACTED], I do not believe that either would be as successful in leading the NSF in the critical years ahead as would [REDACTED] or Massey.

Massey did his graduate work in condensed matter physics and from 1958 through 1979 pursued an outstanding academic career in this area ending as Professor of Physics and Dean of the College at Brown University. From there he was recruited to be the Director of the Argonne National Laboratory and to an adjunct appointment as Professor of Physics at the University of Chicago. In 1982 he relinquished the Directorship of the Argonne Laboratory to take over as Vice President for Research of the University of Chicago and as the University of Chicago officer responsible for exercising the University's management of the Argonne Laboratory under contract with the U.S. Department of Energy. Concurrently he serves as Chairman of the Board of the Argonne National Laboratory/University of Chicago Development Corporation.

Walter Massey has also played a very active role in U.S. science policy. He served as a member of the National Science Board from 1978 through 1984; he was President and then Chairman of the Board of the American Association for the Advancement of Science in 1988-1990 and has recently been named as President-elect of the American Physical Society.

As his curriculum vita indicates he has had broad experience in a variety of state, national and international activities and serves on a number of major corporate Boards of Directors.

He is widely considered to be the Nation's most distinguished black scientist.

Enclosures

CURRICULUM VITAE -- WALTER E. MASSEY

May 1990

Born: Hattiesburg, Mississippi, April 5, 1938

Marital Status: Married -- Shirley Ann Streeter
Children -- Keith and Eric

Address: 4950 Chicago Beach Drive
Chicago, Illinois 60615

Telephone: Offices -- 312/702-6021 or 708/972-5330

Present Position: Vice President for Research
and for Argonne National Laboratory
and
Professor of Physics
The University of Chicago
5801 Ellis Avenue
Chicago, Illinois 60637

Education:

<u>Institution</u>	<u>Inclusive Dates</u>	<u>Degree and Date</u>
Royal Street High School Hattiesburg, Mississippi	1952-1954	(Did not graduate; entered college from 10th grade.)
Morehouse College Atlanta, Georgia	1954-1958	B.S., Physics and Math, 1958
Columbia University New York, New York	Summer 1958	None
Howard University Washington, D.C.	1959-1960	None
Washington University St. Louis, Missouri	Sept. 1960-Jan. 1966	M.A., Ph.D., January 1966

Ph. D. Research:

Development of a theory and the calculations of the ground state properties of liquid helium.

Thesis Title:

"Ground State of Liquid Helium: Boson Solutions for Mass 3 and 4." Available at Olin Library,
Washington University, St. Louis, Missouri.

Research Supervisor: Dr. Eugene Feenberg
Washington University
St. Louis, Missouri

Fellowships and Scholarships:

1. Ford Foundation Early Admission Scholarship: Morehouse College, 1954
2. National Defense Act Fellowship: Howard University, 1959
3. National Science Foundation Fellowship: Washington University, 1961
4. Academic Administration Fellow: American Council on Education, 1975

Professional Organizations:

1. American Association for the Advancement of Science
2. American Association of Physics Teachers
3. American Nuclear Society
4. American Physical Society
5. New York Academy of Sciences
6. Society of Sigma Xi

Honors and Awards:

1. "Outstanding Educator of America" Award, 1974
2. "Distinguished Service Citation" of the American Association of Physics Teachers (AAPT) for "Exceptional Contributions to the Teaching of Physics," 1975
3. University of Illinois College of Engineering Alumni Honor Award for "Distinguished Service in Engineering," 1988
4. Honorary Fellow Award, Society for Technical Communication, 1989
5. Listed: Who's Who in the East and Who's Who in America
6. Doctor of Science Honorary Degree, Lake Forest College, Lake Forest, Illinois, 1981
7. Doctor of Science Honorary Degree, Williams College, Williamston, Massachusetts, 1981
8. Doctor of Science Honorary Degree, Elmhurst College, Elmhurst, Illinois, 1982
9. Doctor of Science Honorary Degree, Atlanta University, Atlanta, Georgia, 1982
10. Doctor of Science Honorary Degree, Rutgers University, New Brunswick, New Jersey, 1984
11. Doctor of Science Honorary Degree, Morehouse College, Atlanta, Georgia, 1984
12. Doctor of Science Honorary Degree, Marquette University, Milwaukee, Wisconsin, 1987
13. Doctor of Science Honorary Degree, Boston College, Boston, Massachusetts, 1987
14. Doctor of Science Honorary Degree, Northern Illinois University, DeKalb, Illinois, 1989
15. Doctor of Science Honorary Degree, Rensselaer Polytechnic Institute, Troy, New York, 1989

Employment History:

- | | |
|--|---|
| 1. <i>Morehouse College</i>
1958-1959 | Instructor of Physics |
| 2. <i>Atlanta University</i>
Summer 1959 | Instructor of Physics |
| 3. <i>Howard University</i>
Summer 1960 | Instructor of Physics |
| 4. <i>Washington University</i>
1960-1961
January 1966-July 1966 | Teaching Assistant
Postdoctoral Research Associate |
| 5. <i>Argonne National Laboratory</i>
July 1966-June 1968
June 1968-September 1968 | Postdoctoral Fellow
Staff Physicist |
| 6. <i>University of Illinois</i>
September 1968-January 1970 | Assistant Professor of Physics |

Employment History (contd.):

- | | | |
|-----|--|---|
| 7. | <i>Brown University</i>
1970-1975
1975-July 1979 | Associate Professor
Professor of Physics and Dean of the College |
| 8. | <i>Argonne National Laboratory</i>
July 1979-1984 | Laboratory Director |
| 9. | <i>The University of Chicago</i>
July 1979- | Professor of Physics |
| 10. | <i>The University of Chicago</i>
1982-1984 | Vice President for Research and Laboratory
Director, Argonne National Laboratory |
| 11. | <i>The University of Chicago</i>
1984- | Vice President for Research and for Argonne
National Laboratory |
| 12. | <i>Argonne National Laboratory /
University of Chicago Development
Corporation</i>
August 1986- | Chairman of the Board |

Other Relevant Experience:A. National Science and Science Policy Experience:

1. *Commission on College Physics*
Member of study group to develop proposals for the improvement of the teaching of physics in high schools and colleges, 1971, 1972
2. *American Physical Society*
Executive Committee, New England Section, 1971, 1972;
Councillor-at-Large, 1980-1983; Vice President, 1990
3. *American Institute of Physics*
Executive Committee on "Physics in the Predominately Black Colleges," 1971, 1972
4. *Aspen Center for Physics*
Participant, 1971, 1976, 1979
5. *National Academy of Sciences -- National Research Council*
Member, Physics Review Committee, 1972-1975
6. *National Academy of Sciences*
Advisory Committee on Eastern Europe and the USSR, 1973-1976
7. *American Association of Physics Teachers*
Committee on Physics in Higher Education, 1974-1977
8. *National Science Foundation*
Advisory Panel, Division of Physics, 1975-1977
Advisory Committee Directorate for Science and Engineering Education, 1985-1989

National Science and Science Policy Experience (contd.):

9. *National Science Board*, 1978-1984
10. *American Association for the Advancement of Science*
Fellow, 1962; Board of Directors, 1981-1985; President-Elect, 1987-1988;
President, 1988-1989; Chairman, 1989-1990
11. *Scientists' Institute for Public Information*
Board of Trustees, 1989-
12. *President's Council of Advisors on Science and Technology*
Member, 1990-

B. Other Academic and Educational Experience:

1. *Graduate Records Examination Board*
Advanced Physics Examination Committee, 1974, 1975
2. *United States Department of Health, Education and Welfare*
Fund for the Improvement of Postsecondary Education
Board of Advisors, 1976-1979
3. *Association of American Universities*
Energy Advisory Committee, 1979-1980
4. *American Association of Colleges*
Commission on Institutional Development and National Affairs
1979-1981
5. *Science Research Institute, Atlanta University Center*
Advisory Board, 1979-1981
6. *Washington University*
Board of Trustees, 1980-1981
7. *Brown University*
Board of Trustees, 1980-
8. *Northwestern University*
Visiting Committee of the College of Arts and Sciences, 1982-1985
9. *Massachusetts Institute of Technology*
Department of Physics Corporation Visiting Committee, 1982-
10. *Harvard University*
Committee to Visit the Department of Physics, 1985-1989

C. Civic, Cultural and Community Affairs:

1. *Urban League of Rhode Island*
Board of Directors, 1973-1975
2. *KQED Television, Inc., San Francisco*
Project Advisory Committee, 1977-1980

Civic, Cultural and Community Affairs (contd.):

3. *World Book-Childcraft International, Inc.*
Advisory Board, 1979-1982
4. *Chicago Museum of Science and Industry*
Board of Trustees, 1980-1989
5. *Mayor's Task Force on High Technology Development, City of Chicago*
Chairman, 1981-1982
6. *Governor's Commission on Science and Technology, State of Illinois*, 1982-1989
7. *Chicago High Tech Association*
Chairman, Board of Directors, 1984-
8. *Chicago Symphony Orchestra*
Board of Trustees, 1984-1989
9. *Illinois Mathematics and Science Academy (high school)*
Board of Trustees, 1985-88
10. *United Way of Chicago*
Board of Directors, 1985-88
11. *Chicago Council on Foreign Relations*
Board of Directors, 1985-
12. *Institute for Illinois*
Board of Directors and Treasurer, 1986-
13. *Governor's Science Advisory Committee, State of Illinois*,
Executive Committee, 1989-
14. *Illinois Coalition*
Board of Directors, 1989-

D. International Experiences:

1. American Nuclear Society, Scientific Exchange to the People's Republic of China,
September/October 1980
2. United States-South African Leadership Exchange Program, Study of South African
Universities, Republic of South Africa, August/September 1981
3. Conference on Physics in Latin America, Rio de Janeiro, Brazil -- Planning Committee,
July/August 1983
4. United States-South African Leadership Exchange Program -- Council Member, 1983-1989
5. American Association for the Advancement of Science, African Regional Symposium on the
Role of Scientific and Engineering Sciences in Development -- Co-chairman, Mbanne,
Swaziland, March 1984, and Grand Bassam, Ivory Coast, December 1984
6. American Association for the Advancement of Science, Project to Strengthen Scientific and
Engineering Infrastructure in Sub-Saharan Africa -- Co-chairman, 1984-

International Experiences (contd.):

7. National Science Foundation -- Advisory Committee on International Programs, 1985-88
8. American Association for the Advancement of Science, Annual Meeting of the Continuing Committee on the Role of Scientific and Engineering Societies in Development, Finland, 1989
9. American Association for the Advancement of Science, Board Planning Meeting for Cooperative Programs Between Soviet Academy of Sciences and the AAAS, USSR, 1989

E. Corporate and Not-for-Profit Organizations:

1. *Analytic Services, Inc.*
Trustee, 1980-1981
2. *Corporation of Woods Hole Oceanographic Institution*
1980-1983; 1986-1989
3. *Research-Cottrell, Inc.*
Board of Directors, 1982-1987
4. *Amoco Corporation*
Board of Directors, 1982-
5. *Continental Materials, Inc.*
Board of Directors, 1982-1990
6. *The First National Bank of Chicago*
Board of Directors, 1983-
7. *Rand Corporation*
Board of Trustees, 1983-
8. *Motorola, Inc.*
Board of Directors, 1984-
9. *Chicago Tribune Company*
Board of Directors, 1987-
10. *MacArthur Foundation*
Board of Directors, 1990-

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
03b. Paper	Curriculum vita (3 pp.)	nd	(b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: Alphabetical Subject Files
WHORM Cat.:
File Location: LA - National Science Foundation (NSF)

Date Closed: 10/22/2009	OA/ID Number: 08715
FOIA/SYS Case #: 2005-0332-F	Appeal Case #:
Re-review Case #:	Appeal Disposition:
P-2/P-5 Review Case #:	Disposition Date:
AR Case #:	MR Case #:
AR Disposition:	MR Disposition:
AR Disposition Date:	MR Disposition Date:

RESTRICTION CODES

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C. Closed in accordance with restrictions contained in donor's deed of gift.

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(b)(9) Release would disclose geological or geophysical information

[REDACTED] (b)(6)

Date and Place of Birth:

[REDACTED]

Education:

[REDACTED]

Fellowships:

[REDACTED]

Professional Appointments:

[REDACTED]

Teaching Honors [REDACTED]:

[REDACTED]

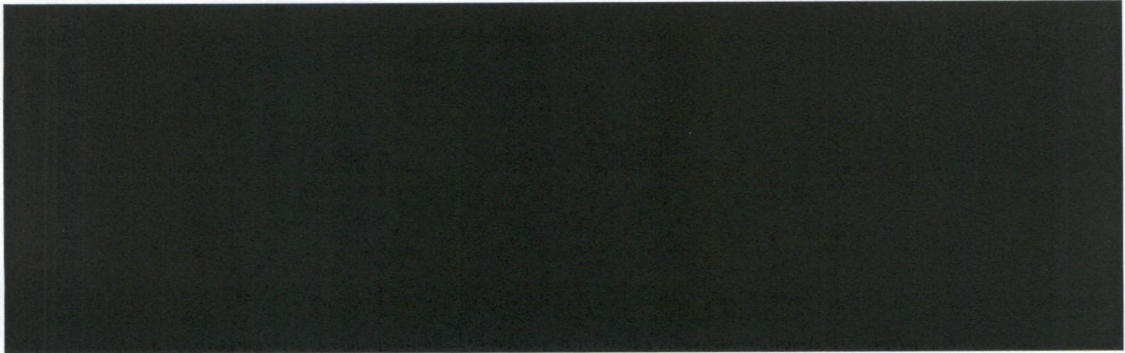
Special Lectures:

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Invited Conference Papers:

[REDACTED]

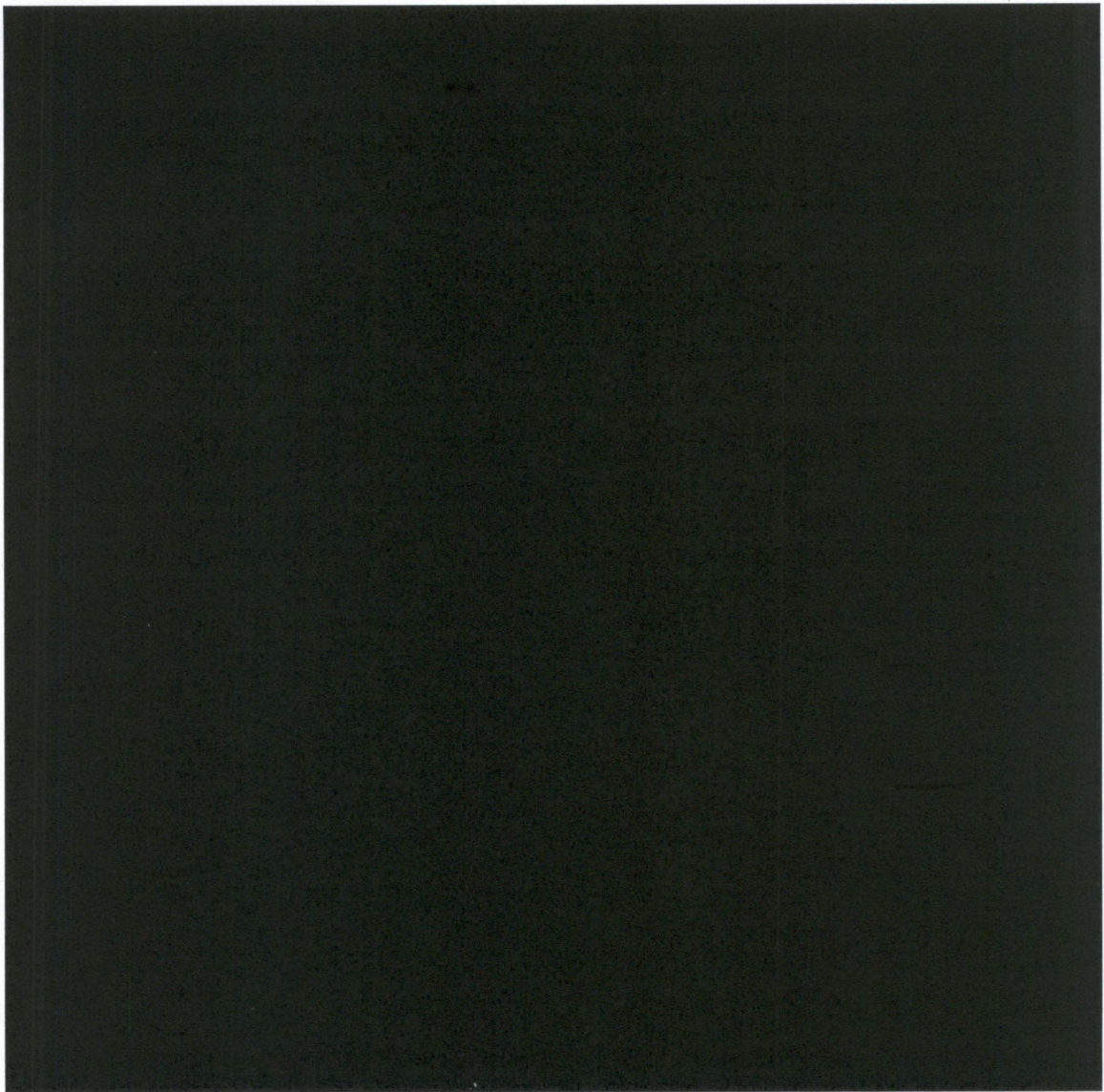
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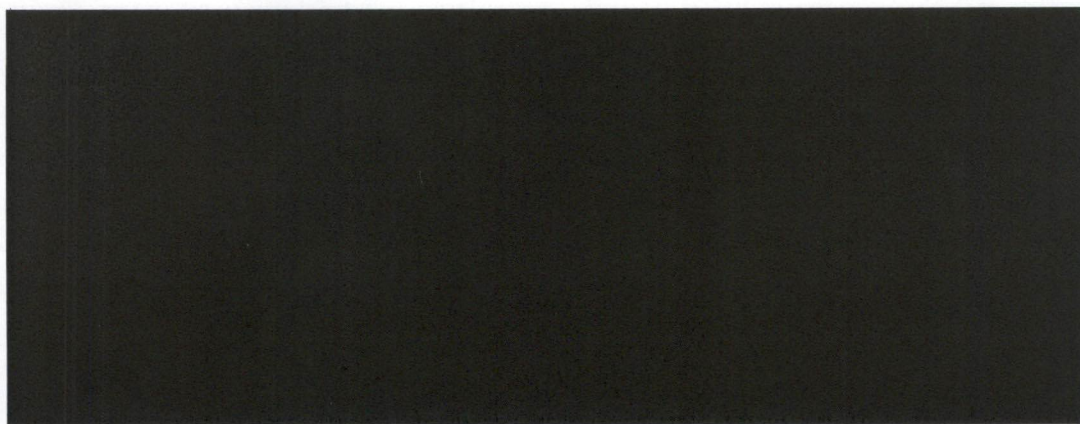
Book:



Professional Societies and Services:



(b)(6)



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04. Memo	Allan Bromley to Governor Sununu RE: Associate Director of OSTP For Life Sciences (2 pp.)	6/22/90	(b)(6)	

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C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Removed as a personal record misfile.

Freedom of Information Act - [5 U.S.C. 552(b)]

(b)(1) National security classified information [(b)(1) of the FOIA]
(b)(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
(b)(3) Release would violate a Federal statute [(b)(3) of the FOIA]
(b)(4) Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]
(b)(6) Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]
(b)(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
(b)(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
(b)(9) Release would disclose geological or geophysical information

THE WHITE HOUSE
WASHINGTON

June 22, 1990

MEMORANDUM TO GOVERNOR SUNUNU

FROM: D. ALLAN BROMLEY *Dulan*

SUBJECT: ASSOCIATE DIRECTOR OF OSTP FOR LIFE SCIENCES

As you know, James Wyngaarden, who has served during this past year as the OSTP Assistant Director for the Life Sciences, has agreed to accept election as the Foreign Secretary of the National Academy of Sciences.

As soon as his election was announced in April I undertook an extensive search for a suitable replacement who could cover the broad range of biological and medical issues that come to OSTP and replace Wyngaarden in such other roles as Chairman of the biotechnology working group for the Competitiveness Council, as an example.

In this search I consulted with the Institute of Medicine, the NAS, FASEB, and the Deans of a number of the major medical schools. One name came to the top of some three quarters of all the lists of possible candidates. That name was:

Donald A. Henderson M.D., M.P.H.
Dean, School of Public Health
Johns Hopkins University, Baltimore

Other persons who were suggested by a number of consultants included:

[REDACTED]

[REDACTED]

(b)(6)

[REDACTED]

(b)(6)

My Associate Directors and I met with all four of these individuals. [REDACTED] subsequently withdrew because of deteriorating health.

We were unanimously in agreement among ourselves and with the majority of our consultants that it would represent a very real coup were we able to bring Henderson to OSTP.

He is considered, worldwide, as the one person who deserves credit for the total eradication of smallpox. He is considered the dean of public health activities in the United States and has the confidence of the biomedical community.

He is a member of the National Academy of Sciences and was awarded the National Medal of Science; this and his other awards, listed on the accompanying curriculum vita, attest to his reputation both nationally and internationally.

The only basis upon which we have a possibility of attracting him is that he is just retiring from the Johns Hopkins Deanship, a position that he has held with distinction since 1977.

My colleagues in OSTP and I have met with him on several occasions for lengthy discussions and are enthusiastic about the possibility of his joining us. He would be a more than worthy successor to James Wyngaarden and would bring a significantly broader range of experience and interest to OSTP.

My recommendation is that the President nominate him as Associate Director for the Life Sciences of the Office of Science and Technology Policy.

APRIL 1990

CURRICULUM VITAE

DONALD AINSLIE HENDERSON

BORN: September 7, 1928
Lakewood, Ohio

OFFICE ADDRESS: 615 N. Wolfe Street
Baltimore, MD 21205
301-955-3540

MARRIED: Nana Irene Bragg
Rochester, New York
September 1, 1951

HOME ADDRESS: 3802 Greenway
Baltimore, MD 21218
301-889-2880

CHILDREN: Leigh Ainslie, 1954
David Alexander, 1956
Douglas Bruce, 1960

EDUCATION:

A.B., Oberlin College, 1950
M.D., University of Rochester School of Medicine, 1954
M.P.H., Johns Hopkins University School of Hygiene and Public Health, 1960

Honoris causa:

M.D., Université de Genève (1980)
LL.D., Marietta College (1978)
L.H.D., State University of New York (1981)
Sc.D., University of Rochester (1977);
Oberlin College (1978);
University of Illinois (1979);
University of Maryland (1980);
Yale University (1986)
Albany Medical College (1989)

APRIL 1990

POSITIONS HELD:

Mary Imogene Bassett Hospital, Cooperstown, New York, Intern in Medicine, 1954-1955; Resident in Medicine, 1957-1959
Communicable Diseases Center, Department of Health, Education, and Welfare, Assistant Chief, Epidemic Intelligence Service, 1955-1956; Chief, Epidemic Intelligence Service and Assistant to Chief, Epidemiology Branch, 1956-1957; Assistant Chief, Epidemiology Branch and Chief, Epidemic Intelligence Service, 1960-1961; Chief, Surveillance Section, Epidemiology Branch, 1961-1965; Chief, Smallpox Eradication Program, 1965-1966
World Health Organization, Chief Medical Officer, Smallpox Eradication, 1966-1977
Johns Hopkins University School of Hygiene and Public Health, Dean and Professor of Epidemiology and International Health, 1977-

PROFESSIONAL SOCIETIES:

American Board of Preventive Medicine, 1963- . . .
American College of Epidemiology, Fellow, 1990-
American College of Preventive Medicine, Fellow, 1978-
American Epidemiological Society, 1963-
American Public Health Association, 1956; Fellow, 1961-
American Society of Tropical Medicine and Hygiene, 1981-
Association of Schools of Public Health, Treasurer, 1978; Vice-President, 1981-1982; 1987-1988; President, 1988-
Indian Society for Malaria and Other Communicable Diseases, Fellow, 1975-
International Epidemiological Association, 1965-
Royal College of Physicians (Edinburgh), Fellow, 1986-
Royal Society of Tropical Medicine and Hygiene, Fellow, 1976-

APRIL 1990

SCIENTIFIC AWARDS AND RECOGNITIONS: (United States)

National Medal of Science, 1986
 National Academy of Sciences - Public Welfare Medal, 1978
 Charles S. Dana Foundation Award for Pioneering Achievement in Health, 1986
 American Academy of Arts and Sciences, Fellow, 1986-
 Institute of Medicine, National Academy of Sciences, Member, 1978-
 Albert Schweitzer International Prize for Medicine, 1985
 American College of Physicians - James D. Bruce Memorial Award, 1978
 American Public Health Association - Rosenhaus International Award for Excellence, 1975
 American Academy of Pediatrics - Honorary Fellow, 1980
 Johns Hopkins University - Distinguished Alumnus Award, 1982
 Michigan State University - Walter F. Patenge Medal of Public Service, 1984
 Vanderbilt University School of Medicine Medal, 1990
 Ohio Foundation of Independent Colleges, Hall of Fame, 1990
 Blue Cross-Blue Shield - 50th Anniversary Distinguished Service Award, 1979
 U.S. Association for the United Nations - Joseph C. Wilson Award in International Affairs, 1978
 U.S. General Accounting Office - Comptroller General's Special Recognition, 1986
 U.S. Department of Health and Human Services
 - Superior Service Award, 1964
 - Sustained Superior Performance Award, 1966
 U.S. Public Health Service - Distinguished Service Medal, 1976
 - Commendation Medal, 1962
 Delta Omega Honorary Public Health Society - Member, 1979
 - Outstanding Alumnus Award, 1980
 Sigma Xi - Member, 1956

SCIENTIFIC AWARDS AND RECOGNITIONS: (Other Countries)

The Japan Prize, 1988
 Republic of China - Health Medal of the First Grade, 1988
 Government of Uruguay - Medal of Abnegation, 1988
 Universidad Peruana Cayetano Heredia, Honorary Professor, 1988
 Commemorative Award of Seventh World Congress of the International Physicians for the Prevention of Nuclear War, 1987
 Gairdner Foundation (Canada) - International Award of Merit, 1983
 Royal Colleges of Physicians of the United Kingdom - Faculty of Community Medicine - Honorary Fellow, 1981
 Royal Society of Medicine
 Richard T. Hewitt Award, 1986
 Honorary Member, 1980
 London School of Hygiene and Tropical Medicine and Royal Society of Tropical Medicine and Hygiene - George McDonald Prize and Medal, 1976
 Government of Ethiopia - Medal for Contributions to Health, 1979
 Government of Afghanistan - *Roghtya Neshan* (Health Medal), 1976
 Ernst-Jung Foundation, (Germany) - *Ernst-Jung Preis für Medizin*, 1976
 Government of India - Special Award, 1975
 Indian Society for Malaria and Other Communicable Diseases - Special Award, 1975
 Lahore, Pakistan - Certificate of Merit, 1977

APRIL 1990

AWARD TO WHO FOR SMALLPOX ERADICATION:

Special Albert Lasker Public Health Service Award, 1976

SPECIAL LECTURESHIPS:

Alumni Reunion Lecture, Oberlin College, 1990
 Cleveland City Club Forum Speaker, 1990
 Vanderbilt University World Health Week, Keynote Speaker, 1990
 Kathryn Boucot Sturgis Lecture, 1990
 Alumni Reunion Lecture, University of Rochester, 1989
 John P. McGovern Lecturer, Baylor College of Medicine, 1989
 Annual Banquet Address, Clinico-Pathological Society of Washington, 1989
 Phyllis Lewander Memorial Lecture - Children's Hospital National Medical Center, Washington, D.C., 1989
 American Pediatric Society - Washington, DC, 1988
 Bloomfield Lecture - Case-Western Reserve University, 1987
 Joseph Mountin Lecture- Centers for Disease Control, 1987
 Agaard Lecture - University of Washington, 1987
 Frontiers of Science Lecture - University of Florida, 1987
 Eighteenth International Pediatric Congress - Keynote Speaker, 1986
 Chief Guest and Keynote Speaker, 30th Anniversary of Indian Public Health Association - Calcutta, India, 1985
 National Convention on the Management of Health Systems - Convention Orator; Jaipur, India, 1985
 P.D. Agarwal Memorial Oration - Calcutta, India, 1985
 Oberlin College Sesquicentennial Speaker - 1983
 Harvard Medical School Bicentennial Speaker - 1982
 Rameshwar Sharma Oration - School of Medicine, Jaipur, India, 1981
 Harben Lecture - Royal Institute of Public Health and Hygiene, London, 1980
 Stephens Lecture - Oberlin, Ohio, 1980.
 V.W. Scully Distinguished Lecture - Hamilton, Ontario, Canada, 1979
 Joseph C. Wilson Lecture - Rochester, New York, 1979
 Julia M. Jones Memorial Lecture - American Lung Association and American Thoracic Society, 1979
 Merck Sharpe and Dohme Lecture - Canadian Public Health Association, Ottawa, Canada, 1977
 James Bordley III Lecture - Mary Imogene Bassett Hospital, Cooperstown, New York, 1977
 Jenner Memorial Lecture - Bristol (UK) Royal Infirmary, 1975
 Commencement and Convocation Addresses:
 San Diego State University School of Public Health - 1988
 University of California (San Diego) School of Medicine - 1984
 Michigan State University School of Medicine - 1984
 University of Southern California School of Medicine - 1978

APRIL 1990

PROFESSIONAL COMMITTEES: (Present)**World Health Organization**

Expert Advisory Panel on Virus Diseases, 1976-

Committee on Orthopoxvirus Infections, 1981-

Consultant Group on Poliomyelitis Eradication, Chairman, 1988-

Pan American Health Organization

Technical Advisory Group on Immunization, Chairman, 1985-

American Journal of Epidemiology,

Board of Overseers, Associate Editor, 1965-1977; Chairman, 1984-

Editorial Advisory Board - Bibliography of Bioethics, 1979-

International Association for Maternal and Neonatal Health, Scientific Council, 1981-

Rotary Foundation of Rotary International, Polio Plus Advisory Committee, 1985-

Government Accounting Office

Advisory Board, Program Evaluation and Methodology Division, 1988-

U.S. Department of State

Advisory Committee on Oceans, Environmental and Scientific Affairs, 1988-

Department of Health and Human Services

National Vaccine Advisory Committee, 1988-1989; Chairman, 1990-

Secretary's Council on Health Promotion and Disease Prevention, 1989-

Association of Academic Health Centers

Task Force on Health Promotion /Disease Prevention, 1989-

"AIDS Patient Care" magazine - Editorial Advisory Panel, 1987-

United Fresh Fruit and Vegetable Association, Scientific Advisory Panel, 1988-

Institute of Medicine, Board on International Health, 1988-

Charles A. Dana Foundation Awards Jury, 1990-

Foundation for Development of International Health (Japan), Scientific Consultant, 1990-

BOARD OF DIRECTORS/TRUSTEES:

Indian Institute of Health Management Research, 1985-

Maryland Society for Medical Research, Inc., 1978-

Population Crisis Committee, 1981-

International Center for Diarrheal Disease Research (Dhaka), 1988-

Medical Alumni Association, Mary Imogene Bassett Hospital, 1989-

BIOGRAPHICAL LISTINGS:

Who's Who in the World

The International Who's Who

Who's Who in America

Who's Who in Frontiers of Science and Technology

American Men and Women in Science: Medical and Health Sciences

Dictionary of International Biography

APRIL 1990

PROFESSIONAL COMMITTEES: (Past)**American Public Health Association**

Committee on Hepatitis, Chairman, 1961-1965

Multiple Antigen Committee, 1964-1966

Epidemiology Section Council, 1965-1967

Surgeon General's Advisory Committees on:

Influenza, Secretary, 1961-1963

Measles Vaccines, Secretary, 1963

Immunization Practice, Secretary, 1964-1966

World Health Organization

Special Committee on Measles Vaccine, Consultant, 1963

Scientific Group on Human Virus Vaccines, Member, 1965

Global Commission for the Certification of Smallpox Eradication, 1978-1980

Program Advisory Group for the Prevention of Blindness, 1978-1982

Programme for Research and Training in Tropical Diseases - Scientific and Technological Advisory Committee, 1982-1984

Caribbean Epidemiology Center - Scientific Advisory Committee, 1980-1983

National Research Council, National Academy of Sciences

Board on Science and Technology in International Development, 1981-1983

Committee on Research Grants, 1982-83

National Academy of Sciences, Institute of Medicine,

AID Health Strategy Study, Steering Committee, 1978

Steering Committee for the Study on Clinical Investigations in Developing Countries, 1978-1980

Advisory Committee on Health, Biomedical Research and Development, Chairman, 1981-1983

Steering Committee, Study of Tropical Diseases, 1984-1987

Government Accounting Office

Research and Education Advisory Panel to the Comptroller-General, 1977-1986

Department of Health and Human ServicesPHS Hospitals *ad hoc* Advisory Committee, 1978

Secretary's Committee on Influenza, Vice-Chairman, 1979

National Ethics Advisory Board, 1977-1980

CDC Programs and Policy Advisory Committee, 1978-1980

Immunization Practices Advisory Committee, Centers for Disease Control, 1982-1986

Chairman, Mayor's Task Force on Environmental Carcinogens (Baltimore), 1977-1978**NASA - Planetary Protection Study Group, 1978****Executive Office of the President, Office of Science and Technology**

Task Force for Science and Technology in Foreign Assistance, Chairman, 1980

Advisory Committee on Science, Technology and Development, 1978-1979

Consultant, 1978-1982

Harvard University,

Visiting Committee, University Health Services, 1981-1985

Burroughs-Wellcome Fund - Pharmacoepidemiology Awards Committee, 1983-1987**City University of New York Medical School, National Visiting Council, 1986-1989****Institute of Medicine, National Academy of Sciences,**

Committee on the Evaluation of Polioomyelitis Vaccine, 1987-88

U.S. Agency for International Development

Research Advisory Committee, 1983-1990

PUBLICATIONS:

More than 100 scientific publications dealing primarily with smallpox eradication, epidemiology and immunization.

February 1990

Book

Fenner, F, Henderson, DA, Arita, I, Jezek, Z, and Ladnyi, ID.
Smallpox and Its Eradication, published by World Health
Organization, 1988.

Book- Chapters (BC)

- (1) Karzon, DT, Henderson, DA
Current Status of Live Attenuated Vaccines.
Advances in Pediatrics Volume XIV, 1966, pp. 121-200.
Year Book Medical Publishers, Inc.
- (2a) Henderson, DA
Smallpox.
Maxcy-Rosenau Preventive Medicine and Public Health, 10th
edition, edited by Sartwell, P.E.
Appleton-Century-Crofts, 1973, pp. 104-116
- (2b) Henderson, DA
Smallpox.
Maxcy-Rosenau Preventive Medicine and Public Health, 11th
edition, edited by Last, J.M. New York.
Appleton-Century-Crofts, 1980, pp. 95-110.
- (2c) Henderson, DA
Smallpox.
Maxcy-Rosenau Preventive Medicine and Public Health, 12th
edition, edited by Last, J.M. Appleton-Century-Crofts,
1985, pp. 129-138.
- (3a) Henderson, DA
Smallpox.
Epidemiology and Community Health in Warm Climate
Countries. Edited by Russell and Standard. Churchill
Livingstone, Edinburgh, 1976, pp. 160-167.
- (3b) Henderson, DA
Smallpox.
Epidemiology and the Community Control of Disease in Warm
Climate Countries, edited by Robinson. Churchill
Livingstone, Edinburgh, 1985, pp. 249-261.
- (4a) Henderson, DA
Variola and Vaccinia.
Cecil Textbook of Medicine, 16th edition, edited by
Wyngaarden, J.B. and Smith, L.H. W.B. Saunders,
Philadelphia, 1982, pp. 1658-1663.
- (4b) Henderson, DA
Variola and Vaccinia.
Cecil Textbook of Medicine, 17th Edition, edited by
Wyngaarden, J.B. and Smith, L.H. W.B. Saunders,
Philadelphia, 1985, pp. 1724-1728.

- (4c) Henderson, DA
Variola and Vaccina. . . .
Cecil Textbook of Medicine, 18th Edition, edited by
Wynngaarden, J.B. and Smith, L.H., W.B. Saunders,
Philadelphia, 1988 (in press).
- (5) Henderson, DA
Smallpox: Eradication of a Killer.
Encyclopædia Britannica, Medical and Health Annual -
1979, pp. 125-144.
- (6) Henderson, DA
Explicit Goals for Prevention and Public Health.
Working for a Healthier America, edited by McNerney,
W.J., pp. 87-94. Ballinger Publishing Co., Cambridge,
1980.
- (7) Henderson, DA
Lessons from The Smallpox Eradication Experience in Medicine,
Science, and Society, edited by K.J. Issalbacher, John Wiley
and Sons, New York, pp. 715-726.
- (8) Foege, WH and Henderson, DA
Management Priorities in Primary Health Care in Selective
Primary Health Care Intervention, edited by Walsh, J.A.,
Warren, K.S. The University of Chicago Press, Chicago and
London, pp. 313-321.
- (9) Henderson, DA
Smallpox and Vaccinia in Vaccines, edited by Plotkin, S. and
Mortimer, T., pp. 8-30. W.B. Saunders Company, 1987.
- (10) Warren, KS, Bundy, DAP, Anderson, RM, Jamison, DT, Davis, A,
Senft, A, Prescott, NM, Henderson, DA
Helminth Infections.
Chapter in Evolving Health Sector Priorities in
Developing Countries, December, 1989.

February 1990

Scientific Papers

- (1) Armijo, R, Henderson, DA, Timothee, R, Robinson, HB
Food Poisoning Outbreaks Associated with Spray-Dried Milk - An Epidemiological Study.
Am. J. of Public Health 47:1093-1100, 1957.
- (2) Poskanzer, DC, Henderson, DA, Kunkle, EC, Kalter, SS, Clement, WB and Bond, JO
Epidemic Neuromyasthenia, An Outbreak in Punta Gorda, Florida.
New Eng. J. Medicine 257:356-364, 1957.
- (3) Clement, WB, Henderson, DA, Lawrence, JW and Bond, JO
Epidemic Neuromyasthenia, An Outbreak in Punta Gorda, Florida - An Illness Resembling Iceland Disease.
J. Florida State Med. Assoc. 45:422-426, 1958.
- (4) Henderson, DA and Shelokov, A
Medical Progress: Epidemic Neuromyasthenia-Clinical Syndrome.
New Eng. J. Med. 260:757-764, 814-818, 1959.
- (5) Henderson, DA and Hawn, CVZ
The Epidemiology of Antibiotic-Resistant Staphylococci in the Community.
Surg. Clinics of North America, 40:971-982, 1960.
- (6) Trotter, Y, Dunn, FL, Drachman, RH, Henderson, DA, Pizzi, M and Langmuir, AD
Asian Influenza in the United States, 1957-1958.
Am. J. Hyg. 70:34-50, 1959.
- (7) Quirce, JM, Vargas-Mendez, O, Nunez, J, Montoya, JA, Brody, J, Henderson, DA and Martins da Silva, M
Vaccination with Attenuated Polioviruses in Costa Rica.
First International Conference of Live Poliovirus Vaccine, Scientific Publication No. 44, Pan American Sanitary Bureau, 1959, pp. 510-513.
- (8) Dull, HB, Jensen, KE, Rakich, JH, Cohen, A, Henderson, DA and Pirkle, CI
Monovalent Asian Influenza Vaccine. Evaluation of Its Use during Two Waves of Epidemic Asian Influenza in Partly Immunized Penitentiary Population.
J. Amer. Med. Assoc. 172:1223-1229, 1960.
- (9) Aach, RD, Elsea, WR, Lyster, JL and Henderson, DA
Efficacy of Varied Doses of Gamma Globulin During an Epidemic of Infectious Hepatitis, Hoonah, Alaska, 1961.
Am. J. Pub. Health 53:1623-1629, 1963.
- (10) Langmuir, AD, Henderson, DA, Serfling, RE, Sherman, IL
The Importance of Measles as a Health Problem.
Am. J. Pub. Health 52 (Supp.):1-3, 1962.

- (11) Guinea, VF, Casay, HL, Ruthig, DW, Henderson, DA, et al.
A Collaborative Study of Measles Vaccines in Five United States Communities.
Am. J. Pub. Health 53:645-651, 1963.
- (12) Henderson, DA, Witte, JJ, Morris, L, Langmuir, AD
Paralytic Disease Associated with Oral Polio Vaccines.
J. Amer. Med. Assoc. 190:41-48, 1964.
- (13) Langmuir, AD, Henderson, DA, Serfling, RE
The Epidemiological Basis for the Control of Influenza.
Am. J. Pub. Health 54:563-571, 1964.
- (14) Henderson, DA
Viral Hepatitis: Experience in the United States.
The Milbank Memorial Fund Quarterly XLIII(2):
Part 2:404-411, 1965.
- (15) Foegen, WH, Leland, OS, Mollohan, CS, Fulginiti, VA, Henderson, DA,
Kemp, CH
Inactivated Measles Virus Vaccine.
Pub. Health Reports 80:60-64, 1965.
- (16) Joseph, PR, Millar, JD, Henderson, DA
An Outbreak of Hepatitis Traced to Food Contamination.
New Eng. J. Med. 273:188-194, 1965.
- (17) Dizon, JJ, Alvero, MG, Joseph, PR, Tamayo, JF, Mosley, WH,
Henderson, DA
Studies of Cholera El Tor in the Philippines.
1. Characteristics of Cholera El Tor in Negros Occidental Province, November 1961 to September 1962.
Bull. Wld. Hlth. Org. 33:627-636, 1965.
- (18) Joseph, PR, Tamayo, JF, Mosley, WH, Alvero, MG, Dizon, JJ,
Henderson, DA
Studies of Cholera El Tor in the Philippines. 2. A Retrospective Investigation of an Explosive Outbreak in Bacolod City and Talisay, November 1961.
Bull. Wld. Hlth. Org. 33:637-643, 1965.
- (19) Tamayo, JF, Mosley, WH, Alvero, MG, Joseph, PR, Gomez, CZ,
Montague, T, Dizon, JJ, Henderson, DA
Studies of Cholera El Tor in the Philippines.
3. Transmission of Infection among Household Contacts of Cholera Patients.
Bull. Wld. Hlth. Org. 33:645-649, 1965.
- (20) Mosley, WH, Alvero, MG, Joseph, PR, Tamayo, JF, Gomez, CZ,
Montague, T, Dizon, JJ, Henderson, DA
Studies of Cholera El Tor in the Philippines.
4. Transmission of Infection among Neighborhood and Community Contacts of Cholera Patients.
Bull. Wld. Hlth. Org. 33:651-660, 1965.

- (21) Guinea, VF, Henderson, DA, Casey, HL, Wingo, ST, Ruthig, DW, et al.
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Efficacy. II. Serological Studies.
Pediatrics 37:649-665, 1966.
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The Cerebrospinal Fluid in Type III Poliomyelitis.
Am. J. Epidemiology 83:189-195, 1966.
- (23) Morris, L, Witte, JJ, Gardner, P, Miller, G, Henderson, DA
Surveillance of Poliomyelitis in the United States, 1962-1965.
Pub. Health Reports 82:417-428, 1967.
- (24) Neff, JM, Lane, JM, Pert, JH, Moore, R, Millar, JD, Henderson, DA
Complications of Smallpox Vaccination. I. National Survey in
the United States, 1963.
New Eng. J. Med. 276:125-132, 1967.
- (25) Neff, JM, Levine, RH, Lane, JM, Ager, EA, Moore, H, Rosenstein, BJ,
Millar, JD, Henderson, DA
Complications of Smallpox Vaccination. II. Results Obtained
by Four Statewide Surveys.
Pediatrics 39:916-923, 1967.
- (26) Miller, G, Gale, J, Villarejos, V, James, W, Arteaga, CG, Casey, H,
Henderson, DA
Edmonston B and Further Attenuated Measles Vaccine - A Placebo
Controlled Double Blind Comparison.
Am. J. Pub. Health 57:1333-1340, 1967.
- (27) Henderson, DA
Smallpox Eradication and Measles-Control Programs in West and
Central Africa - Theoretical and Practical Approaches and
Problems.
Industry and Tropical Health VI, 112-120, Harvard School
of Public Health, Boston, 1967.
- (28) Arita, I, Henderson, DA
Smallpox and Monkeypox in Primates.
Primates in Medicine 3:122-123, 1969.
- (29) Gelfand, HM, Henderson, DA
A Program for Smallpox Eradication and Measles Control
throughout West Africa.
J. of International Health 2:24-33, 1966.
- (30) Arita, I, Henderson, DA
Smallpox and Monkeypox in Non-Human Primates.
Bull. Wld. Hlth. Org. 39:277-283, 1968.
- (31) Henderson, DA
La Evaluacion en los Programas de Vacunacion.
Boletin de la Oficina Sanitaria Panamericana 66:426-434,
1969.

- (32) Millar, JD, Roberto, RR, Wulff, H, Wenner, HA, Henderson, DA
Smallpox Vaccination by Intradermal Jet Injection.
Bull. Wld. Hlth. Org. 41:749-760, 1969.
- (33) Henderson, DA
The Status of the Global Smallpox Eradication Programme in
September, 1969.
Proceedings of Symposium on Smallpox, Yugoslav Academy of
Arts and Sciences, Zagreb, 23-35.
- (34) Arita, I, Henderson, DA
Freeze-dried Vaccine for the Smallpox Eradication Programme.
Proceedings of Symposium on Smallpox, Yugoslav Academy of
Arts and Sciences, Zagreb (1969), 39-50.
- (35) Henderson, DA
Control and Eradication of Smallpox.
Tropical Doctor 1:33-35, 1970.
- (36) Henderson, DA
Smallpox Surveillance in the Strategy of Global Eradication.
Health Centre Journal 12:59-66, 1970.
- (37) Wehrle, PF, Posch, J, Richter, KH, Henderson, DA
An Airborne Outbreak of Smallpox in a German Hospital and its
Significance with Respect to Other Recent Outbreaks in Europe.
Bull. Wld. Hlth. Org. 43:669-679, 1970.
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Rey, M, Ristori, C, Sulianti-Saroso, J
Design for Immunization Programs in the Developing Countries.
International Conference on the Application of Vaccines
against Viral, Rickettsial and Bacterial Diseases of Man.
PAHO (Washington) (1971) 626-635 and Pediatrícia Indonesia
12:408- 426, 1972.
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Smallpox: The Problem.
International Conference on the Application of Vaccines
against Viral, Rickettsial and Bacterial Diseases of Man.
PAHO (Washington) (1971) 139-143.
- (40) Henderson, DA
Epidemiology in the Global Eradication of Smallpox.
Intl. J. Epidemiology 1:25-30, 1972.
- (41) Henderson, DA
Smallpox Vaccination.
Proceedings of the Seminar on Vaccination in Africa.
Centre International de l'Enfance (Paris), 1971,
pp. 44-46.

- (42) Henderson, DA, Arita, I
Monkeypox and its Relevance to Smallpox Eradication.
WHO Chronicle 27:145-148, 1973.
- (43) Henderson, DA
La Variole.
Médécine et Hygiène 31:709-719, 1973.
- (44) Henderson, DA
Eradication of Smallpox: The Critical Year Ahead.
Proc. Royal Soc. 66:493-500, 1973.
- (45) Henderson, DA
Genesis, Strategy and Progress of the Global Smallpox
Eradication Program.
J. Communicable Dis. 6:155-159, 1974.
- (46) Foegen, WH, Millar, JD, Henderson, DA
Smallpox Eradication in West and Central Africa.
Bull. Wld. Hlth. Org. 52:209-222, 1975.
- (47) Henderson, DA
Global Smallpox Eradication Programme.
Swasth Hind 19:116-118, 1975.
- (48) Henderson, DA
Smallpox Eradication - the Final Battle (Jenner Lecture).
J. Clinical Pathology, 28:843-849, 1975.
- (49) Henderson, DA
Surveillance of Smallpox.
Intl. J. Epidemiology 5:19-28, 1976.
- (50) Henderson, DA
Current Status of Smallpox in the World.
J. Com. Dis. 7:165-170, 1975.
- (51) Henderson, DA
The Eradication of Smallpox.
Scientific American 235:25-33, 1976.
- (52) Arita, I and Henderson, DA
Monkeypox and Whitepox Viruses in West and Central Africa.
Bull. Wld. Hlth. Org. 53:347-353, 1976.
- (53) Henderson, DA
Smallpox Eradication.
Proc. R. Soc., London, 199:83-97, 1977.
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- (63) Henderson, DA
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Developing Countries.
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for Developing Countries, Geneva, July 1987 (in press).
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Ernst Jung Prize Symposium, 1987 (in press).
- (73) Henderson, DA
Session I: Strategies for Vaccine Delivery: Introduction
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May-June 1989, 1987 (in press).
- (74) Henderson, DA
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Reviews of Infectious Diseases, 1987 (in press).
- (75) Henderson, DA
Child Survival Revolution
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February 1990

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Prevention
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February 1990

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Introductory Note to: "Outbreaks of Smallpox Due to
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Epidemiology, Vol. 128, No. 1, 1988.
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World Health, 1989 (in press).

HENDERSON, DONALD AINSLIE, university dean; b. Cleve., Sept. 7, 1928; s. David Alexander and Grace Eleanor (McMillan) H., m. Nana Irene Bragg, Sept. 1, 1951; children: Leigh Ainslie, David Alexander, Douglas Bruce. B.A., Oberlin (Ohio) Coll., 1950, D.Sc. (hon.), 1979; M.D., U. Rochester (N.Y.), 1954, D.Sc. (hon.), 1977; M.P.H., Johns Hopkins U., 1960; LL.D. (hon.), Marietta (Ohio) Coll., 1978; D.Sc. (hon.), U. Ill., 1979, U. Md., 1980; M.D. (hon.), U. Geneva, 1980; L.H.D. (hon.), SUNY, 1981; D.Sc. (hon.), Yale U., 1986. Diplomate: Am. Bd. Preventive Medicine. Intern. then resident Mary Imogene Bassett Hosp., Cooperstown, N.Y., 1954-55, 57-59; chief epidemic intelligence service Center Disease Control, USPHS, Atlanta, 1955-57; chief surveillance sect. Center Disease Control, USPHS, 1960-66; chief med. officer smallpox eradication WHO, Geneva, 1966-77; dean Johns Hopkins U. Sch. Hygiene and Pub. Health, 1977—. Contr. articles to med. journals. Recipient Commendation medal USPHS, 1962, Disting. Service medal, 1976; Ernst Jung prize, 1976; award Govt. India-Indian Soc. Malaria and Other Communicable Diseases, 1975; Rosenhaus internat. award for excellence, 1975; George MacDonald medal London Sch. Hygiene and Tropical Medicine, Royal Soc. Tropical Medicine and Hygiene, 1976; Health medal Govt. Afghanistan, 1976; Spl. Albert Lasker Pub. Health Service award for WHO, 1976; Public Welfare medal Nat. Acad. Scis., 1978; Joseph C. Wilson award in internat. affairs, 1978; James D. Bruce Meml. award, 1978; 50th Anniversary Disting. Service award Blue Cross-Blue Shield, 1979; medal for contbns. to health Govt. of Ethiopia, 1979; Outstanding Alumnus award Delta Omega, 1980; Disting. Alumnus award Johns Hopkins U., 1982; Internat. Ment award Gairdner Found., 1983; Albert Schweitzer Internat. prize for medicine, 1985; Nat. Medal Sci., 1986; Richard T. Hewitt award Royal Soc. Medicine, 1986; Charles Dana Found. award for Pioneering Achievement in Health, 1986; Japan prize in Preventative Medicine, 1988. Fellow Nat. Acad. Arts and Scis., Am. Acad. Pediatrics (hon.), Royal Coll. Physicians U.K. (hon.); mem. Nat. Acad. Arts & Scis., Inst. Medicine Nat. Acad. Scis., Am. Public Health Assn., Internat. Epidemiol. Assn., Royal Coll. Physicians (Edinburgh), Royal Soc. Tropical Medicine and Hygiene, Indian Soc. Malaria and Other Communicable Diseases. Home: 3802 Greenway Baltimore MD 21218 Office: John Hopkins U. Sch. Hygiene Pub. Health 615 N. Wolfe St Baltimore MD 21205

THE WHITE HOUSE
WASHINGTON

August 2, 1990

MEMORANDUM FOR C. BOYDEN GRAY

FROM: D. ALLAN BROMLEY *AW*

SUBJECT: NSF DIRECTORSHIP

At Chase Untermeyer's suggestion I am writing to you to request that an announcement of the President's intent to nominate Walter Massey to the Directorship of the National Science Foundation be made as soon as possible. The incumbent, Erich Bloch, retires as of September 1 and such an announcement would put an end to a very active rumor mill as well as returning stability to the NSF staff.

I shall much appreciate your help.

cc: Chase Untermeyer

THE WHITE HOUSE
WASHINGTON

January 2, 1990

Mr. Honorable Rich Eck
Dresden, N.Y.

Dear Rich:

Enclosed here with is a listing
of the figures from the forthcoming
Science and Engineering Indicators -
1989 of which I would very
much appreciate 8 1/2 x 11 hard
copies and standard vignettes for
use in Congressional testimony.

Again, many thanks

Sincerely

Dolan

It's a great report!

D.A.S.

Figures: Science and Engineering Indicators-1989

0-1, 0-2, 0-3, 0-4, 0-11, 0-16, 0-18

0-22, 0-23, 0-24

1-9, 1-10, 1-11, 1-12, 1-13, 1-14, 1-17

1-19, 1-20

2-5, 2-6, 2-8, 2-9

3-16

4-4, 4-7,

5-2, 5-3, 5-10

6-1, 6-5,

7-2, 7-7

8-1.

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20508

DATE: January 2, 1990

TO: The Honorable Erich Bloch
ADDRESS: Director, NSF

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FAX NUMBER: 357-9725

FROM: D. Allan Bromley

TELEPHONE NUMBER: 456-7116

FAX NUMBER: (202) 395-3261

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DATE: January 2, 1990

TO: The Honorable Erich Bloch
ADDRESS: Director, NSF

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FAX NUMBER:

357-9725

FROM: D. Allan Bromley

TELEPHONE NUMBER: 456-7116

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(b)(1) National security classified information [(b)(1) of the FOIA]
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(b)(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
(b)(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
(b)(9) Release would disclose geological or geophysical information

THE WHITE HOUSE

WASHINGTON

June 21, 1990

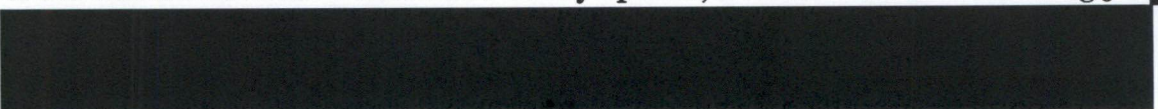
MEMORANDUM FOR JOHN H. SUNUNU

FROM: D. ALLAN BROMLEY 

SUBJECT: NSF DIRECTORSHIP

(b)(6)

As you know, Erich Bloch is coming to the end of his six year appointment as Director of the National Science Foundation. In my opinion, he has done an outstanding job 



That concluded, in April I asked Dr. Mary Good, Senior Vice President for Technology of Allied Signal, and Chairman of the National Science Board, to chair a search committee for Erich's replacement. This approach is in accordance with the National Science Foundation's Organic Act, (42 U.S.C. 1864), Section 5(a) which states that "The Director of the Foundation (referred to in this Act as the "Director") shall be appointed by the President by and with the advice and consent of the Senate. Before any person is appointed as Director, the President shall afford the Board an opportunity to make recommendations to him with respect to such appointment.

As part of the search the NAS, NAE, and AAAS were asked to provide recommendations. Recommendations were also received from a number of the major scientific societies and from a wide spectrum of individual scientists and engineers.

From this input the search committee has winnowed the list to four persons. They are the following:



Walter E. Massey Vice President
University of Chicago



(b)(6)

I have known all four of these candidates for many years and would note that two of them, [REDACTED] and Massey, are [REDACTED].

My recommendation is that the President nominate Walter E. Massey to the NSF Director with [REDACTED] as the alternate, if one should be required. I am enclosing their curriculum vitae herewith. [REDACTED] while Massey's field is condensed matter physics.

While I have a high regard for [REDACTED], I do not believe that either would be as successful in leading the NSF in the critical years ahead as would [REDACTED] or Massey.

Massey did his graduate work in condensed matter physics and from 1958 through 1979 pursued an outstanding academic career in this area ending as Professor of Physics and Dean of the College at Brown University. From there he was recruited to be the Director of the Argonne National Laboratory and to an adjunct appointment as Professor of Physics at the University of Chicago. In 1982 he relinquished the Directorship of the Argonne Laboratory to take over as Vice President for Research of the University of Chicago and as the University of Chicago officer responsible for exercising the University's management of the Argonne Laboratory under contract with the U.S. Department of Energy. Concurrently he serves as Chairman of the Board of the Argonne National Laboratory/University of Chicago Development Corporation.

Walter Massey has also played a very active role in U.S. science policy. He served as a member of the National Science Board from 1978 through 1984; he was President and then Chairman of the Board of the American Association for the Advancement of Science in 1988-1990 and has recently been named as President-elect of the American Physical Society.

As his curriculum vita indicates he has had broad experience in a variety of state, national and international activities and serves on a number of major corporate Boards of Directors.

He is widely considered to be the Nation's most distinguished black scientist.

Enclosures

CURRICULUM VITAE -- WALTER E. MASSEY

May 1990

Born: Hattiesburg, Mississippi, April 5, 1938

Marital Status: Married -- Shirley Ann Streeter
Children -- Keith and Eric

Address: 4950 Chicago Beach Drive
Chicago, Illinois 60615

Telephone: Offices -- 312/702-6021 or 708/972-5330

Present Position: Vice President for Research
and for Argonne National Laboratory
and
Professor of Physics
The University of Chicago
5801 Ellis Avenue
Chicago, Illinois 60637

Education:

<u>Institution</u>	<u>Inclusive Dates</u>	<u>Degree and Date</u>
Royal Street High School Hattiesburg, Mississippi	1952-1954	(Did not graduate; entered college from 10th grade.)
Morehouse College Atlanta, Georgia	1954-1958	B.S., Physics and Math, 1958
Columbia University New York, New York	Summer 1958	None
Howard University Washington, D.C.	1959-1960	None
Washington University St. Louis, Missouri	Sept. 1960-Jan. 1966	M.A., Ph.D., January 1966

Ph. D. Research:

Development of a theory and the calculations of the ground state properties of liquid helium.

Thesis Title:

"Ground State of Liquid Helium: Boson Solutions for Mass 3 and 4." Available at Olin Library,
Washington University, St. Louis, Missouri.

Research Supervisor: Dr. Eugene Feenberg
Washington University
St. Louis, Missouri

Fellowships and Scholarships:

1. Ford Foundation Early Admission Scholarship: Morehouse College, 1954
2. National Defense Act Fellowship: Howard University, 1959
3. National Science Foundation Fellowship: Washington University, 1961
4. Academic Administration Fellow: American Council on Education, 1975

Professional Organizations:

1. American Association for the Advancement of Science
2. American Association of Physics Teachers
3. American Nuclear Society
4. American Physical Society
5. New York Academy of Sciences
6. Society of Sigma Xi

Honors and Awards:

1. "Outstanding Educator of America" Award, 1974
2. "Distinguished Service Citation" of the American Association of Physics Teachers (AAPT) for "Exceptional Contributions to the Teaching of Physics." 1975
3. University of Illinois College of Engineering Alumni Honor Award for "Distinguished Service in Engineering," 1988
4. Honorary Fellow Award, Society for Technical Communication, 1989
5. Listed: Who's Who in the East and Who's Who in America
6. Doctor of Science Honorary Degree, Lake Forest College, Lake Forest, Illinois, 1981
7. Doctor of Science Honorary Degree, Williams College, Williamston, Massachusetts, 1981
8. Doctor of Science Honorary Degree, Elmhurst College, Elmhurst, Illinois, 1982
9. Doctor of Science Honorary Degree, Atlanta University, Atlanta, Georgia, 1982
10. Doctor of Science Honorary Degree, Rutgers University, New Brunswick, New Jersey, 1984
11. Doctor of Science Honorary Degree, Morehouse College, Atlanta, Georgia, 1984
12. Doctor of Science Honorary Degree, Marquette University, Milwaukee, Wisconsin, 1987
13. Doctor of Science Honorary Degree, Boston College, Boston, Massachusetts, 1987
14. Doctor of Science Honorary Degree, Northern Illinois University, DeKalb, Illinois, 1989
15. Doctor of Science Honorary Degree, Rensselaer Polytechnic Institute, Troy, New York, 1989

Employment History:

- | | |
|--|---|
| 1. <i>Morehouse College</i>
1958-1959 | Instructor of Physics |
| 2. <i>Atlanta University</i>
Summer 1959 | Instructor of Physics |
| 3. <i>Howard University</i>
Summer 1960 | Instructor of Physics |
| 4. <i>Washington University</i>
1960-1961
January 1966-July 1966 | Teaching Assistant
Postdoctoral Research Associate |
| 5. <i>Argonne National Laboratory</i>
July 1966-June 1968
June 1968-September 1968 | Postdoctoral Fellow
Staff Physicist |
| 6. <i>University of Illinois</i>
September 1968-January 1970 | Assistant Professor of Physics |

Employment History (contd.):

- | | | |
|-----|---|---|
| 7. | <i>Brown University</i>
1970-1973
1975-July 1979 | Associate Professor
Professor of Physics and Dean of the College |
| 8. | <i>Argonne National Laboratory</i>
July 1979-1984 | Laboratory Director |
| 9. | <i>The University of Chicago</i>
July 1979- | Professor of Physics |
| 10. | <i>The University of Chicago</i>
1982-1984 | Vice President for Research and Laboratory
Director, Argonne National Laboratory |
| 11. | <i>The University of Chicago</i>
1984- | Vice President for Research and for Argonne
National Laboratory |
| 12. | <i>Argonne National Laboratory/
University of Chicago Development
Corporation</i>
August 1986- | Chairman of the Board |

Other Relevant Experience:A. National Science and Science Policy Experience:

1. *Commission on College Physics*
Member of study group to develop proposals for the improvement of the teaching of physics in high schools and colleges, 1971, 1972
2. *American Physical Society*
Executive Committee, New England Section, 1971, 1972;
Councillor-at-Large, 1980-1983; Vice President, 1990
3. *American Institute of Physics*
Executive Committee on "Physics in the Predominately Black Colleges," 1971, 1972
4. *Aspen Center for Physics*
Participant, 1971, 1976, 1979
5. *National Academy of Sciences -- National Research Council*
Member, Physics Review Committee, 1972-1975
6. *National Academy of Sciences*
Advisory Committee on Eastern Europe and the USSR, 1973-1976
7. *American Association of Physics Teachers*
Committee on Physics in Higher Education, 1974-1977
8. *National Science Foundation*
Advisory Panel, Division of Physics, 1975-1977
Advisory Committee Directorate for Science and Engineering Education, 1985-1989

National Science and Science Policy Experience (contd.):

9. *National Science Board*, 1978-1984
10. *American Association for the Advancement of Science*
Fellow, 1962; Board of Directors, 1981-1985; President-Elect, 1987-1988;
President, 1988-1989; Chairman, 1989-1990
11. *Scientists' Institute for Public Information*
Board of Trustees, 1989-
12. *President's Council of Advisers on Science and Technology*
Member, 1990-

B. Other Academic and Educational Experience:

1. *Graduate Records Examination Board*
Advanced Physics Examination Committee, 1974, 1975
2. *United States Department of Health, Education and Welfare*
Fund for the Improvement of Postsecondary Education
Board of Advisors, 1976-1979
3. *Association of American Universities*
Energy Advisory Committee, 1979-1980
4. *American Association of Colleges*
Commission on Institutional Development and National Affairs
1979-1981
5. *Science Research Institute, Atlanta University Center*
Advisory Board, 1979-1981
6. *Washington University*
Board of Trustees, 1980-1981
7. *Brown University*
Board of Trustees, 1980-
8. *Northwestern University*
Visiting Committee of the College of Arts and Sciences, 1982-1985
9. *Massachusetts Institute of Technology*
Department of Physics Corporation Visiting Committee, 1982-
10. *Harvard University*
Committee to Visit the Department of Physics, 1985-1989

C. Civic, Cultural and Community Affairs:

1. *Urban League of Rhode Island*
Board of Directors, 1973-1975
2. *KQED Television, Inc., San Francisco*
Project Advisory Committee, 1977-1980

Civic, Cultural and Community Affairs (contd.):

3. *World Book-Childcraft International, Inc.*
Advisory Board, 1979-1982
4. *Chicago Museum of Science and Industry*
Board of Trustees, 1980-1989
5. *Mayor's Task Force on High Technology Development, City of Chicago*
Chairman, 1981-1982
6. *Governor's Commission on Science and Technology, State of Illinois*, 1982-1989
7. *Chicago High Tech Association*
Chairman, Board of Directors, 1984-
8. *Chicago Symphony Orchestra*
Board of Trustees, 1984-1989
9. *Illinois Mathematics and Science Academy (high school)*
Board of Trustees, 1985-88
10. *United Way of Chicago*
Board of Directors, 1985-88
11. *Chicago Council on Foreign Relations*
Board of Directors, 1985-
12. *Institute for Illinois*
Board of Directors and Treasurer, 1986-
13. *Governor's Science Advisory Committee, State of Illinois*,
Executive Committee, 1989-
14. *Illinois Coalition*
Board of Directors, 1989-

D. International Experiences:

1. *American Nuclear Society, Scientific Exchange to the People's Republic of China*,
September/October 1980
2. *United States-South African Leadership Exchange Program, Study of South African Universities, Republic of South Africa*, August/September 1981
3. *Conference on Physics in Latin America, Rio de Janeiro, Brazil -- Planning Committee*,
July/August 1983
4. *United States-South African Leadership Exchange Program -- Council Member*, 1983-1989
5. *American Association for the Advancement of Science, African Regional Symposium on the Role of Scientific and Engineering Sciences in Development -- Co-chairman*, Mbanne, Swaziland, March 1984, and Grand Bassam, Ivory Coast, December 1984
6. *American Association for the Advancement of Science, Project to Strengthen Scientific and Engineering Infrastructure in Sub-Saharan Africa -- Co-chairman*, 1984-

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Collection:

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Series: Bromley, D. Allan, Files
Subseries: Alphabetical Subject Files
WHORM Cat.:
File Location: LA - National Science Foundation (NSF)

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(b)(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
(b)(9) Release would disclose geological or geophysical information

[REDACTED] (b)(6)

Date and Place of Birth:

[REDACTED]

Education:

[REDACTED]

Fellowships:

[REDACTED]

Professional Appointments:

[REDACTED]

Teaching Honors [REDACTED]:

[REDACTED]

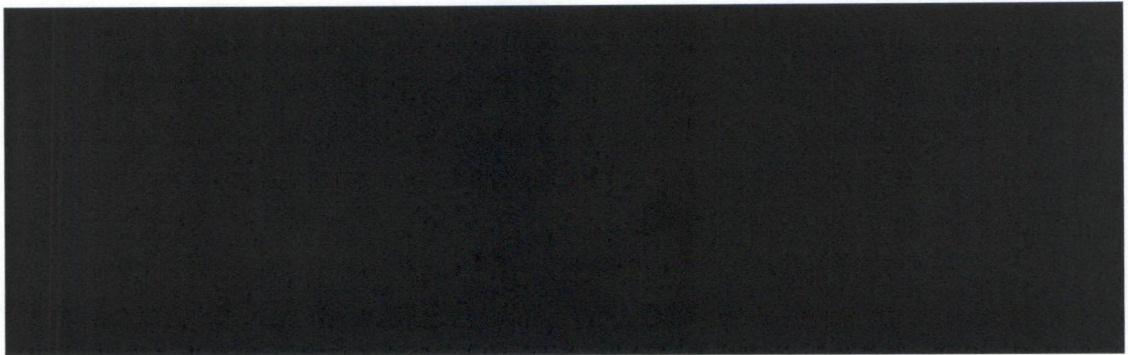
Special Lectures:

[REDACTED]

Invited Conference Papers:

[REDACTED]

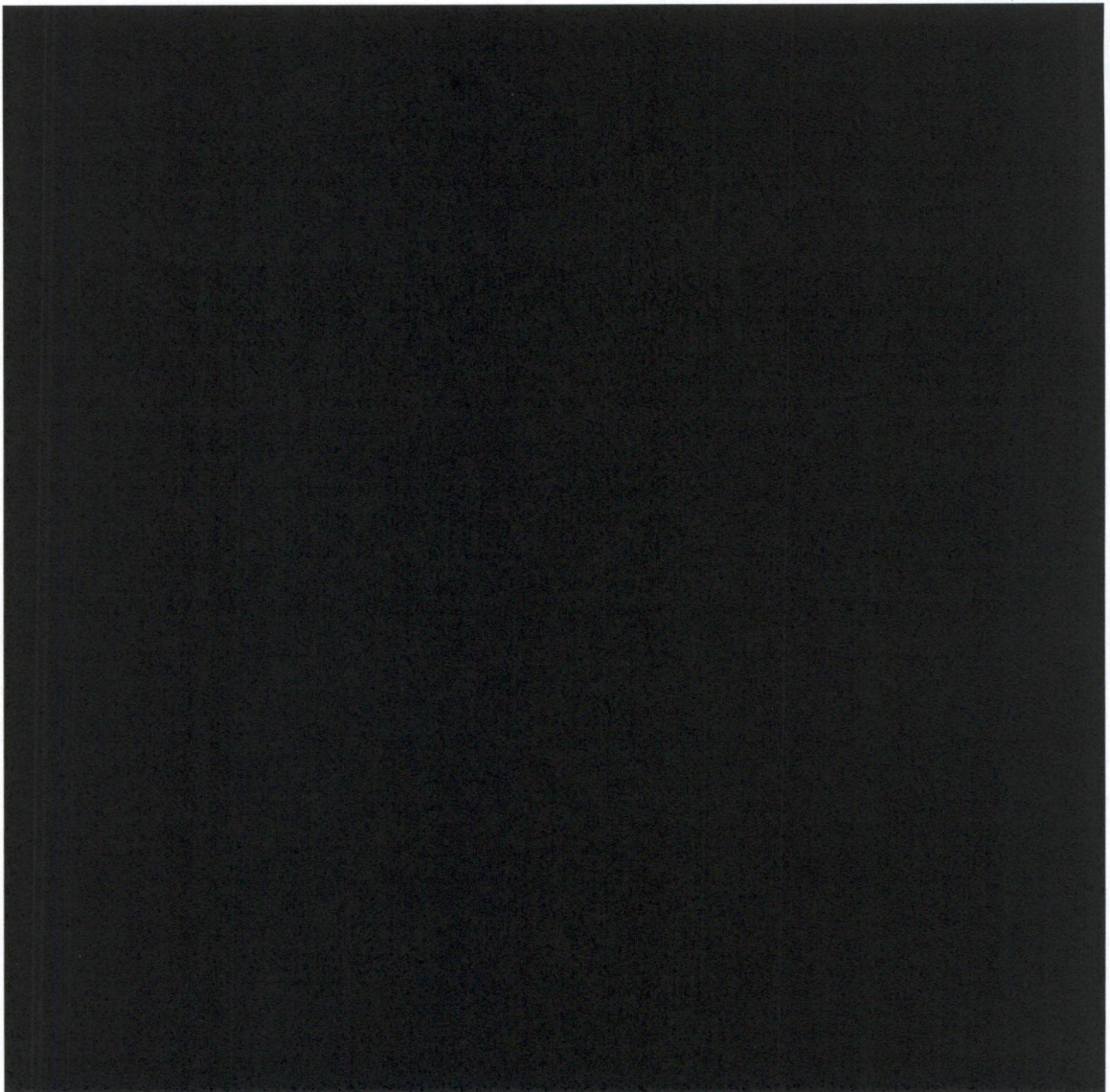
(b)(6)



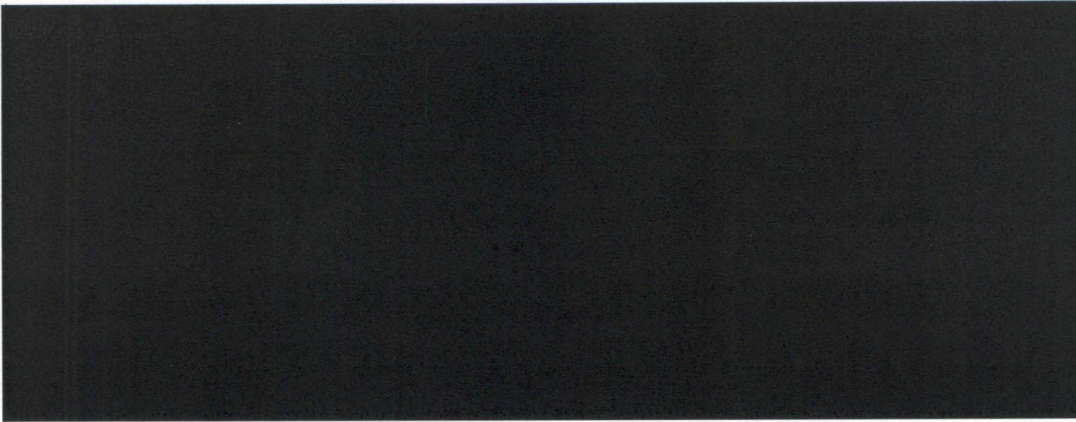
Book:



Professional Societies and Services:



(b)(6)



"CORRESPONDENCE TRACKING"

TYPE: Information

DOCUMENT NUMBER: 9023072

FROM: Willenbrock, Karl: NSF

TO: Bromley

**DATE OF
CORRESPONDENCE: 08/02/90**

SUBJECT: Book FYI, "Investing in the Future"

ASSIGNED TO:

ACTION REQUIRED:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 08/06/90

FILE: NEOB

NATIONAL SCIENCE FOUNDATION

WASHINGTON, D.C. 20550



OFFICE OF THE
ASSISTANT DIRECTOR
FOR SCIENTIFIC,
TECHNOLOGICAL, AND
INTERNATIONAL AFFAIRS

August 2, 1990

Honorable D. Allan Bromley
Assistant to the President for
Science and Technology
Executive Office of the President
Office of Science and Technology Policy
Washington, D.C. 20506

Dear Allan:

I heard indirectly of your interest in the work of the Science Policy Research Unit at the University of Sussex. Dr. John Irvine, a Senior Fellow at SPRU, recently completed a study with partial support from our Division of Science Resources Studies.

This study has been printed as a book entitled, "Investing in the Future." A copy is enclosed for your retention.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "F. Karl".

F. Karl Willenbrock
Assistant Director

cc: Mr. Erich Bloch

THE WHITE HOUSE
WASHINGTON

August 16, 1990

Dear Karl:

Many thanks for sending me the copies of the reports that John Irvine and his colleagues at the University of Sussex have recently produced. I found them to be extremely interesting and they provide imperative information on national funding systems that I have not found easy to obtain elsewhere.

I have always had a high opinion of the Sussex activity since their pioneering response to the Club of Rome's book entitled The Limits of Growth a number of years ago and perhaps as much as anything else, I have found the title of the Sussex response "The Limits of Doom", to be extremely well taken.

In my opinion, the Sussex group has established an excellent standard for policy studies generally and I am pleased to see that you and your colleagues in NSF are supporting some of their activities.

Again, my thanks and with all best wishes,

Sincerely yours,



D. Allan Bromley
Assistant to the President
for
Science and Technology

Dr. F. Karl Willenbrock
Assistant Director for Scientific,
Technological, and International Affairs
National Science Foundation
1800 G Street, Northwest
Washington, D.C. 20550

THE WHITE HOUSE
WASHINGTON

August 7, 1990

MEMORANDUM FOR JAMES W. CICCONI

FROM: D. ALLAN BROMLEY *Alan*
SUBJECT: ERICH BLOCH'S RETIREMENT

As you know, Erich Bloch retires September 1 after six years of service as Director of the National Science Foundation. In my opinion he has done an outstanding job and, indeed, been the most effective Director in the history of the Foundation.

I would hope that the President would be willing to send Erich a letter along the lines of the enclosed draft marking this occasion.

I know too that Erich would be extremely pleased were the President to sign the enclosed photograph of Erich and his wife, Rene, in some appropriate fashion.

Many thanks for your help.

Enclosures

**DRAFT LETTER FROM PRESIDENT BUSH TO ERICH BLOCH
UPON HIS DEPARTURE FROM THE NATIONAL SCIENCE FOUNDATION**

Dear Erich:

I am very sorry to see your six-year term at the helm of the National Science Foundation come to an end. You have presided over one of the most dynamic and productive periods in the Foundation's history, and I am sure that people will look back on your time there as one of NSF's brightest moments.

Today, NSF is a stronger and more influential agency than it has ever been before--largely because of your leadership. You have raised the visibility of the Foundation in the eyes of the public, the Administration, and the Congress by linking its programs more closely to the problems and goals of the country. You have initiated innovative partnerships and cooperative arrangements that have greatly strengthened key areas of science and technology. Your emphasis on engineering research, computer sciences, and computer networking will fuel our country's competitiveness for years to come.

Your commitment to international cooperation in science and technology has also paid great dividends. By strengthening our ties with Japan and the Soviet Union, you have helped distribute the costs of basic science and technology and have sped the pace of scientific progress.

I also want to thank you for your commitment to mathematics and science education. You know that I believe that improvement of all sectors of our educational system is one of the most serious problems that our country faces--particularly in the areas of science and technology. I appreciate the fact that the education and human resources programs now constitute 20 percent of the NSF budget, despite the ever-growing opportunities in research. Your focus on programs for women and minorities is especially heartening, since we will need many more women and underrepresented minorities in the educational pipeline if we are to meet the need for future scientists and engineers.

We in the Administration are going to continue to work for the goals you helped establish, including a doubling of the NSF budget by 1993. It is one of the best investments of Federal dollars that we can make, with payoffs that will extend many years into the future.

I wish you every success and happiness in all of your future endeavors. It has been a pleasure working with you these last six years.

Barbara joins me in sending you and Rene our very warmest best wishes,

Sincerely,

THE WHITE HOUSE
WASHINGTON

August 2, 1990

MEMORANDUM FOR C. BOYDEN GRAY

FROM: D. ALLAN BROMLEY *AW*

SUBJECT: NSF DIRECTORSHIP

At Chase Untermeyer's suggestion I am writing to you to request that an announcement of the President's intent to nominate Walter Massey to the Directorship of the National Science Foundation be made as soon as possible. The incumbent, Erich Bloch, retires as of September 1 and such an announcement would put an end to a very active rumor mill as well as returning stability to the NSF staff.

I shall much appreciate your help.

cc: Chase Untermeyer

THE WHITE HOUSE

WASHINGTON

June 11, 1990

Dear Dr. Barrett:

Thank you for sending a copy of your letter to Erich Bloch. I share your enthusiasm for the increased emphasis on mathematics and science education within NSF, and indeed throughout the Administration. Clearly the area of education and human resources is a most important one to all of us in the mathematics and science community.

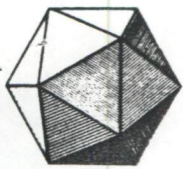
Improving education for all students, and at all levels, is critically important. Thank you for your commitment to attaining this goal for our nation.

Sincerely,

A handwritten signature in dark ink, appearing to read "D. Allan Bromley". The signature is fluid and cursive, with the first name "D." being small and the last name "Bromley" being larger and more prominent.

D. Allan Bromley
Assistant to the President
for
Science and Technology

Dr. Lida K. Barrett
President
Mathematical Association of America
College of Arts & Sciences
Mississippi State University
Drawer AS
Mississippi State, MS 39762



The MATHEMATICAL ASSOCIATION of AMERICA

Lida K. Barrett, President

June 4, 1990

Mr. Erich Bloch
Director
National Science Foundation
1800 G Street, N.W.
Room 520
Washington, DC 20550

Dear Mr. Bloch:

On behalf of the Mathematical Association of America and its 30,000 members, I would like to express strong support for the new directions in which you are leading the Foundation's efforts in education. We are especially pleased to see increased emphasis on integrated planning and coordinated programs, up and down the varied levels of education and across the broad spectrum of interactions with research and human resource issues. In recently released guidelines, such as those for the Alliances for Minority Participation program, we also see a new Foundation emphasis on programs that will produce real results, and in real time. These new thrusts parallel similar efforts being made within our own organization and the U.S. mathematics education community more broadly. We applaud them heartily.

For too long, national efforts to improve education in mathematics, science, and technology have been fragmented. Numbers of important projects have been supported, but numbers of questionable ones have also, for the simple reason that a coherent plan has been lacking. National leadership in education requires more than enthusiasm and commitment. It requires vision and planning as well.

In Luther Williams, you have chosen a man of remarkable vision to lead the Foundation's bold new effort in education and human resources. We stand ready to cooperate with him and the other directorates of the Foundation in every way possible, to work toward the common goal of excellence in education -- for all students, at all levels.

Sincerely,

Lida K. Barrett
President
Mathematical Association of America

xc. Dr. D. Allan Bromley
Honorable Bob Traxler
Honorable Doug Walgren
Honorable Barbara Mikulski
Honorable Edward Kennedy

THE WHITE HOUSE
WASHINGTON

June 5, 1990

MEMORANDUM FOR MARY L. GOOD

FROM: D. ALLAN BROMLEY 
SUBJECT: NOMINEES FOR THE NSF DIRECTORSHIP

Although I know that you are nearing the end of your search process, I am enclosing herewith a letter from Dr. Richard Anthes, President of UCAR, with a further list. Some of these persons, I know, you have already included in your considerations and I am looking forward to your short list as soon as that becomes available.

Let me again tell you how much I appreciated your coming on such short notice to participate in the brain storming session for possible background for the G-7 Summit. The discussion was an extremely interesting one, and within a few days we will be sending you copies of our brief summaries of the material that we have made available to Ambassador McCormack for his use.

It was sad news indeed to learn of our colleague, Bob Noyce, sudden death on June 3. He had seemed to be in both excellent health and excellent spirits when he was with us for this recent meeting and he will be very much missed, not only at SEMATECH but throughout the entire electronics industry and beyond that, the entire high technology industry in this country. In my view, he was one of the few people who truly rates the appellation "genius."

THE WHITE HOUSE

WASHINGTON

April 4, 1990

Dear Erich,

I have heard from OMB in somewhat greater detail concerning the basis of their objection to the National Science Foundation request for information on social impact of potential research projects on minority recruitment, math and science literacy, etc. While recognizing that you may have good reasons for asking these questions of grant recipients, they view the imposition of the questions upon all applicants as inconsistent with the paperwork reduction act, and a counter-productive burden in time and cost to place upon applicants who will not be funded.

In my view, their argument has merit. Wouldn't it be better to devise a new approach and to request this additional information only of those who are actually supported by NSF?

Sincerely yours,



D. Allan Bromley
Assistant to the President
for
Science and Technology

Dr. Erich Bloch
Director
National Science Foundation
1800 G Street, N.W.
Washington, D.C. 20550

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
06. Letter	Allan Bromley to A.C. Anderson RE: National Science Foundation leadership (1 pp.)	3/28/90	(b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: Alphabetical Subject Files
WHORM Cat.:
File Location: LA - National Science Foundation (NSF)

Date Closed:	10/22/2009	OA/ID Number:	08715
FOIA/SYS Case #:	2005-0332-F	Appeal Case #:	
Re-review Case #:		Appeal Disposition:	
P-2/P-5 Review Case #:		Disposition Date:	
AR Case #:		MR Case #:	
AR Disposition:		MR Disposition:	
AR Disposition Date:		MR Disposition Date:	

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

P-1 National Security Classified Information [(a)(1) of the PRA]
P-2 Relating to the appointment to Federal office [(a)(2) of the PRA]
P-3 Release would violate a Federal statute [(a)(3) of the PRA]
P-4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
P-5 Release would disclose confidential advice between the President and his advisors, or between such advisors [(a)(5) of the PRA]
P-6 Release would constitute a clearly unwarranted invasion of personal privacy [(a)(6) of the PRA]

C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Removed as a personal record misfile.

Freedom of Information Act - [5 U.S.C. 552(b)]

(b)(1) National security classified information [(b)(1) of the FOIA]
(b)(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
(b)(3) Release would violate a Federal statute [(b)(3) of the FOIA]
(b)(4) Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]
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(b)(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
(b)(9) Release would disclose geological or geophysical information

THE WHITE HOUSE
WASHINGTON

March 28, 1990

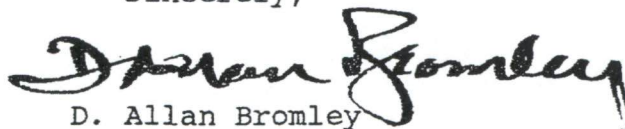
Dear Dr. Anderson:

Thank you for your letter of March 12 concerning the leadership of the National Science Foundation. I quite agree with you about the importance of replacing Erich Bloch with an equally outstanding individual.

(b)(6) I know [REDACTED] well and share your feelings about her experience and abilities. As the selection process begins, I will bear in mind your recommendation.

I sincerely appreciate your taking the time to write.

Sincerely,

A handwritten signature in dark ink, appearing to read "D. Allan Bromley". The signature is fluid and cursive, with a large, prominent "B" at the end.

D. Allan Bromley
Assistant to the President
for
Science and Technology

Dr. A.C. Anderson
Head and Professor
Department of Physics
University of Illinois at
Urbana-Champaign
Urbana, ILL 61801

THE WHITE HOUSE

WASHINGTON

November 22, 1989

Giech
Dear Mr. Bloch:

I commend you and your staff for the outstanding program the National Science Foundation provided this year for the Presidential Awardees in Teaching Mathematics and Science. There was no doubt that the teachers were most appreciative of the ceremonies acknowledging their expertise and dedication to their profession.

I would like to call your attention to Title III of Report 101-128 of the U.S. Senate Committee on Appropriations which included the following paragraph:

In addition, the Committee is concerned about the failure of the Department of Education and the National Science Foundation to cooperate more readily on steps to improve math, science and engineering education. Too often the NSF's educational materials have not had the chance to be properly distributed through the extensive education network. For this reason, the Committee directs the OSTP to take immediate steps to improve any and all coordination problems between the two agencies and to report to the Committee by March 1, 1990, on the progress they have made on this matter.

To reply to the Senate Committee on Appropriations in a timely fashion, I would like to meet with you and Secretary Cavazos as soon as possible to discuss ways by which our agencies can comply with the Committee's request. If you have no objection, I will have a member of my staff contact your office to arrange the meeting for us. I look forward to seeing you soon.

Sincerely,

D. Allan

D. Allan Bromley
Assistant to the President
for Science and Technology

The Honorable Erich Bloch
Director, National Science Foundation
1800 G Street N.W.
Washington, D.C. 20550

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
07. Memo	Allan Bromley to John Sununu RE: NSF Directorship (2 pp.)	6/21/90	(b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: Alphabetical Subject Files
WHORM Cat.:
File Location: LA - National Science Foundation (NSF)

Date Closed: 10/22/2009	OA/ID Number: 08715
FOIA/SYS Case #: 2005-0332-F	Appeal Case #:
Re-review Case #:	Appeal Disposition:
P-2/P-5 Review Case #:	Disposition Date:
AR Case #:	MR Case #:
AR Disposition:	MR Disposition:
AR Disposition Date:	MR Disposition Date:

RESTRICTION CODES

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C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Removed as a personal record misfile.

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(b)(1) National security classified information [(b)(1) of the FOIA]
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THE WHITE HOUSE

WASHINGTON

June 21, 1990

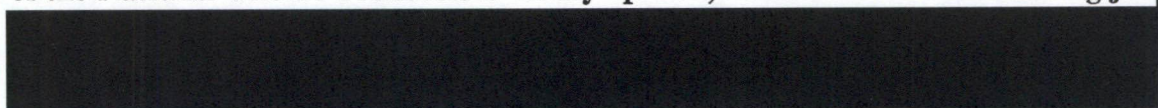
MEMORANDUM FOR JOHN H. SUNUNU

FROM: D. ALLAN BROMLEY 

SUBJECT: NSF DIRECTORSHIP

(b)(6)

As you know, Erich Bloch is coming to the end of his six year appointment as Director of the National Science Foundation. In my opinion, he has done an outstanding job 



That concluded, in April I asked Dr. Mary Good, Senior Vice President for Technology of Allied Signal, and Chairman of the National Science Board, to chair a search committee for Erich's replacement. This approach is in accordance with the National Science Foundation's Organic Act, (42 U.S.C. 1864), Section 5(a) which states that "The Director of the Foundation (referred to in this Act as the "Director") shall be appointed by the President by and with the advice and consent of the Senate. Before any person is appointed as Director, the President shall afford the Board an opportunity to make recommendations to him with respect to such appointment.

As part of the search the NAS, NAE, and AAAS were asked to provide recommendations. Recommendations were also received from a number of the major scientific societies and from a wide spectrum of individual scientists and engineers.

From this input the search committee has winnowed the list to four persons. They are the following:



Walter E. Massey Vice President
University of Chicago



(b)(6)

I have known all four of these candidates for many years and would note that two of them, [REDACTED] and Massey, are [REDACTED].

My recommendation is that the President nominate Walter E. Massey to the NSF Director with [REDACTED] as the alternate, if one should be required. I am enclosing their curriculum vitae herewith. [REDACTED] while Massey's field is condensed matter physics.

While I have a high regard for [REDACTED], I do not believe that either would be as successful in leading the NSF in the critical years ahead as would [REDACTED] or Massey.

Massey did his graduate work in condensed matter physics and from 1958 through 1979 pursued an outstanding academic career in this area ending as Professor of Physics and Dean of the College at Brown University. From there he was recruited to be the Director of the Argonne National Laboratory and to an adjunct appointment as Professor of Physics at the University of Chicago. In 1982 he relinquished the Directorship of the Argonne Laboratory to take over as Vice President for Research of the University of Chicago and as the University of Chicago officer responsible for exercising the University's management of the Argonne Laboratory under contract with the U.S. Department of Energy. Concurrently he serves as Chairman of the Board of the Argonne National Laboratory/University of Chicago Development Corporation.

Walter Massey has also played a very active role in U.S. science policy. He served as a member of the National Science Board from 1978 through 1984; he was President and then Chairman of the Board of the American Association for the Advancement of Science in 1988-1990 and has recently been named as President-elect of the American Physical Society.

As his curriculum vita indicates he has had broad experience in a variety of state, national and international activities and serves on a number of major corporate Boards of Directors.

He is widely considered to be the Nation's most distinguished black scientist.

Enclosures

THE WHITE HOUSE
WASHINGTON

December 19, 1990

MEMORANDUM FOR JOHN H. SUNUNU

FROM: D. Allan Bromley



Herewith the latest salvo in GSA-NSF exchange. I remain convinced that forcing NSF to move would represent a very real mistake on many grounds. Your help in preventing this will be much appreciated.

Attachment



Administrator
General Services Administration
Washington, DC 20405

12/19/90

Copy to: Dr. White
Dr. Harp
Ms. MacFarlane

OFFICE OF THE DIRECTOR
1990 DEC 19 P 4:14

Mr. Frederick M. Bernthal
Acting Director
National Science Foundation
1800 G Street, N.W.
Washington, D.C. 20550

Dear Mr. Bernthal:

I am in receipt of your letter dated December 14, 1990, in which you restate your decision not to relocate. After careful review of all information and supporting documentation, including the position stated in your December 14 letter, I have determined that pursuant to section 210(e) of the Federal Property and Administrative Services Act of 1949, 40 U.S.C. 490(e), it is advantageous to the government in terms of economy and efficiency for the National Science Foundation (NSF) to relocate to the location selected by the recent competition and hereby direct NSF to do so.

In your December 14, 1990, letter you maintain that the formal review process cited in Mr. Handley's November 30, 1990, letter directing your agency to relocate was never initiated by NSF and thus your letter is not an appeal of that decision. While I understand your position, it is clear that your refusal to accept the relocation communicated by letter dated November 6, 1990, initiated a review by the Regional Administrator. This resulted in a review of the budgetary concerns and impact on your agency's mission addressed in your letter. No purpose would be served by a further review of your relocation by officials in our Washington regional office. Both the Real Estate Division and the Regional Administrator have evaluated all information presented in support of your determination not to relocate, and have communicated their decisions in prior letters.

Your agency's budgetary issues have been addressed by the General Services Administration (GSA) in various meetings and correspondence. With respect to your concern that you do not, at this time, have an appropriation from which you can expend money for relocation, and therefore cannot authorize GSA to enter into the lease, we point out that it is GSA that is

-2-

responsible for obligations concerning the lease under express statutory authority of the Congress.

The move is not scheduled until fiscal year 1993 and you have time to obtain funds through the budget process. The General Services Administration will provide assistance in obtaining the necessary funds for your relocation in future years from both the Office of Management and Budget and Congress.

It is my view that the statutory requirement for consultation has been met and that the matter must now be decided. The process of finding a suitable site for your relocation was initiated by you several years ago, and as stated above, you are hereby directed to relocate to the site selected by that process.

GSA looks forward to working with you on an efficient and economic relocation of your agency.

Sincerely,



for Richard G. Austin
Administrator