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Collection/Office of Origin: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: Organization Files - PCAST

OA/ID Number: 62078
Folder ID Number: 62078-002

Folder Title:
President's Council of Advisors for Science and Technology: General [5 of 7] [1992]

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Row:

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Position:

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"Document Control"

TYPE: INFORMATION

DOCUMENT NUMBER: 9202094

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: SHAPIRON, HAROLD

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/17/92

SUBJECT: LETTER TO DAVID PACKARD REGARDING THE PCAST MEETING
BEING HELD AT THE CALIFORNIA RANCH ON AUGUST 6-7.

DIRECTORATE
ASSIGNED:

STAFF
ASSIGNED:

ACTION
REQUIRED:

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:
DATE COMPLETED:

STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: PCAST
D. Allan Bromley

WHITE HOUSE TRACKING #:

CONTACT PERSON:
PHONE:

EXT:

REMARKS:

OSTP RECEIVED: 07/27/92
FILE: PCAST

DEPT RECEIVED:

CENTRAL FILES:

2094

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92 JUL 27 AM 11:33

CSTP
MAIL ROOM

July 17, 1992

The Honorable David Packard
Chairman of the Board
Hewlett-Packard Company
1501 Page Mill Road
Palo Alto, CA 94304

Dear David:

Much to my regret, I will be unable to join the special PCAST meeting to be held at your ranch in California on August 6-7. I am extremely grateful for the hospitality you have extended to all of us, but I have promised to spend that week with my children and grandchildren at our home on Lake Michigan. I am sorry to have to miss this meeting, both because of the substantive issues involved and because I will not have the opportunity to visit you in California. However, since my family is spread over such a wide geographic area, it is difficult to give up the chance to see them all.

My understanding is that the meeting at MIT went very well, and I look forward to Allan's report regarding the upcoming meeting at Berkeley. I myself will be moderating meetings in North Carolina and Washington in the next few weeks. I will of course send you my observations on these.

We had a very good PCAST meeting in Washington last week, and the staff is now preparing new drafts of various parts of our report on colleges and universities.

Best regards.

Sincerely,

Harold T. Shapiro

HTS/rm

bc: Ms. A. Barnett

Dr. A. Bromley ✓

"Document Control"

TYPE: ACTION DOCUMENT NUMBER: 9202557
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: EDWARDS, Robert H.: BOWDOIN COLLEGE

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/17/92

SUBJECT: HE IS FORWARDING HIS COMMENTS FOR THE PCAST PANEL
STUDYING RESEARCH INTENSIVE UNIVERSITIES.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/06/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: *NRN per AKD* PHONE: EXT:

OSTP RECEIVED: 07/23/92 DEPT RECEIVED:
FILE: P-PCAST

CENTRAL FILES:

2557

BOWDOIN COLLEGE

BRUNSWICK, MAINE 04011
207-725-3221

RECEIVED

PRESIDENT

July 17, 1992

92 JUL 23 AM 10:08

OSTP
MAIL ROOM

Mr. D. Allan Bromley
The Assistant to the President
for Science and Technology
The White House
Washington, D. C. 20500

Dear Mr. Bromley:

Thank you very much for your letter of June 8 regarding future relationships between American universities and the Federal Government. It could not be more timely to counter the political rhetoric of the day that suggests, observably incorrectly, that something in the American academic culture places it at odds with the mainstream of American values and social aspirations. Partnership, especially in the natural sciences, will be essential in the years ahead. As one who has lived a number of years in Europe and Asia, I know that the potential vitality of this partnership in the peacetime world is one clear American comparative advantage.

I write from the point of view of an undergraduate college with a long history of sending graduates in biology, biochemistry, chemistry, geology, and physics on to graduate programs. From that perspective, it is very unfortunate that your review, by concentrating on "research-intensive universities" seems to omit from its scrutiny the fifty or so "science colleges" that are also, because of the nature of science, also "research intensive" in the way they conduct their science programs. I am not sure that you would want to conduct a special sub-inquiry into the role of these colleges and their needs, but some special note surely needs to be taken of them. There are good statistics on their contributions, as you perhaps know, although, except for certain research-related NSF programs, they have been excluded from vital Federal laboratory renovation and construction programs.

There are many reasons why these colleges should be considered part of the basic scientific fabric of the country of which the research university is a part. Most important, I think, are:

- the high productivity of these colleges, relative to universities, over many decades in producing undergraduates for graduate degree programs in science and engineering -- and ultimately for teaching;

- the commitment of college faculty, while remaining actively researching scientists, to undergraduate teaching -- and to research and experimentation in the pedagogy of science (for example, at Bowdoin, the development of micro-scale techniques for organic chemistry labs that are now used widely around the country);
- the disposition of college faculty to be engaged with high-school math and science reform (for example, the just-awarded \$10 million NSF grant to the Maine Mathematics and Science Alliance, to improve K-12 science and math in the State of Maine, received strong inputs from Bowdoin mathematicians and physicists).

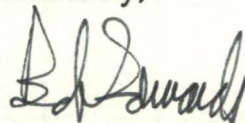
Bowdoin's examples would have analogues in many other colleges. The point is not to engage in special pleading but to suggest that, in the seamless web that constitutes a science-based society, there are vital higher-education resources that are quantitatively significant and qualitatively, substantively creative outside the research universities. It would be a loss, and inefficient, if they fell out of the culture of science.

These colleges could, in fact, fall out of that culture. As generous as our alumni are -- and their continuing generosity is incredible despite declining tax incentives -- the cost of laboratory and instrumentation renovation and replacement is getting beyond us. What we need is a high-quality, peer-reviewed, competitive, matching, capital-grant program, probably based in the NSF, under which colleges could compete against comparable institutions for grants for facilities that will enable us to continue to educate excellent young scientists.

I do hope your inquiry, to which we all wish much success, will find it possible not to overlook the nation's undergraduate science colleges.

With kind regards,

Sincerely,



Robert H. Edwards

RHE/jt

cc: Dr. Peter Likins
Dr. Harold T. Shapiro

"Document Control"

TYPE: ACTION DOCUMENT NUMBER: 9202558
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: STANLEY, PeterW.: POMONA COLLEGE

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/15/92

SUBJECT: HE IS FORWARDING HIS COMMENTS FOR THE PCAST PANEL
STUDYING RESEARCH INTENSIVE UNIVERSITIES.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

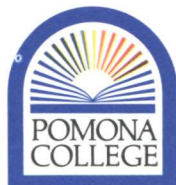
ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/06/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

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REMARKS: *NRN per AKD* PHONE: EXT:

OSTP RECEIVED: 07/23/92 DEPT RECEIVED:
FILE: P-PCAST
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2558
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The President

July 15, 1992

92 JUL 23 AM 10:08

Dr. D. Allan Bromley
The Assistant to the President for Science and Technology
The White House
Washington, DC 20500

Dear Dr. Bromley:

I was pleased to learn that the President's Council of Advisors on Science and Technology (PCAST) has undertaken a review of the relationship between the Federal government and research-intensive universities. This partnership has been at the core of the remarkable success of science in the United States since the Second World War, and it is therefore essential to ensure its continuing vitality. Since most research scientists and engineers in this country, as well as those who teach science and engineering at the undergraduate and postgraduate levels, have received their advanced training at research-intensive universities, the success of these institutions is critical to the success of the American scientific enterprise.

I hope, however, that while PCAST studies the relationship between the Federal Government and the research-intensive universities, it will not overlook the contributions of predominantly undergraduate institutions, such as Pomona College, to the education of America's scientists and to scientific research as well. The continuing success of U.S. science will require attention by the Federal government not only to research-intensive universities but also to undergraduate colleges.

I am sure the members of PCAST recognize the success of undergraduate colleges in preparing students for scientific careers. As documented in the reports of the Oberlin Conference (1985) and Project Kaleidoscope (1991), predominantly undergraduate institutions, especially selective liberal arts colleges, are disproportionately effective in educating future scientists. According to the Project Kaleidoscope report, undergraduate colleges constituted 10 of the nation's top 25 institutions in the percentage of graduates from 1970-82 who had earned doctorates in science by 1986. These institutions are remarkable not only for the proportion of scientists that they graduate, but for the high quality of those young scientists, many of whom compete successfully for national awards. Pomona College's alumni, for example, regularly receive NSF predoctoral fellowships. Although we graduate only about 350 students in all fields annually, in 1991

Letter to D. Allan Bromley

-2-

Pomona students and alumni received 7 of the 900 NSF Predoctoral Fellowships awarded nationally. In 1992 3 more of our graduates were so honored.

Our own experience and numerous studies, such as Project Kaleidoscope, indicate that a crucial reason that undergraduate institutions are so successful in educating future scientists is that students at these colleges have the opportunity to work closely with their professors on genuine research projects. It is through the doing of real science while they are still formulating their career plans that students can become excited by, and committed to, science. Cary Miller, a 1982 graduate of Pomona College and now Assistant Professor of Chemistry at the University of Maryland, writes of his summer research experience with Dr. Alvin Beilby of Pomona's Chemistry Department, "This summer of research played a decisive role in my eventual specialization in electrochemistry and my current position as assistant professor at the University of Maryland, College Park...At the time I did not fully appreciate that this research under Dr. Beilby would become a crucial, even catalytic, moment in my scientific career."

Undergraduate research was also critical in the decision of a more recent graduate, Julie Archer, Class of 1990, to pursue a scientific career. Having done well in courses in her first two years, Ms. Archer was nevertheless unsure that she was suited to be a scientist. Her mind was changed in the summer after her sophomore year, when she had the opportunity to work on an NIH-funded research project in the laboratory of Pomona Biology Professor Larry Cohen. Her enjoyment and success in that project, and a subsequent research experience at the University of California, San Francisco, persuaded her that she was not only capable, but desirous, of being a scientist. She is currently an NSF predoctoral fellow in biology at the Massachusetts Institute of Technology.

For these and many other Pomona College alumni--including such illustrious scientists as Roger Revelle, Edward Knapp, the former head of NSF, and National Academy of Sciences member Thomas Pollard--the opportunity to do research while they were undergraduates was instrumental in their career decisions. For that reason, it is essential that the Federal government help to ensure a vigorous research presence at predominantly undergraduate institutions at the same time that it works to sustain the research-intensive universities.

Supporting research at undergraduate colleges not only enhances their ability to teach and train future scientists; it is also a wise investment in the advancement of knowledge, for many productive scientists have chosen to work at colleges such as ours. According to surveys conducted by the Council on Undergraduate

Letter to D. Allan Bromley

-3-

Research, science professors at undergraduate institutions publish, on average, between 0.5 and 1 paper a year in refereed journals, often with student coauthors. While this may be less than the publication rate of university faculty, it nevertheless represents first-rate, peer-reviewed work. Our own faculty illustrates the quality of scientist that can be found at the college level.

Emeritus Professor Corwin Hansch, who has published over 250 papers, is one of the most frequently cited chemists in the world. Two biologists, Anna Glasgow and Rachel Levin, have recently received Presidential Young Investigator awards from NSF. While these individuals are exceptional, they are not unique; there are many active, funded, publishing scientists like them at Pomona and its sister colleges.

Certainly there is a need to reexamine and revitalize the relationship between the Federal government and research-intensive universities. The nation's scientific future will be poorer, however, unless the Federal government also sustains the quality of teaching and research at the undergraduate liberal arts colleges that play a disproportionately prominent role in educating and motivating future scientists. I hope that as PCAST formulates its recommendations to shape policies for research and education in science it will not overlook the importance of undergraduate colleges.

Sincerely yours,

A handwritten signature in blue ink, appearing to read "Peter W. Stanley".

Peter W. Stanley

cc: Mr. David Packard
Pres. Harold Shapiro

TYPE: ACTION DOCUMENT NUMBER: 9202576
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: BOERNER, Wolfgang M.: THE UNIVERSITY OF ILLINOIS

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/15/92

SUBJECT: HE IS FORWARDING HIS COMMENTS FOR THE PCAST PANEL ON
THE HEALTH OF U.S. UNIVERSITIES.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/07/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

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REMARKS: *NRA per AKD* PHONE: EXT:

OSTP RECEIVED: 07/24/92 DEPT RECEIVED:
FILE: P-PCAST
CENTRAL FILES:



The University of Illinois
at Chicago

5576

Communications and Sensing Laboratory (M/C 154)
Department of Electrical Engineering and Computer Science
840 West Taylor Street, SEL-4210
Chicago, Illinois 60607 [PO #: 60680-4348]
Tel/Fax +[1] (312) 996-5480/2456

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92 JUL 24 AID: 32
1992 July 15

D. Allan Bromley
Ass. to the President for Science & Technology
Director of the Office of Science & Technology Policy
Executive Office of the President
The White House
1600 Pennsylvania Avenue, N.W.
Washington, D.C. 20500
T/F:

Honorable D. Allan Bromley:

This is in response to your letter of 1992 June 08, to our Chancellor, Dr. James J. Stukel requesting the input of faculty members of UIC to the President's Council of Advisors on Science and Technology (PCAST).

In this context, I wish to draw your personal attention and that of the President's Council of Advisors on Science and Technology on my recent activities related to:

- (1) The Base Closures and Facilities Realignment Act, regarding Fort Sheridan, Lake County, Illinois Proposal for the Establishment of an "Great Lakes International Center for Ecological Research Education and Policy";
- (2) Various presentations on the topic of: 'The 1990ies -to- 2020ies - A transition from National Military toward Planetary Environmental Defense' in the USA, EC and CIS;
- (3) Participation in the "Second Sankt-Petersburg Conference on Higher (Secondary) Education in Europe and the World, 1992 June 20 - July 06".

and various memorandums dealing with the reuse and realignment of closed military facilities for the training of "Environmental Clean-up Brigades", and for the establishment of "International (Regional) Centers for Ecological Research, Education, Policy and Defense".

All of these issues deal with the request for a more active involvement of joint academic - industrial - governmental cooperation in forefront environmental research, education, policy and defense in which the leading research-intensive Universities will have to play a major role.

Looking forward to your direct response.

Sincerely yours,

Wolfgang-M. Boerner, Ph.D., Dipl.-Ing.
University of Illinois Senior Scholar
Professor & Director

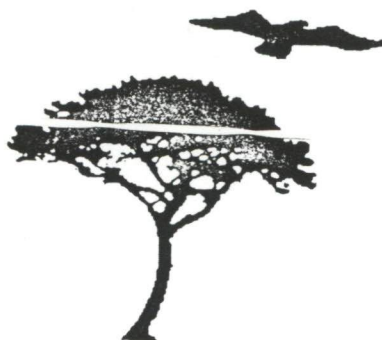
Enclosures

cc: Dr. James J. Stukel
Dr. John B. Wanat
Dr. Ronald P. Legon
Dr. Rick Schoell

WMB:mrmltr xi/1.24



Defense Industry and the Environmental Agenda - Symposium '91



October 9 -10, 1991

*Sheraton Premier
at
Tysons Corner, Vienna, VA*

PROCEEDINGS

National Security Industrial Association

available from: DR. D. BRENT POPE
Committee Executive
National Security Industrial Association
NSIA, Suite 300, 1025 Connecticut Ave., NW
WASHINGTON, D.C. 20036-5405
T/F: +[1](202)775-1440/1309

TYPE: INFORMATION

DOCUMENT NUMBER: 9202057

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: SPLETE, ALLEN: THE COUNCIL OF INDEPENDENT COLLEGES

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/15/92

SUBJECT: LETTER TO DR. BROMLEY REGARDING THE PCAST MEETING
AND ITS STUDY OF UNIVERSITIES AND THE FEDERAL
GOVERNMENT

DIRECTORATE
ASSIGNED:

STAFF
ASSIGNED:

ACTION
REQUIRED:

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:
DATE COMPLETED:

STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: PCAST
D. Allan Bromley

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OSTP RECEIVED: 07/15/92
FILE: PCAST

DEPT RECEIVED:

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THE COUNCIL OF INDEPENDENT COLLEGES

The National Service Association for Independent Colleges

92 JUL 15 AID: 23

July 13, 1992

OSTP
MAIL ROOM

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

Dear Dr. Bromley:

Thank you for your letter of June 18 regarding the review which PCAST is undertaking relative to relationships between research universities and the federal government. I commend you for taking on this initiative at a crucial time.

As you know, CIC represents the primary undergraduate feeder colleges for most of the large research universities. I do hope that their role and importance will somehow surface during your public meetings. Too often the area of undergraduate science is forgotten in the press of what research needs doing at the graduate level. I urge you and your council members not to forget this important relationship and trust that you will do all that you can to nurture support for undergraduate research facilities as well as for major graduate programs. Disregard for the needs of feeder colleges will compound the scarcity of those now interested in science careers.

CIC intends to continue its work with others to try to encourage more minority participation in science and engineering programs as part of its Black College Leadership program and through its exchange aspect of this program.

Best personal wishes for a productive set of meetings.

Sincerely,

Allen P. Splete
President

cc: Richard Rosser
Howard Holcomb

TYPE: . ACTION

DOCUMENT NUMBER: 9202543

ORIGINATOR: 02

STATUS I

DIRECTORATE STATUS

FROM: KLEIN, George D.

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/15/92

SUBJECT: HE IS FORWARDING HIS COMMENTS FOR THE PCAST PANEL
STUDY ON THE PARTNERSHIP BETWEEN THE FEDERAL
GOVERNMENT AND RESEARCH INTENSIVE UNIVERSITIES.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/04/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: *NRN PM AKD* PHONE: EXT:

OSTP RECEIVED: 07/20/92 DEPT RECEIVED:
FILE: P-PCAST

CENTRAL FILES:

2543

Dr. George D. Klein
P.O. Box 5061, Station A
Champaign, IL, 61825-5061

July 15, 1992

Dr. D. Allen Bromley
The Assistant to the President for Science and Technology
The White House
1600 Pennsylvania Avenue
Washington, DC. 20500

RECEIVED
JUL 20 12:22
OSTP
MAIL ROOM

Dear Dr. Bromley: **RE: Review, Partnership between Federal Government and Research-Intensive Universities.**

I write in a private citizen capacity although, for the record, I work as a professor of geology at the University of Illinois Urbana-Champaign. This letter is in response to a letter you sent to Dr. M.W. Weir, Chancellor of that university, and which was circulated to science faculty there.

In my view, the on-going review of the partnership between the Federal Government and Research-Intensive Universities is timely and necessary. Although such a partnership goes back to the Morrill Act and expanded over the last 50 years, that relationship clearly is at a cross-roads. Whether by design or accident, that partnership was intensified by the cold war, but seems to be diminishing in importance since the end of the cold war. Whether that timing is coincident or causal remains to be seen.

The current diminishing interest at the national level regarding science and technology is the result of deficit economics of the past decade and earlier, and the appearance of lack of interest at the highest level of this country's executive leadership. Over the past decade, despite modest increases in science funding, offset by inflation and recession, the infrastructure of science has deteriorated. The efficiency of scientific work has deteriorated. The morale of the scientific community has deteriorated. Increased bureaucratic mandates at the federal level and the campus level has also contributed to diminishing efficiency of scientific research.

Yet if America is to remain the world leader in science and technology, the partnership between the Federal Government and Research-Intensive Universities must be expanded in terms of financial support, there must be a clear sign that the executive leadership of this country wants such pre-eminence for this country, will work hard to help maintain it, and set the public tone so that the country is behind the effort. It must be done to maximize the efficiency of the time and efforts of the scientific community (translation: LESS bureaucracy at the campus and national level).

Here is a list of some things that such a future partnership might involve:

- (1) Increase the amount of funding for INDIVIDUALLY-INITIATED Scientific and Technological research funding.
- (2) Eliminate the bureaucratic system of "block funding".
- (3) Stabilize the funding for "big science projects" and require that they be accompanied by both a short-term and a long-term cost analysis.
- (4) Permit scientific projects to be funded for longer periods rather than current two-year funding cycle (such as at the National Science Foundation). A five-year funding cycle would be more efficient research-wise, and probably also cost-effective.

(5) Put a ceiling on campus overhead (indirect costs) so as to force university administrations to streamline their accounting and management of research funds (and probably eliminate abuses that have surfaced recently).

(6) Place a premium on scientific research that is not only Excellent (outstanding quality), but also RELEVANT (in the national interest in a particular discipline). Mandate that every proposal be accompanied by a three page summary of why the proposed research is in the best interests of the USA.

(7). Redesign the proposal procedure so that less time needs to be spent on exhaustive reviews of past work. Thus a limit of ten pages (double space; five pages single-spaced) of text should be adequate (In other countries, such as Canada and the Netherlands, they require no more than three to five pages of narrative). A shorter proposal would be more focused, and thus speed efficiency of proposal management at the federal level.

(8) Establish a national task force that undertakes a periodic (five-year?) review of the partnership between the Federal Government and Research-Intensive universities so as to fine-tune current practices and provide flexibility to the structure of science so it respond quickly to fast-moving changes or competition from abroad. Possibly such a review structure could include an annual review as well.

(9) Set aside about 10 percent of the annual research budget for research in all disciplines for meeting new challenges and new initiatives that are new significant and different that are outside the traditional track of scientific work, provided it demonstrates significance and relevance in terms of the national interest.

(10) Set aside an additional 10 percent for research that involves both cross-sub-disciplinary research within a discipline of science as well as between disciplines of science, with the same criteria capsulized in #9. The ability of American researchers to work along cross-intradisciplinary and interdisciplinary lines is perhaps one of the greatest strengths of the USA and it should be government policy to capitalize on this unique aspect of our country's cultural uniqueness (having travelled and worked overseas I can tell you that everything there tends to be structured in narrow subcompartments).

(11) Involve industrial participation with the partnership between the Federal Government and the Research-Intensive universities.

Obviously, this requires a major funding increase at the federal level, but the Federal Government must look at such research funding as AN INVESTMENT IN the future not just to maintain international scientific and technological leadership, but the products of such research should eventually lead to marketable products and services which should generate an increase in tax revenues.

Because we have never met, I enclose a copy of a brief biography of my scientific qualifications from a national directory for your information.

If questions remain, please feel free to write or telephone (217/333-2076).

Sincerely



George D. Klein

copies: Charles Drake
R. J. Kirkpatrick

Nat. Affairs; contrb. articles to ABA (vice chmn. subcom. on regulation of securities, chmn. task c. coun. securities com.); George ardin & Waite 1101 Connecticut

pany executive; b. Carbondale, e (Kallish) K.; m. Luce Weill-Florence, Joel, Rosine. B.A., U. grad., Sorbonne, is, 1947. Asst. r, 1948-50; producer Royal Acad. nder Spoken Arts, Inc., New d., 1987-; lectr. Am. theatre rno and Sidney at Watergate, ss Menagerie, on Continent and etches, in Europe, 1954-55; Codzovous at Senlis, 1949, Cecile or, is, 1970. Bd. dirs. Boys Clubs, ill. of New Rochelle. Served to Democrat Jewish. Home: 95 spoken Arts 310 North Ave New

consultant; b. N.Y.C., Jan. 29, m. Lynne Schneider; children: e Coll., 1964; MA in Econ., U. of UCLA, 1968-72; assoc. prof., search fellow Nat. Bur. Econ., pres. Econ. Analysis Corp., Los le, 1978; bd. dirs. Pilgrim Group Washington, 1976-86, bd. govs. es to prof. jous. Ford Found. 5-76, Law and Econ. fellow U. nd., 1981-87; recipient ann. prize U. Miami Law and Econ. Ctr., n Econ. Assn., 1979. Mem. Am. 05 Hilgard Ave Los Angeles CA

executive; b. N.Y.C., Sept. 20, m. Betty Stecher, Feb. 17, 1946; dy Ann. B.A., CCNY, 1942. —; founder, pres., chief editor B. Rye, N.Y., 1953-; cons. direct s., industry, 1950-; Author: all Guide to American Directories. Direct Mail Advt. Assn. Lodge:

N.Y.C., Nov. 19, 1942; s. Leo pr. 26, 1964 (div. 1974); 1 dau., Fashion Inst. Tech., 1962. Pres., itic Parsons Sch. Design; critic, pipient Coty award, 1973, 74, 75; s fashion design Coun. Fashion Council Fashion Designers, Mus. us., Guggenheim Mus. Office: ork NY 10018*

ty, Sept. 16, 1900; s. Samuel and June 30, 1933; 1 son, Richard r, 1949; postgrad., Villanova U. d Marshall Coll., 1959, U. Pa., on Coll., 1960; J.D., St. Joseph's ar: Pa. 1921. Since practiced in 7-31; spl. dep. atty. gen. 1931-34; dge Orphans Ct., 1952-; North cting dean Temple U. Sch. Law, mn. Investigation; counsel Joint Pa.; spl. asst. OPA; spl. adviser osp., Am. Jewish Com., Jewish einstein Med. Center; former dir. te, hon. chancellor Temple U. ert L. Johnson award; Lucien Honor award; B'nai B'rith Mid-r Temple U. Sch. of Law, 1959. Midday (Phila.). Law sch. bldg. 16 River Park Apts Philadelphia A 19107

N.Y.C., Sept. 2, 1919; s. Sam and r, Mar. 14, 1953; children—Peter d L., Suzanne G. B.A., Bklyn. A., Columbia U., 1952; postgrad., 66. Fgn. service officer 1947-75; 3d sec., econ. officer Rangoon, dies Dept. State, 1951-52; 2d sec., gensburg-Soviet studies 1954-55; c., polit. officer Bonn, Germany, r. mem. for European affairs Nat. affairs Moscow, 1966-67; coun-Berlin, 1968-71, U.S. minister to 74-75; exec. dir. Am. Council on John J. McCloy Fund, 1975-88; 1976-85; spl. asst. for fgn. affairs —; advisor on internat. programs Md., 1969-71; adj. prof. U. San Diego; chmn. bd. Zeiss Avionics, ii, a Study in Soviet Nationalities, n to Keystone of Security, 1989. —; vice chmn. bd. trustees Mercer , N.J., 1978-84; mem. adv. bd. m. bd. visitors internat. program orated Legion of Merit; recipient twice Baker Scholar Harvard U.; public of Germany), Distng. Svc. ard Bus. Coll. (v.p. Washington il on Fgn. Relations, Unitarian, ice: 6535 Caminito Kittanett La Office of Pres Teaneck NJ 07666

ment of Psychiatric Disorders: Adults and Children, 2d edit., 1980, Mind, Mood and Medicine, 1981; co-editor: Critical Issues in Psychiatric Diagnosis, 1978, Anxiety: New Research and Changing Concepts, 1980; contrb. articles to med. jous. Recipient A.E. Bennett neuropsychiat. rsch. award, 1964, Found.'s Fund prize for rsch. in psychiatry, 1988, McAlpin prize Nat. Assn. Mental Health, 1988, Gd. medal Soc. Neurol. Psychiat., 1990. Fellow Psychiat. Rsch. Soc. (past pres.), Am. Psychopath. Assn. (past pres.), Hamilton award 1980), Am. Coll. Neuropsychopharmacology (life, past pres.), Royal Coll. Psychiatry (founding). Home: 1016 Fifth Ave #14D New York NY 10028 Office: NY State Psychiat Inst 722 W 168th St New York NY 10032 also: 182 E 79 St Ste E New York NY 10021

KLEIN, EDWARD JOEL, editor, author, lecturer; b. Yonkers, N.Y., Oct. 19, 1936; s. Meyer I. and Gertrude (Axelrod) K.; m. Emiko Oshikiri, June 25, 1963 (div. 1975); children: Karen, Alec; m. Tessa Namuth, Mar. 20, 1978 (div. 1981); m. Dolores Jones Barrett, Oct. 24, 1987. B.S., Columbia U., 1960, M.S., 1961. Copy boy, feature writer N.Y. Daily News, N.Y.C., 1957-60; reporter World Telegram & Sun, N.Y.C., 1960-61; reporter, editor Japan Times, Tokyo, 1961-63; fgn. corr. UPI, Tokyo, 1963-64; editor The Shipping and Trade News, Tokyo, 1964-65; assoc. editor Newsweek Mag., N.Y.C., 1965-69, fgn. editor, 1969-76, asst. mng. editor, 1976-77; editor N.Y. Times Mag., N.Y.C., 1977-87; contbg. editor Vanity Fair, N.Y.C., 1988—. Author: (with Robert Littell and Richard Chesnoff) If Israel Lest For The War, 1969, The Parachutists, 1981; editor: (with Don Erickson) About Men. Mem. Coun. Fgn. Rel.

KLEIN, ERNEST VICTOR, lawyer; b. Prague, Czechoslovakia, July 9, 1933; came to U.S., 1940; s. Frank and Maria (Schick) Denhof K.; m. Leonora Daniels, Oct. 4, 1958; children—Elizabeth, Hailey, Joshua. A.B., Brown U., 1954; LL.B., Georgetown U., 1961. Bar: Mass., 1961. Assoc. Gaston & Snow (formerly Gaston, Snow, Motley & Holt), Boston, 1961-66, ptnr., 1966-; bd. dirs. NH Ball Bearings, Peterborough, N.H., 1977-85, Spiessl Kitchen Vosik, Boston, Gannett, Welsh, Kotler, Boston. Corp. mem. Perkins Sch. for Blind, Waltham, Mass., 1964-—. Served with U.S. Army, 1954-56. Mem. ABA, Boston Bar Assn. Democrat Jewish. Clubs: Badminton and Tennis (Boston); Longwood Cricket (Brookline). Avocations: skiing; tennis. Home: 7 Brimmer St Boston MA 02108 Office: Gaston & Snow 1 Federal St Boston MA 02110

KLEIN, GEORGE DEVRIES, geologist; b. Den Haag, Netherlands, Jan. 21, 1933; came to U.S., 1947, naturalized, 1955; s. Alfred and Doris (deVries) K.; m. Chung Sook Kim Chung, May 23, 1982. BA, Wesleyan U., 1954; MA, U. Kans., 1957; Ph.D., Yale U., 1960. Research sedimentologist Sinclair Research Inc., 1960-61; asst. prof. geology U. Pitts., 1961-63; asst. prof. to assoc. prof. U. Pa., 1963-69; prof. U. Ill., Urbana, 1970-; vis. fellow Wolfson Coll. Oxford U., 1969; vis. prof. geology U. Calif., Berkeley, 1970; vis. prof. oceanography Oregon State U., 1974, Seoul Nat. U., 1980, U. Tokyo, 1983; CIC vis. exchange prof. geophys. sci. U. Chgo., 1979-80; vis. prof. geophysics U. Utrecht, 1988; vis. prof. sedimentary geology Vrije U. of Amsterdam, The Netherlands, 1989; chief scientist Deep Sea Drilling Project Leg 58, 1977-78; continuing edn. lectr.; assoc. Ctr. Advanced Studies U. Ill., 1974, 83. Author: Sandstone Depositional Models for Exploration for Fossil Fuels, 3d edit, 1985, Clastic Tidal Facies, 1977, Holocene Tidal Sedimentation, 1976; assoc. editor Geol. Soc. Am. Bull., 1975-81; cons. editor: McGraw-Hill Ency. of Sci. and Yearbook, 1977-89; chief cons. adv. editor: CEPSCO div. Burgess Pub. Co., 1979-81; series editor: Geol. Sci. Monographs, Internat. Human Resources Devel. Corp. Press, Inc., 1981-87, Sedimentary Geology, Prentice-Hall Inc., 1988-; mem. editorial bd. Geology, 1973-74, 89-; Sedimentary Geology, 1985-89, Elsevier; mng. editor Sedimentology, Earth Scis. Revs., 1987-; Recipient Outstanding Paper award Jour. Sedimentary Petrology, 1970; Erasmus Haworth Disting. Alumnus award in geology, U. Kans., 1980; Sr. Rsch. fellow, Japan Soc. for Promotion of Sci., 1983, Sr. Fulbright Rsch. fellow, The Netherlands, 1989; Outstanding Geology Faculty Mem. award U. Ill. Geology Grad. Student Assn., 1983; NSF grantee. Fellow Geol. Soc. Am. (chmn. div. sedimentary geology 1985-86); mem. Am. Geophys. Union, Am. Inst. Prof. Geologists, Soc. Exploration Geophysicists, Soc. Econ. Paleontologists and Mineralogists, Internat. Assn. Sedimentologists, Am. Assn. Petroleum Geologists, Sigma Xi. Office: Univ Ill Dept Geology 245 Natural History Bldg 1301 W Green St Urbana IL 61801-2999

KLEIN, HAROLD PAUL, microbiologist; b. N.Y.C., Apr. 1, 1921; Alexander and Lillian (Pal) K.; m. Gloria Nancy Dolgov, Nov. 14, 1942; children—Susan Ann, Judith Ellen. B.A., Bklyn. Coll., 1942; Ph.D., U. Calif., Berkeley, 1950. Am. Cancer Soc. fellow Mass. Gen. Hosp., Boston, 1950-51; instr. microbiology U. Wash., Seattle, 1951-54; asst. prof. U. Wash., 1954-55; asst. prof. biology Brandeis U., Waltham, Mass., 1955-56; assoc. prof. Brandeis U., 1956-60, prof., 1960-63, chmn. dept. biology, 1956-63; vis. prof. bacteriology U. Calif., Berkeley, 1960-61; div. chief exobiology, dir. life scis. Ames Research Center, NASA, Mountain View, Calif., 1963-84; scientist-in-residence Santa Clara U., Calif., 1984-; mem. U.S.-USSR Working Group in Space Biology and Medicine, 1971-84; leader biology team Viking Mars Mission, 1976; mem. space sci. bd. NAS, 1984-89. Mem. editorial bd. Origins of Life, 1970-89. Served with U.S. Army, 1943-46. NSF Sr. Postdoctoral fellow, 1963; grantee NIH, 1955-63; NSF, 1957-63. Mem. Internat. Soc. Study Origin of Life, Am. Soc. Biol. Chemists, Internat. Astronautical Fedn., Phi Beta Kappa. Home: 1022 N California Ave Palo Alto CA 94303 Office: Santa Clara U Dept Biology Santa Clara CA 95053

KLEIN, HENRY, architect; b. Cham, Germany, Sept. 6, 1920; came to U.S., 1939; s. Fred and Hedwig (Weiskopf) K.; m. Phyllis Harvey, Dec. 27, 1952; children: Vincent, Paul, David. Student, Inst. Rauch, Lausanne, Switzerland, 1936-38; B.Arch., Cornell U., 1943. Registered architect, Oreg., Wash. Designer office of Pietro Belluschi, Architect, Portland, Oreg., 1948-51; architect Henry Klein Partnership, Architects, Mt. Vernon, Wash., 1952-—. Bd. dirs. Wash. Pks. Found., Seattle, 1977-; Valley Mus. N.W. Arts, 1988-—. With U.S. Army, 1943-46. Recipient Louis Sullivan award Internat. Union Bricklayers and Allied Craftsmen, 1981; Presdl. Design award Nat. Endowment Arts, 1988; George A. and Eliza Howard Found. fellow. Fellow AIA. Jewish. Home: 1957 Little Mountain Rd Mount Vernon WA 98273 Office: Henry Klein Partnership 205 Matheson Bldg Mount Vernon WA 98273

KLEIN, HERBERT GEORGE, newspaper editor; b. Los Angeles, Apr. 1, 1918; s. George and Amy (Cordes) K.; m. Marjorie G. Galbraith, Nov. 1, 1941; children—Joanne L. (Mrs. Robert Mayne), Patricia A. (Mrs. John Root). AB, U. So. Calif., 1940; Hon. Doctorate, U. San Diego, 1989. Reporter Alhambra (Calif.) Post-Advocate, 1940-42, news editor, 1946-50; spl. corr. Conley Newspapers, 1946-50, Washington corr., 1950; with San Diego

KLEIN, HERBERT SANFORD, historian; b. N.Y.C., Jan. 6, 1936; s. Emil Aaron and Florence (Friedman) K.; m. Harriet E. Manelis, Sept. 3, 1956 (div.); children: Rachel, Daniel, Jacob. A.B., U. Chgo., 1957, M.A., 1959, Ph.D., 1963. Instr. dept. history U. Chgo., 1962-63, asst. prof. history, 1963-67, asso. prof., 1967-69; asso. prof. Columbia U., 1969-71; prof. 1971-; via. prof. U. Calif., Berkeley, 1968, U. Toronto, Ont., Can., 1974-75, Oxford (Eng.) U., 1975, U. de la Republica, Montevideo, Uruguay, 1978, U. Federal de Parana, Brazil, 1977, Hebrew U. of Jerusalem, 1983, U. de São Paulo, 1986. Author: Slavery in the Americas, A Comparative History of Cuba and Virginia, 1967, Parties and Political Change in Bolivia, 1880-1952, 1969, The Middle Passage: Comparative Studies in the Atlantic Slave Trade, 1978, Bolivia, The Evolution of a Multi-Ethnic Society, 1982, African Slavery in Latin America and the Caribbean, 1986; co-author: Revolution and the Rebirth of Inequality, 1981, Royal Treasures of the Spanish Empire in America, 1580-1825, 1982; co-editor: Social Change in Brazil, 1945-85, 1989; contrb. numerous articles, revs. to prof. jous. Recipient Socio-Psychol. prize AAAS, 1978; Social Sci. Research Council grantee, 1971-72, 79-80; Am. Council Learned Socs. grantee, 1973; NSF grantee, 1974-76; Nat. Endowment for Humanities grantee, 1975-77; Am. Philos. Soc. grantee, 1978; Tinker Found. grantee, 1975-77; Guggenheim and Woodrow Wilson fellow Smithsonian Instn., 1980-81. Mem. Conf. Latin Am. Historians, Am. Hist. Assn. Jewish. Office: Columbia U Dept History New York NY 10027

KLEIN, JEFFREY S., lawyer, newspaper executive; b. Los Angeles, Apr. 15, 1953; s. Norman and Shirley Klein; m. Karyn Kitson, Sept. 29, 1984; 2 children. BA, Claremont Mens Coll., 1975; M in Journalism, Columbia U., 1978; JD, Stanford U., 1980. Assoc. Kaplan, Livingston, Goodwin, Berkowitz & Selvin, Beverly Hills, Calif., 1980-81, Garey, Mason & Sloane, Santa Monica, Calif., 1981-83; weekly contrb. UPI-Radio, L.A., 1983-84; ar. staff counsel Times Mirror, 1983-87, asst. to pres., 1987-; asst. to pub. L.A. Times, 1989-; adj. prof. journalism U. So. Calif., 1985-87. Author weekly column Legal View, Los Angeles Times, 1985-; various book revs. Advncr Gov. Bruce Babbitt, Phoenix, 1980. Mem. Calif. Bar Assn. Office: Times Mirror Sq Los Angeles CA 90053

KLEIN, JOAN DEMPSEY, judge; b. San Jose, Calif., Aug. 18, 1924; d. Edward Joseph and Estelle (Kottinger) Dempsey; m. Donard Lee Klein, Mar. 16, 1963; children: Marc Dempsey Gross, Brad Hunter Gross; stepchildren: Karen Beth, Susan Linda. BA, San Diego State Coll., 1948; LLB, UCLA, 1955. Bar: Calif., U.S. Supreme Ct. 1964. Dep. atty. gen., trial lawyer State of Calif., 1955-63; judge L.A. Mcl. Ct., 1963-75, presiding judge, 1974; mem. L.A. Superior Ct., 1974-78; presiding justice, Calif. Ct. Appeals, L.A., 1978-; prof. jud. adminstr. U. So. Calif., 1974-75; mem. Calif. Coun. on Criminal Justice, 1970-74, Jud. Criminal Justice Planning Com., 1974-76; del. Nat. Adv. Commn. Criminal Justice Standards and Goals, Washington, 1973; chmn. adv. com. Calif. Hwy. Patrol, 1976; participant S. Am. Lecture Tour Internat. Communication Agency. Mem. adv. bd. Girls Week L.A. City Schs., Gifted Children's Assn., San Fernando Valley, Vol. League San Fernando Valley. Named Alumna of Yr. Law Sch. UCLA, 1963, Angel of Distinction L.A. Cen. City Assn., 1969, Woman of Achievement Calif. Fedn. Bus. and Profl. Women's Club, 1973, Mcl. Ct. Judge of Yr. Calif. Trial Lawyers, 1973, Woman of Yr. L.A. Times, 1975; recipient Profl. Achievement award UCLA Alumni Assn., 1975, Myrtle Wreath award Hadassah, 1977, Community Woman of Achievement award Big Sisters L.A., 1979, cert. merit from Gov. Brown, 1979, Portrait in Excellence award B'nai B'rith Women. Mem. Internat. Fedn. Women Lawyers, Nat. Assn. Women Judges (founding and current pres.), Calif. Women Lawyers (pres. 1975), Calif. Judges Assn., L.A. County Bar Assn., Women Lawyers Assn., Bus. and Profl. Women's Club (L.A. chpt.), Legion Lex U. So. Calif., UCLA Law Sch. Alumni Assn. (past pres.). Democrat. Office: Ct Appeals 3580 Wilshire Blvd Los Angeles CA 90010

KLEIN, JOHN E., agricultural products company executive; b. 1945; married. BA, Princeton U., 1967; JD, U. Mich., 1971. Assoc. firm Sullivan & Cromwell, N.Y.C., 1971-75; with Bunge Corp., N.Y.C., 1976-; v.p., 1981-83, exec. v.p., 1983-85, pres., 1985-; also dir. Office: Bunge Corp 1 Chase Manhattan Pla New York NY 10005

KLEIN, JOSEPH MARK, mining company executive; b. N.Y.C., Nov. 9, 1921; s. Erwin Wolfe and Ada (Black) K.; m. Betty Evelyn Northington, Dec. 24, 1948; children: Kathryn Ann, Elizabeth Ellen, Joseph Mark, Timothy Northington. Certificate in fgn. trade, Am. Grad. Sch. Internat. Mgmt., 1946. Vice pres. internat. ops. Clary Corp., San Gabriel, Calif., 1948-60; dir. Clary Corp., 1967-70; dir. internat. ops. Remington Rand Corp., N.Y.C., 1961-62; pres. NBC Internat. Ltd.; v.p. NBC News, N.Y.C., 1962-66; exec. v.p., dir. Cyprus Mines Corp., Los Angeles, 1966-79; chmn. bd. Hawaiian Cement Corp., 1969-79; pres., dir. Pluess-Stauffer Industries, Inc., Los Angeles, 1979-; dir. Mission Ins. Group, Inc.; mem. Pres.'s Export Expansion Council, 1971-74; Vice-chmn. bd. trustees Am. Grad. Sch. Internat. Mgmt., 1975-83, chmn. bd. trustees, 1983-88, chmn. exec. com., 1988-—. Served to capt. U.S. Army, 1940-46. Decorated Silver Star, Bronze Star, Purple Heart; recipient Jonas B. Meyer Outstanding Alumni Assn. award Am. Grad. Sch. Internat. Mgmt., 1974, So. Calif. Alumni Assn. award, 1974. Mem. Am. Inst. Mining Engrs., Newcomen Soc., Town Hall, Ret. Officers Assn., Mil. Order Purple Heart (Ariz. comdr. 1949-50, condr. Hollywood chpt. 1987-88), Am. Legion (comdr. post 283 1990-). Republican. Presbyterian. Clubs: California, Riviera Country. Lodge: Elks' Home: 1071 Villa View Dr Pacific Palisades CA 90272 Office: 845 Via de la Paz Suite 487 Pacific Palisades CA 90272

KLEIN, JOSEPH MICHELMAN, musical director; b. Sharon, Mass., July 16, 1936; s. Henry H. and Esther (Michelman) K.; m. Mary A. Morford, May 1, 1964; children: Christopher, Michael, Joshua. Grad. pvt. studies, Tanglewood, Mass., 1957; BA, Columbia U., 1958; studies with Nadia Boulanger, Paris, France, 1959-60. Formerly chmn. music dept. Horace Mann Sch., N.Y.C.; with mus. theatre faculty Syracuse (N.Y.) U., 1986-89, aranger-pianist CBS radio and TV, mus. coach Bing Crosby family, Hollywood Palace TV Show; mus. dir. Seagram Liquor, McDonald's Hamburgers, Toyota, indsls.; active in Calif. star-system theatres including Ben Kapen's Melodyland, Hyatt Music Theatre, Circle Star Theatre, Carousel Theatre, also Los Angeles Civic Light Opera; mus. dir. nat. co. Man of La Mancha, 1967-70; condr. (broadway prodns.) Johnny Johnson, 1971, Lost in the Stars, 1972, Man of La Mancha, 1972, Cyrano, 1973, Over Here, with The Andrew Sisters, 1974, Sacramento Music Circus, 1975, 76, 78, 79, 80, Pippin, 1977, On The Twentieth Century, 1979, Jones Beach, 1981; mus. dir. Radio City Music Hall, N.Y.C., 1982-85, Chorus Line, 15th anniversary tour, 1989; dir. Columbia U. Bands, N.Y.C., 1984-86; music faculty Trinity Sch., N.Y.C., 1984-86. Mem. Am. Fedn. Musicians, Actors Equity, Soc. Stage Dirs. and Choreographers, Nat. Acad. of Rec. Arts and Scis. Home: 28 W 87th St New York NY 10024

"Document Control"

TYPE: INFORMATION

DOCUMENT NUMBER: 9202191

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: GEORGE, THOMAS: WASINGTON STATE UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/14/92

SUBJECT: THANK YOU TO DR. BROMLEY FOR YOUR LETTER DISCUSSING
PCAST STUDIES.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
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COPIES TO: D. Allan Bromley
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Washington State University

Office of the President

Pullman, WA 99164-1048
509-335-6666

2191

July 14, 1992

Dr. D. Allan Bromley
Assistant to the President for Science and Technology
The White House
Washington, DC 20202

Dear Dr. Bromley:

Thank you for your letter of June 8, 1992, in which you described the President's Council of Advisors on Science and Technology (PCAST) undertaking to review the partnership between the nation's research-intensive universities and the Federal Government.

We support this effort and plan to attend personally or to be represented at the September 24, 1992, meeting at Northwestern University. In preparation for that meeting, we are publishing your letter in our research newsletter and, through an accompanying editorial, hope to solicit input from our faculty so that WSU will be well represented at the September meeting.

If we can be of special assistance to you in your efforts, please do not hesitate to call us.

Sincerely yours,

Samuel H. Smith
President

Thomas F. George
Provost

SHS:jlrm

cc: Robert V. Smith, Vice Provost for Research
James J. Wills, Office of Grant and Research Development

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TYPE: ACTION DOCUMENT NUMBER: 9202570
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: ALPERT, Daniel: UNIVERSITY OF ILLINOIS

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/14/92

SUBJECT: HE IS FORWARDING A COPY OF HIS PAPER ENTITLED "THE
FLOURISHING OF ACADEMIC SCIENCE AND THE
FRAGMENTATION OF THE AMERICAN RESEARCH UNIVERSITY",
TO BE DISTRIBUTED TO PCAST MEMBERS.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

ACTION STAFF
REQUIRED: AS APPROPRIATE ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/07/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

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CENTRAL FILES:

University of Illinois
at Urbana-Champaign

The Center for Advanced Study

912 West Illinois Street
Urbana, IL 61801

217 333-6729
217 244-3396 fax

2510

02 JUL 24 AM 11:08

OSTP
MAIL ROOM

July 14, 1992

D. Allan Bromley
The Assistant to the President
for Science and Technology
The White House
Washington, DC 20500

Dear Dr Bromley:

I submit herewith for your consideration and that of PCAST the final draft of a paper entitled "The Flourishing of Academic Science and the Fragmentation of the American Research University." It is directly responsive to all of the "topics of interest to PCAST" which you included in your letter of June 8, 1992 to university presidents, and inviting comments from faculty members as well.

Although my paper was obviously written for publication in one of the nation's refereed journals, I welcome your distributing copies of this draft to members of PCAST and others taking part in the study of the partnership between the American research universities and the federal government. I would welcome an opportunity to discuss these issues further with you and the Council.

Also enclosed is a one-page resume indicating my background and long-term interests in science and technology policy.

Sincerely yours,

Daniel Alpert

Daniel Alpert
Professor emeritus, physics
Director emeritus, Center for Advanced Study

cc: Chancellor M. W. Weir

enclosures

June 1991

Daniel Alpert

University of Illinois at Urbana-Champaign

Daniel Alpert received his Ph.D. in physics from Stanford University. During World War II he participated in the Manhattan Project and in the development of components used in military radar systems. Following the war he returned to basic research in surface physics and gaseous electronics and was appointed Manager of the Physics Department in the Westinghouse Research Laboratories in 1947. He was a key scientist in the development of ultrahigh vacuum technology, which is now widely used in scientific instruments and for handling or producing materials of great purity. For this work, he received the Gaede-Langmuir prize of the American Vacuum Society.

In 1957 Alpert joined the faculty of the University of Illinois as Professor of Physics, and in 1959 he reorganized, renamed, and was appointed Director of the Coordinated Science Laboratory. Here he built an interdepartmental problem-oriented program aimed at applying modern technology to significant public sector problems. He played a key role in initiating, administering, and developing the PLATO program in computer-based education (1960-1975). Awarded a Guggenheim fellowship in 1964, he studied the role of university professors in addressing problems posed by society.

In 1965, Alpert was appointed Dean of the Graduate College and Chairman of the Research Board. In this role he fostered the establishment of several new interdisciplinary research organizations as special academic units in the Graduate College, including the Computer-based Education Research Laboratory (PLATO), the Center for Advanced Computation (ILLIAC IV), and the Center for Advanced Study.

From 1972 to 1987, he served as Director of the Center for Advanced Study, where he played an active part in the sponsorship of interdisciplinary studies and projects, and the encouragement of new programs of research and education on the Urbana-Champaign campus. In 1987, he formally retired and was named Director Emeritus of the Center for Advanced Study.

Since then, he has served as Director of the Program in Science, Technology and Society (1987-1990), and, since 1988, research scientist in the National Center for Supercomputing Applications.

Among several dozen publications, the following are indicative of his continuing interests:

"Performance and Paralysis: The Organizational Context of the American Research University," The Journal of Higher Education, 56, 3 (1985).

"What is the Problem of Retrenchment in Higher Education?" H. Petrie and D. Alpert, Journal of Management Studies 20, 1, (1983).

"Technology and Regional Institutions." Technology and Social Institutions, Kan Chen, ed. Institute of Electrical and Electronics Engineers, Inc. 1974, pp. 20-35.

"Advances in Computer-based Education." D. Alpert and D.L. Bitzer, Science 167 (1970), pp. 1582-1590.

"The Role and Structure of Interdisciplinary and Multi-disciplinary Research Centers." Proceedings of the Ninth Annual Meeting, Council of Graduate Schools. December, 1969.

"Applied Science and Engineering in the University." The Interaction of Science and Technology, in W. Dale Compton, ed. University of Illinois Press, Urbana, 1969, pp.79-94.

DRAFT DRAFT DRAFT DRAFT DRAFT 7/12/92

The Flourishing of Academic Science and the Fragmentation of the American Research University

Daniel Alpert

1.0 Introduction: the best of times and the worst of times

Research provides extraordinary benefits to society through the creation of new knowledge and the training of scientists and engineers. The research and higher education system in the United States is the envy of the world, and has a long history of advancing the state of scientific knowledge. . . The Nation now expects that in addition to knowledge, science and engineering will contribute to U.S. prestige and competitiveness abroad, create new centers of research excellence on a broad geographic basis, . . provide unparalleled opportunities for education and training, and nurture a more diverse research work force.

Office of Technology Assessment, U. S. Congress¹ (April, 1991)

America has lived and grown great through science and technology. . . we have hitched our economy to the best scientific research system we could develop and have prospered as a result. . .

The responses [to an Association questionnaire] paint a picture of an academic community beset by flagging morale, diminishing expectations, and constricting horizons. From one institution to the next, across demographic categories, across disciplines of research, the nation's scientists are sending a warning. Academic research in the United States is in serious trouble.

Leon Lederman, Nobelist, physicist, president of the American Association for the Advancement of Science (AAAS)²

[There has been] a change from the land-grant notion of service to the idea of knowledge as a personal profession in which the individual, at age twenty-eight or thirty or so, is locked into a scholarly career in a particular sub-field of a particular discipline.

New faculty members are too often chosen not for commitment to those wider aims of scholarly service, but for narrow disciplinary expertise. . . I believe this view of knowledge is destructive, first because it isolates department from department, and it isolates individual from individual within those departments. . . it has made for a trivialization of aim and a narrowing of focus, . . . and it has led to a massive loss of institutional loyalty. . . Only by seeing knowledge as a common quest can our institutional life be restored.

Frank H.T. Rhodes, President, Cornell University³

The above commentaries on the state of the American research university raise serious questions about its current problems and future prospects: How can the same enterprise be accurately portrayed as healthy, vigorous, and highly regarded, and at the same time, as under-funded, demoralized, and in disarray? How did the world's "best scientific¹ research system" result in universities

¹ Unless otherwise stated, "science" in this paper includes engineering, social and behavioral sciences as well as the natural sciences.

TYPE: ACTION
ORIGINATOR: 02

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DOCUMENT NUMBER: 9202544
DIRECTORATE STATUS

FROM: GREENWOOD, Frederick C.: UNIVERSITY OF HAWAII

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/14/92

SUBJECT: HE IS FORWARDING HIS COMMENTS FOR THE PCAST PANEL ON
U.S. UNIVERSITIES.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/05/92 STAFF DUE DATE
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COPIES TO: D. Allan Bromley

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CENTRAL FILES:



University of Hawaii at Manoa

Pacific Biomedical Research Center
1993 East-West Road • Honolulu, Hawaii 96822

Facsimile: (808) 956-4768

July 14, 1992

Dr. D. Alan Bromley
The Assistant to the President
for Science and Technology
The White House
Washington D.C.

Dear Dr. Bromley:

I am responding to your invitation in your letter to President Simone for input on the PCAST review of the partnership between the research intensive universities and the federal government.

The strength and success of federal investment in research at the universities was a strong factor in my immigration into the U.S.A. from the U.K. in 1968. I continue to be impressed by the high standards and cost effectiveness of research, consequent upon the rigorous and highly competitive review of the direct costs of research and its quality throughout the lengthy review process from the initial review group to Council, in the case of NIH.

In marked contrast, the elements of competition and peer review have been totally absent from the negotiations on the indirect costs of the research from which scientists, program staff and research administrators are excluded. Hence there is a need to apply competitive pressure, peer review and include scientists and research administrators in the calculation and agreement on indirect costs at all universities, whether public or private. I have included the private universities because no one sector should be excluded from review and competition and because my perception is that the federal government has been subsidizing these universities.

In reviewing the partnership on research between the federal government and the universities, there should also be an examination of what the universities gain from conducting such research. This does not appear to have been previously quantified and it is up to the federal government to point out to the universities the direct spin-off of research to graduate and undergraduate training and education that the federal government enables many faculty to fulfill their responsibilities, the research requirement of their job descriptions, the role of patents and royalties in supporting university endowments and the role of the research that is congruent with individual state needs.

Dr. D. Alan Bromley
July 14, 1992
Page 2

The federal government has been derelict in studies which no university would willingly initiate themselves.

Your letter emphasizes partnership for a relationship which some have come to view as a one-way entitlement program. Again, in the capitalistic spirit of competition, surely the time has come to seek matching commitments from the universities such that research becomes a joint venture. I am particularly proud of the University and the State of Hawaii in its direct investment in research by supporting organized research institutes and by the salary support of faculty who devote from 30 to 80% of their time to research. In addition, the State has specifically matched grants to my institute, returns some 50% of the indirect costs it collects from the federal government to the University to directly support research through our University Research Council directly to the units that generate direct and indirect costs.

Finally, I have had the opportunity of attending both a regional and a national meeting on the NIH Strategic Plan in which cost containment was highlighted as an essential element of continued funding for the advances in biomedical research. I was depressed that the reaction of many representatives of research intensive universities simply pleaded for a maintenance of the status quo except, of course, for an increase in funding, the need to fully recover direct and indirect costs of research undertaken "for the federal government" and a denial of the need to subject their thinking to what Dr. Bernadette Healy described as "reality testing". One excuse for masterly inactivity was the recognition that your office was to undertake a review of the partnership and hence we did not have to address the thorny issue of indirect costs. I enclose my cry of frustration to the panel chairman after the meeting and his courteous response.

On a personal note: in a conversation with you on the training of science attachés, you pointed out the need for such professionals to be trained in programs such as the School of Foreign Service, STER Program. The same wisdom should be applied when the federal government discusses with the University its indirect cost rate - we must include active principal investigators and research administrators in these negotiations.

Yours sincerely,



Frederick C. Greenwood, Ph.D.
Director, Pacific Biomedical
Research Center

FCG:aam

cc: Dr. A.J. Simone, President, UH
Dr. D. Yount, Vice President, Research & Grad. Educ.
Dr. M. Ghali, Director of Research



University of Hawaii at Manoa

Pacific Biomedical Research Center
1993 East-West Road • Honolulu, Hawaii 96822
Facsimile: (808) 956-4768

June 29, 1992

Professor S. Gilman, M.D.
Co-Chair, Cost Management Panel
Fax no. (313) 936-8763

Dear Dr. Gilman:

Thank you for the opportunity to join the discussions on the Cost Management Panel. My long journey from Hawaii was worthwhile in yielding insights into the majority view of the future of biomedical research and the role of the universities in this endeavor.

The diversity of the Panel was more apparent than real and the Panel's reactions to the excellent NIH position papers on indirect costs boiled down to a plea for more data and/or to let OSTP bite the bullet, reactions not dissimilar to the Advisory Committee to the Director of NIH itself, no strong endorsement but a plea for more data.

Likewise, I can understand the dual interests of the Panel on buildings and R01s/RPGs expressed during discussion on how to handle a \$1 billion increase in NIH budget, a sure test of winnowing altruism from self-interest. I support the one-shot approach to facilities since this would defuse efforts to earmark funds for buildings. The focus on R01s/RPGs to the exclusion of other issues of interest to Congress, women and minorities and the SBIR Program for example, was not subject to Dr. Healy's "reality testing".

It seems that in both broad areas of indirect costs and priorities that the minorities, whether they be ethnic, gender or entrepreneurial, must continue to rely on the NIH leadership and their dialogue with a Congress facing urgent and complex socio-economic problems of access to basic health care, poverty, crime and a needy infrastructure.

I trust that Dr. Healy will be able to convince Congress that all participants and institutions in the biomedical area will be allowed to play a part in enhancing the competitiveness and the job creating potential of the biomedical industry as an outcome of the strategic plan. With best wishes.

Yours sincerely,

Frederick C. Greenwood, Ph.D.
Director, Pacific Biomedical
Research Center
Program Director, RCMI

UNIVERSITY OF MICHIGAN
DEPARTMENT OF NEUROLOGY

Taubman Center 1914/0316
1500 East Medical Center Drive
Ann Arbor, Michigan 48109-0316

Phone: (313) 936-9070

FAX: (313) 936-8763

Sid Gilman, M.D.
Professor and Chair

1 July 1992

Frederick C. Greenwood, Ph.D.
Director, Pacific Biomedical Research Center
1993 East-West Rd.
Honolulu, HI 96822

Dear Dr. Greenwood:

Thank you for your communication of 29 June 1992. It was a pleasure to interact with you during our discussions on the Cost Management Panel. I thought that your comments were refreshing, down to earth, and direct. I will send your letter to Lynn Bryant to ensure that your thoughts are incorporated in the brief statement that we will make in the middle of July when we reconvene to discuss the strategic plan. With best regards.

Sincerely yours,



Sid Gilman, M.D.

SG:neo

cc: Frank Stout
Lynn Bryant

"Document Control"

.TYPE: ACTION DOCUMENT NUMBER: 9202542
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: YONKE, Annette M.: UIC, COLLEGE OF MEDECINE AT CHICAGO

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/14/92

SUBJECT: SHE IS WRITING IN RESPONSE TO DR. BROMLEY'S LETTER
WHICH SEEKS INPUT FOR PCAST REVIEW ON THE
PARTNERSHIP BETWEEN UNIVERSITIES AND THE FEDERAL
GOVERNMENT.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

ACTION STAFF
REQUIRED: AS APPROPRIATE ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/04/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: NRN per AKD PHONE: EXT:

OSTP RECEIVED: 07/20/92 DEPT RECEIVED:
FILE: P-PCAST

CENTRAL FILES:

2542

UIC

College of Medicine at Chicago

Department of Medical Education (M/C 591)
(Formerly Center for Educational Development)
The University of Illinois at Chicago
986 College of Medicine East
808 South Wood Street, 9th Floor
Chicago, Illinois 60612
(312) 996-3590

July 14, 1992

D. Allan Bromley
Assistant to the President for S&T
Director, Office of S&T Policy
Executive Office of the President
The White House
1600 Pennsylvania
Washington, D.C.

Dear Dr. Bromley:

I am writing to respond to your letter which seeks input for PCAST review on the partnership between universities and the federal government.

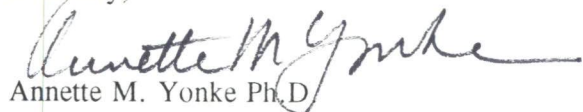
As a faculty member in a research university, my request is that PCAST seriously and formally address the issue of university-based women in the sciences. Although it is the last item on your list, and there is only one female member of the President's Council of Advisors on Science and Technology, the problem warrants attention in today's political climate.

In my work with physicians, I find that there are women who aspire to full time academic research and teaching. Yet there are few academic women who understand and advise about getting grants, publishing, and teaching in conjunction with marriage and children. The entire process of entering, competing and remaining in the academic mainstream of research and education while attending to the family is a social-scientific problem that merits earnest attention and funding.

For starters, I suggest that the Council appoint a task force to conduct a multi-institutional study on the uniqueness of this problem in selected Carnegie 100 universities. (The literature on women in academia pretty much lumps all of higher education into one batch but I think the research universities are a special case). Data from such a study would be an excellent source for subsequent policy decision.

Thank you for soliciting faculty input. I hope your public meetings and further activities will consider this critical issue.

Sincerely,



Annette M. Yonke Ph.D.
Associate Professor

c. John Wanat, VC Research

"Document Control"

TYPE: INFORMATION

DOCUMENT NUMBER: 9202093

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: PYE, KENNETH: SOUTHERN METHODIST UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/13/92

SUBJECT: THANK YOU FOR THE OPPORTUNITY OF APPEARING AT THE
PCAST MEETING REGARDING VIEWS ON THE SUBJECT OF THE
HIGHER EDUCATION COLLOQUIEM ON SCIENCE FACILITIES.

DIRECTORATE
ASSIGNED:

STAFF
ASSIGNED:

ACTION
REQUIRED:

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:
DATE COMPLETED:

STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: PCAST
D. Allan Bromley

WHITE HOUSE TRACKING #:

CONTACT PERSON:
PHONE:

EXT:

REMARKS:

OSTP RECEIVED: 07/27/92
FILE: P-PCAST

DEPT RECEIVED:

CENTRAL FILES:

2093

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27 JUL 27 AM

OST
MAIL ROOM



July 13, 1992

Dr. D. Allan Bromley
Assistant to the President for
Science and Technology
The White House
Washington, DC 20500

Dear Dr. Bromley:

I appreciate the opportunity of appearing at a meeting of PCAST. My views on the subject have been expressed to the Higher Education Colloquium on Science Facilities in testimony before the Subcommittee on Science of the Committee on Science, Space and Technology of the House of Representatives in February, 1992. President Shapiro is a member of the Council and the Colloquium, and I could add little to the testimony or his interpretation of it.

Sincerely,

A. Kenneth Pye
President

"Document Control"

TYPE: ACTION DOCUMENT NUMBER: 9202556
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: FINK, Gerald R.: WHITEHEAD INSTITUTE

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/13/92

SUBJECT: HE IS FORWARDING HIS COMMENTS FOR THE PCAST PANEL
STUDYING RESEARCH INTENSIVE UNIVERSITIES.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/06/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: *NRN per AKD* PHONE: EXT:

OSTP RECEIVED: 07/23/92 DEPT RECEIVED:
FILE: P-PCAST
CENTRAL FILES:



WHITEHEAD INSTITUTE

Dr. Gerald R. Fink
Director
617 / 258-5215
FAX 617 / 258-9872

July 13, 1992

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92 JUL 23 AM : 08

OSTP
MAIL ROOM

Dr. D. Allan Bromley, Chairman
President's Council of Advisors on Science and Technology
Office of Science and Technology Policy
Executive Office of the President
Washington, DC 20506

Dear Dr. Bromley:

I was very disappointed that I was unable to attend the public meeting of the President's Council of Advisors on Science and Technology (PCAST) on the MIT campus recently. The work that you and other members of PCAST are doing is extremely important. Your efforts to gather insights about the Federal relationship with research-intensive universities and the capacity of such universities to fulfill their missions will greatly enhance public understanding of the issues shaping the future of scientific progress in this country.

I would like to suggest, however, that your focus be expanded to include non-profit research institutions. As you know, non-profit research institutions are an integral part of the academic research effort in the United States. Such institutions receive 10 percent of all research funds awarded by the National Institutes of Health and a comparable amount from the National Science Foundation. Non-profit research institutions are making vital contributions in biomedical science, agriculture, engineering and many other areas of science and technology.

My concern about the inclusion of non-profit research institutions at this stage of your inquiry stems from events that occurred in the late 1980s. In 1986, the Panel on the Health of U.S. Colleges and Universities of the White House Science Council, for which you were vice-chairman, produced an excellent report titled *A Renewed Partnership*, which consisted of "an examination of federal government-university-industry interactions in U.S. research and higher education in science and engineering."

The Panel emphasized the importance of "university research" and outlined new strategies for meeting research needs in the future. The problem is that when these strategies were implemented in legislation and later, in agency guidelines, the emphasis on "universities" remained. Certain programs were completely inaccessible to scientists at independent non-profit research

institutions, even though they were pursuing the same goals, with the same level of success, as their university-based counterparts.

Non-profit independent research institutions fill an important niche in the national research effort. I hope that you will include these institutions in your plans for strengthening the research environment.

Thank you for your consideration.

Sincerely

A handwritten signature in dark ink, appearing to read "Gerald R. Fink", with a stylized flourish at the end.

Dr. Gerald R. Fink
Director

"Document Control"

TYPE: ACTION DOCUMENT NUMBER: 9202537
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: GAVIN, Robert M.: MACALESTER COLLEGE

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/08/92

SUBJECT: HE IS WRITING WITH HIS COMMENTS FOR THE PCAST PANEL
FOR THE STUDY ON THE HEALTH OF U.S. UNIVERSITIES.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/04/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: PHONE: EXT:

OSTP RECEIVED: 07/15/92 DEPT RECEIVED:
FILE: P-PCAST
CENTRAL FILES:

2537

THE PRESIDENT
MACALESTER COLLEGE
1600 GRAND AVENUE
SAINT PAUL, MINNESOTA 55105
612-696-6207

RECEIVED

July 8, 1992

92 JUL 15 10:23

Dr. D. Allan Bromley
The Assistant to the President
for Science and Technology
The White House
Washington, D.C. 20500

OSTP
MAIL ROOM

Dear Dr. Bromley:

Thank you very much for your letter of June 8, 1992 inviting me to participate in the public meetings scheduled by the President's Council of Advisors on Science and Technology (PCAST). You and the Council are to be commended for holding such meetings on the important issue of the relationship between research-intensive universities and the Federal government. Clearly, this has been a crucial area for the health and welfare of science in this nation and around the world. I am sure that under the leadership of Mr. David Packard and Dr. Harold Shapiro, PCAST will gather very important information on shaping the relationship for the future.

I wonder whether PCAST has plans for a subcommittee dealing with research and education at the undergraduate level. The research activities of faculty and students at the undergraduate level play a crucial role in the development of our leading scientists and in a significant fraction of the research articles published in our scientific journals. I am sure you are aware of numerous studies about the productivity of undergraduate science programs which are research based. In fact, there is a growing consensus that good undergraduate science requires a research-based laboratory experience. The recent Project Kaleidoscope report documents this very well.

I offer to be of assistance to the Council should you wish to schedule public meetings on the topic of research and education at the undergraduate level. I would be pleased to host a public meeting at Macalester and I am sure that I could assist in finding at least a half dozen similar institutions across the country whose Presidents would be happy to host a regional public meeting.

With best regards, I am

Sincerely yours,


Robert M. Gavin, Jr.

RMG:ljh

MACALESTER
COLLEGE

"Document Control"

TYPE: ACTION

ORIGINATOR: 02

DOCUMENT NUMBER: 9202531

STATUS I

DIRECTORATE STATUS

FROM: BLACK, Billy C.: ALBANY STATE COLLEGE

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/08/92

SUBJECT: HE IS FORWARDING HIS COMMENTS TO THE PCAST PANEL ON
THE HEALTH OF U.S. UNIVERSITIES.

DIRECTORATE

ASSIGNED: PCAST

STAFF
ASSIGNED:

ACTION
REQUIRED: AS APPROPRIATE

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE: 08/04/92

STAFF DUE DATE

DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS: NRN per AKD

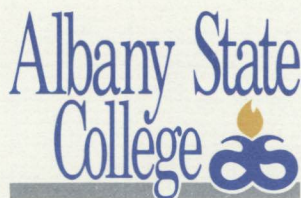
PHONE:

EXT:

OSTP RECEIVED: 07/21/92
FILE: P-PCAST

DEPT RECEIVED:

CENTRAL FILES:



July 8, 1992

Mr. D. Allan Bromley
Assistant to the President
for Science and Technology
The White House
Washington, D. C. 20005

Dear Mr. Bromley:

Thank you for your letter of June 8, in which you asked me to respond to challenges facing American higher education, and the appropriate nature of the partnership between the Federal Government and the Nation's research-intensive universities. I am pleased to comply with your request.

Specifically, I would like to address this challenge as it relates to the Federal Government's role in expanding the number of university-based women and minorities in science and engineering. In my view, there is an urgent need to increase understanding of scientific and technological issues among all Americans, especially among women and minorities, if our nation is to remain the leader that she is in many disciplines and domains.

The recent report prepared by the Hudson Institute for the U. S. Department of Labor clearly points out that minorities and women will be in the majority by the turn of the Century. Thus, these individuals must be trained to relieve the serious deficiencies that currently exist in our country. They must be trained to propose reasonable solutions and solve problems.

While some progress has been made in increasing the representation of minorities and women, both of these groups continue to be underrepresented in science and engineering fields. There are, presently, shortages of trained computer professionals and most types of engineers at all degree levels.

There is also a problem of acquisition, retention, and maintenance of high quality faculty to teach science, mathematics and computer science courses at the pre-college levels. A large percentage of our nation's youth graduate from high school with no science or mathematics beyond the tenth grade.

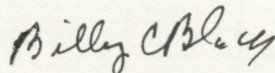
Page 2: Continued
Mr. D. Allan Bromley
July 8, 1992

The Federal Government must recognize the changes that are eroding the science and engineering workforce, and do more to increase the number of women and minorities graduating in science and engineering. As the 1988 interim report of the Task Force on Women, Minorities and the Handicapped in Science and Technology pointed out, "Federal research and development funds help to influence the Nation's entire science and engineering effort. They generate new knowledge, and employ and train scientists and engineers. These funds should be leveraged to help develop a more diverse, world-class generation of scientific and engineering workers by the year 2000."

In closing, let me say that it is my sincere hope that stronger partnerships will be built between the Federal Government and the nation's historically black colleges and universities as well as other minority institutions. Federal funds should be specifically earmarked for these institutions to strengthen and or develop a scientific and technologically based infrastructure that will help to produce capable men and women who will be needed to keep our nation competitive while solving unsolved problems.

Thank you.

Sincerely,

A handwritten signature in cursive script that reads "Billy C. Black".

Billy C. Black
President

"Document Control"

TYPE: ACTION DOCUMENT NUMBER: 9202519
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: GILLILAND, Martha W.: UNIVERSITY OF ARIZONA

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/08/92

SUBJECT: SHE IS WRITING WITH RECOMMENDATIONS FOR THE PCAST
PANEL STUDYING THE PARTNERSHIP BETWEEN THE NATION'S
RESEARCH-INTENSIVE UNIVERSITIES.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 08/04/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: PHONE: EXT:

OSTP RECEIVED: 07/21/92 DEPT RECEIVED:
FILE: P-PCAST
CENTRAL FILES:

Vice President for Research
and Dean of the Graduate College

THE UNIVERSITY OF
ARIZONA
TUCSON ARIZONA

RECEIVED

Administration 601
Tucson, Arizona 85721
(602) 621-3512
FAX: (602) 621-7507

92 JUL 21 AM 10

OSTP
MAIL ROOM

8 July 1992

D. Allan Bromley
The Assistant to the President
for Science and Technology
Executive Office of the President
The White House
Washington, D.C. 20500

Dear Dr. Bromley:

This is in response to your letter of 8 June 1992 to Dr. Manuel T. Pacheco, President of the University of Arizona concerning the partnership between the nation's research-intensive universities and the federal government. Overall, we believe that the relationship between the federal government and research universities has been strong and remains strong. In recent years, however, it has eroded slightly; specific problem areas are identified below.

- 1) A tendency now exists within the National Science Foundation and the National Institute of Health to "off-load" some of the cost of research to universities. This tendency manifests itself in the agencies' request for investigators who are funded to reduce their budgets and still provide the same research. I recognize that the program officers at these agencies are attempting to obtain as much research as possible for their limited dollars. However, this creates enormous stress within the universities, because it also comes at a time when our state support is declining. I believe this undermines progress in science and engineering in this country and will have a long-term negative impact.
- 2) The federal government is moving away from support for individual research projects and individual investigators toward major multidisciplinary centers. We believe that the centers are important, but in the end, it has been the individual investigators who have given strength and uniqueness to the research effort in the United States. It is at the individual level that the creativity occurs and that produces innovation tied to economic development over the long-term. It is not good policy to erode the very component of the effort in the U.S. that makes us unique and strong.

Dr. Allan Bromley
8 July 1992
Page 2

- 3) The peer review system has generally worked and continues to work. The "pork barrel" efforts that continue in Congress are not good practice and are problematic; however, we do not feel that they are extremely detrimental.
- 4) Three issues loom large for us as we continue to maintain our ability to produce good research: facilities, equipment and graduate student support. Support in all three areas is very inadequate. In particular, our support for graduate students has eroded. Since this is our nation's human resource for future research, it is particularly problematic.

Thank you for the opportunity to provide input.

Sincerely,



Martha W. Gilliland
Interim Vice President for Research

MWG:mdc

TYPE: INFORMATION

DOCUMENT NUMBER: 9202048

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: GUSTON, DAVID: STS PROGRAM

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/07/92

SUBJECT: ENCLOSED IS A COPY OF THE REMARKS MADE AT THE RECENT
OSTP PUBLIC MEETING IN CAMBRIDGE.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: PCAST
D. Allan Bromley

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS:

OSTP RECEIVED: 07/15/92
FILE: PCAST

DEPT RECEIVED:

CENTRAL FILES:

RECEIVED

JUL 15 10:20

3048
STS Program
MIT E51-006
Cambridge, MA 02139
July 7, 1992

OSTP
MAIL ROOM

Dr. D. Allan Bromley
Director
Office of Science and Technology Policy
Old Executive Office Building, rm. 360
Washington, DC 20506

Dear Dr. Bromley:

Enclosed please find a printed copy of the remarks I made at the recent OSTP public meeting in Cambridge. I applaud you and your office for providing such opportunities and would like to encourage you to continue to seek ways of increasing public input--not only from university campuses but also from business and labor groups, elementary and secondary schools, etc.--for science and technology policy. As some of us remarked after the meeting, such opportunities not only allow you to hear us out, but they also allow us to hone our arguments and positions in preparation for even more public debates.

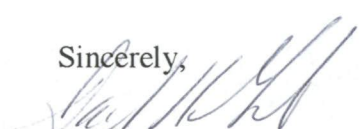
Another function served by the public meeting, perhaps inadvertantly, was to highlight particular programs and activities at MIT. As you may know, not only does MIT have innovative programs in science and engineering research and education, but it also has world-class research and teaching in the history and social studies of science and technology centered in the Program in Science, Technology, and Society (STS).

This past year, the STS Program has coordinated a Workshop on University Science and the Federal Government. Each month, the Workshop brought together senior MIT faculty from many disciplines to discuss current issues in the university-government research partnership such as scientific integrity, the international role of universities, the indirect cost question, and science after the Cold War. Each Workshop was led by a prominent scholar--some from MIT, some not--with expertise in the particular area. The Workshop was organized by Professors Ken Keniston and Sheila Widnall, and I served as the research assistant and rapporteur.

We were all quite pleased with the Workshop, particularly with the willingness of senior faculty to face these difficult questions head-on, and to consider at least in principle, some of the more radical solutions. We are in the process of editing the Workshop presentations in preparation to find a publisher. If you are interested, it may be possible to send you copies of the notes from the Workshops, or a pre-publication version of the collection.

Again, thank you for the opportunity to contribute to your process.

Sincerely,


David H. Guston
617/253-9651

My name is David Guston, and I am a Ph.D. candidate in political science here at MIT. As a former science policy student of Dr. Bromley's at Yale, I would like to congratulate him on the many achievements of his office to date.

I think that OSTPs successes have been predicated upon its recognition that the current science policy environment is fundamentally different from the environment of 1945 or 1950, when the basic instruments and institutions of American science policy were invented.

Then, we were confronted by frightful security problems posed by a seemingly implacable communist foe. America sought the continued enlistment of scientists and engineers in pursuit of Cold War goals. Now, that bilateral confrontation has dissolved into multi-lateral economic competition. With the dissolution of the Cold War, many fear the dissolution of the science policy consensus that, to some extent, piggy-backed on the national security consensus.

If the prevailing science policy consensus is to be preserved, some substitute for national security must be found. Biomedical science finds its substitute in the public health, although the public health rationale is open to more input from citizen's groups, disease lobbies, and professional associations than national security was.

The physical sciences find, or are pushed to find, their substitute in providing innovations for the competitiveness of our industries. But this rationale is almost too appealing, because colleges and universities, large and small, in all corners of the nation, want to contribute to the goal, and reap the local benefits of federal research dollars for economic competitiveness.

The point of emphasizing these changing rationales is that they are more open, more local, more confrontational, and even more personal, than the national security rationale. People readily cede care for national security to the government and to policy elites. They do not so readily cede care for their health, or the health of the economy or the

environment. The current science policy system is becoming more and more integrated with other, more normal politics.

Recognizing this new, more intimate connection between science and a wide array of politics, OSTP has played a role in focusing and coordinating science policy and in maintaining funding.

But this is not enough. The ultimate rationale for any policy comes from the American public. We have recently witnessed the interplay between science and politics with the zero-ing out of the SSC by the House of Representatives in exchange for desperately needed money for inner cities.

In this new context, where public support is so vital, I suggest it is counter-productive for members of the current Administration to reprimand university faculty--faculty who devote their lives to the public goods of research and education--for belonging to a so-called "cultural elite" that "sneers" at public values. May I also suggest that it is counter-productive for the Administration to attack the system of financial aid by which the poorest among us have been able to attend the best private universities.

In summary, the fundamental rationale for support of science at universities has changed from a rather monolithic security rationale to a combination of rationales more sensitive to public input. The federal patron of university science must realize that it cannot fund universities with one hand, and attack their public credibility with the other.

Thank you.

"Document Control"

TYPE: INFORMATION

DOCUMENT NUMBER: 9207855

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: BUCHSBAUM, S.J.: AT&T

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/06/92

SUBJECT: HE IS FORWARDING A COPY OF A PAPER REGARDING THE
U.S. TEXTILE INDUSTRY.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
PCAST
INDUSTRIAL

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: PHONE: EXT:

OSTP RECEIVED: 07/09/92
FILE: P-PCAST

DEPT RECEIVED:

CENTRAL FILES:

7855



AT&T
Bell Laboratories

Crawfords Corner Road
Holmdel, NJ 07733
908 949-5564

S. J. Buchsbaum
Senior Vice President
Technology Systems

July 6, 1992

Dr. D. Allan Bromley
Assistant to the President
for Science and Technology
17th St. & Pennsylvania Avenue, N.W.
Old Executive Office Building
Suite 358
Washington, DC 20506

Dear Allan:

The attached paper on the textile industry in the U.S. was sent to me by a friend of mine. I found it surprisingly interesting. I did not realize, for example, that the textile industry was as capital intensive as claimed.

Perhaps other members of PCAST might find the piece of some interest as well.

Sincerely,

Copy (with att.) to
Alicia K. Dustira

Info
P-
cc: PCAST
DAB
Industrial

See:
as promised.
The figures & quoted
are highlighted in
yellow. George

DEPARTMENT OF ENERGY

CRITICAL TECHNOLOGIES WORKSHOP

FIBER/TEXTILE/FABRICATED PRODUCTS

Dr. Thomas J. Malone
May 27, 1992

We are very glad to be here at the Department of Energy's Critical Technologies Workshop representing the Textiles and Clothing Section.

Actually, the term "Textiles and Clothing" is a misnomer. The industry could be more accurately described as the Fibers, Textiles and Fabricated Products Complex (F/T/FP). This complex is composed of four segments: Fiber producers, textile manufacturers, fabricators (apparel, home furnishings and industrial products manufacturers) and retail establishments, which of course ultimately lead to the consumer.

The fibers segment supplies the complex with the natural (cotton and wool) and man-made (polyester, nylon, etc.) fibers needed for the manufacture of textile products. The textile segment uses these fibers to produce yarns, fabrics, and carpets. Apparel is customarily thought of as the next link in this complex; and, apparel is most certainly important. It touches everyone's lives, from the downy soft baby sleeper to the rugged playwear for active children to the softly draping woman's evening dress to the crisply pleated men's slacks to the camouflage uniforms worn by our military. But fabricated products include much more! Our surroundings benefit from home furnishings such as upholstered furniture, draperies, sheets and table linens. Industrial fabrics abound in forms that are often not easily recognized. Tire cord, pond liners, abrasives, grasscatcher bags, awnings, conveyor belts, and many, many more products incorporate industrial fabrics. Other fabricated products include medical applications such as surgical gowns and artificial skin. Finally the last link in our complex is the retailer, providing the all-important link with the consumer. The retailer is concerned with having the right products available at the right time on his floor!

The Fiber/Textile/Fabricated Products industry is indeed a high technology industry. The use of chemistry, including advanced polymer science, computers, electronics, robotics, and sophisticated machinery are commonplace in our industry. Capital expenditures as a percent of sales for the capital-intensive fiber/textile portion of this complex exceeds both the U.S. average and that of most major U.S. manufacturing industries.

The importance of the F/T/FP complex cannot be overemphasized. The industry accounts for \$200 billion in annual consumer sales, with value of shipments of \$144 billion. There are over 26,000 companies in the United States involved in the complex, with an annual capital investment of \$4 billion. These companies provide employment for 2.2 million individuals, not just in the

Southeast, but nationwide. These 2.2 million jobs account for 12% of all industrial employment and support an annual payroll of \$27.6 billion. Women made up 77% of the apparel workforce in 1989, compared with 33% for all manufacturing. Minorities had about double the number of jobs in apparel as in total manufacturing. Of special interest for this workshop might be the fact that the F/T/FP complex purchases 5.5% (\$3.1 billion) of all fuel and energy consumed by U.S. industry.

The integration of the F/T/FP complex can best be described as vertically interwoven. The segments of the complex have supported and worked in cooperative efforts such as the Textile Research Institute (TRI), Cotton, Inc., the Institute of Textile Technology (ITT), the Textile/Clothing Technology Corporation (TC), and the National Textile Center (NTC). Communications and coordination have been of major concern to our industry, giving rise to several specific activities in support of those concerns. They include the Textile Apparel Linkage Council (TALC), the Voluntary Inter-industry Communications Standards Committee (VICS), the Sundries and Apparel Findings Linkage Council (SAFLINC), and the Fabric and Suppliers Linkage Council (FASLINC).

The F/T/FP complex is, however, under a very real threat today from the pressure of imports and the resulting loss of jobs. From 1980 to 1991, imports into the United States of products generated in our industry increased by 8.7 billion square meters equivalent--an alarming 313%!! By the year 2000, it is expected that imports will increase another 8 billion square meter equivalents, or an additional 67%! This flood of imports has been a direct cause of 420,000 job opportunities lost in the F/T/FP complex in the United States. A well-respected econometric forecasting organization, The WEFA Group, has forecast that 760,000 present jobs will be lost by the year 2002 if the proposed General Agreement on Tariffs and Trade (GATT) and the North American Free Trade Agreement (NAFTA) are ratified. An additional 210,000 jobs in non-manufacturing sectors would disappear. Nearly 1,000,000 jobs lost to imports!

Even though the F/T/FP complex is under a real threat from imports, it is a fallacy to believe that we are a "sunset" industry. It has been claimed that Japan and Western Europe are allowing their F/T/FP complex to sunset, or fade away, and that the United States should do likewise. In reality, Japan has 1.3 million F/T/FP employees; Western Europe has 3.1 million; and they are both holding steady, not fading away. The United States has 1.8 million--25% fewer F/T/FP workers per capita than Western Europe and 30% less than Japan. Japan and Western Europe are not sunsetting their F/T/FP industry. We should not let ourselves be forced into a sunset situation, either!

There are opportunities for the generic technologies represented at this workshop in the F/T/FP complex. In manufacturing systems management, we are interested in industrial simulation modelling, data exchange tools, modular and other new apparel manufacturing systems, and waste management systems. In flexible computer-integrated manufacturing, machine vision for robotics in automated apparel manufacturing and fabric inspection as well as computer-aided design, process control, simulation and factory scheduling tools are noteworthy. Intelligent processing equipment leads us to think of integrated circuit applications for fiber, textile, and fabricated products machinery.

There are also opportunities for the F/T/FP complex to address the issue of inefficiency wastes in our industry. Markdowns, stockouts, and inventory costs add up to over \$25 billion waste in our complex - a real problem. An aggressive industry effort to implement "Demand Activated Manufacturing" (DAM), often referred to as Quick Response, is evoking cooperative efforts at every link in the distribution channel to improve information sharing, joint planning and electronic data interchange (EDI).

It is encouraging to note that there has been progress for the F/T/FP complex. In the early 1980's, with the help of consulting firms knowledgeable in the total industry complex, companies from all segments recognized the necessity for changing the system from the conventional push system to a demand activated manufacturing system. Crucial in the move were the requirements for companies in the different segments to communicate electronically and the capture of point of sale information at retail. In dramatic fashion both have been implemented with 21 thousand companies using electronic data interchange and a \$3.2 billion in point of sale investment committed to date. Research indicates that 80% of large complex's companies are pursuing some extent of demand activated manufacturing.

Leading companies in the F/T/FP complex, along with key consulting firms and vendors hope to undertake a new initiative in simulation modelling of the system dynamics of the entire complex from fibers to the consumer. Working with Peter Senge and his associates at M.I.T., it is anticipated that a three year program involving outstanding and knowledgeable talent may prove successful. Such an ambitious undertaking, never before attempted for a major industrial complex, may provide important new insights for improving the system dynamics. If successful, it may also provide a role model for similar work in other industries. The companies involved have committed \$2 million per year for the three year effort. Because of the high risk nature of the work and its potential benefits to the entire industry. Sponsors are seeking federal government support of the program at \$1.5 million/year.

The need for world class collaboration and research and development efforts is apparent. Universities, the F/T/FP complex, and government working together can bring the United States to a level of world class competitiveness heretofore unknown.

Toward this end, the reality of the past is discouraging for the F/T/FP complex. In 1989, the federal government supported over \$29 billion in funding for manufacturing research and development. Of that, \$15 billion went to the aerospace industry; \$8 billion went to electronics and communications. The F/T/FP complex received no significant federal funding. Since that time, modest federal funds have been committed for the support of TC² and NTC. While these monies are appreciated and very much needed, there are ample opportunities for us to make a difference on the F/T/FP complex, indeed, on the national economy, with stronger support from our Federal government.

The industries in the "ACE complex"—aerospace, communications, and electronics—have long enjoyed, and profited from, the lion's share of federal R&D funding.

FEDERAL VS INDUSTRY R&D FUNDING IN 1989

INDUSTRY	FEDERAL FUNDS	INDUSTRIAL FUNDS	TOTAL FUNDS	FEDERAL % OF TOTAL R&D	% OF FEDERAL FUNDS
Total manufacturing	29,233*	59,648	88,871	32.9	100.0
Aerospace	15,647	3,511	19,157	81.7	53.5
Electronics, communications	7,928	10,618	18,546	42.7	27.1
Rubber products	313	930	1,243	25.2	1.1
Autos, trucks, railroad equipment (including tanks)	1,982	9,431	11,413	17.4	6.8
Scientific instruments	991	5,531	6,522	15.2	3.4
Machinery (including computers)	1,669	10,457	12,126	13.8	5.7
Fabricated metals	73	732	805	9.1	0.2
Iron and steel	21	601	622	3.4	0.1
Chemicals	381	11,134	11,515	3.3	1.3
Petroleum products	21	2,068	2,089	1.0	0.1
Food and beverage	0	1,172	1,172	0.0	0.0
Paper/pulp	0	1,009	1,009	0.0	0.0
Textiles	0	176	176	0.0	0.0

*In millions of dollars

manufacturing technologies. Together these efforts constitute a deep penetration by the military into almost every high-tech frontier and could have a profound impact on the nation's industrial future.

With a reputation in Congress as one of the most effective organizations in the Pentagon's labyrinthine bureaucracy, DARPA has seen its budget double since 1985, reaching over \$1.2 billion in fiscal 1990 and rising to nearly \$1.5 billion in 1991. However, the agency's continued role in pursuing a dual-use technology policy depends on a fragile coalition of interests. In 1989 the Office of Management and Budget ordered DARPA to stop funding several major projects, including high-definition television and x-ray lithography, because they were too closely linked to civilian rather than military objectives. OMB reportedly wanted to withdraw support for the Sematech consortium as well. The Bush administration has strongly opposed dual-use investment, although a recent White House report supporting an explicit technology policy and growing interest in a "critical technologies" list may signal a change of heart.

Yet even if DARPA's support continues, serious flaws in the dual-use strategy mean trouble ahead. Although an explicit technology policy may appear to be a breath of fresh air, especially one that reconciles military and civilian needs, it may actually hinder the transfer of tech-

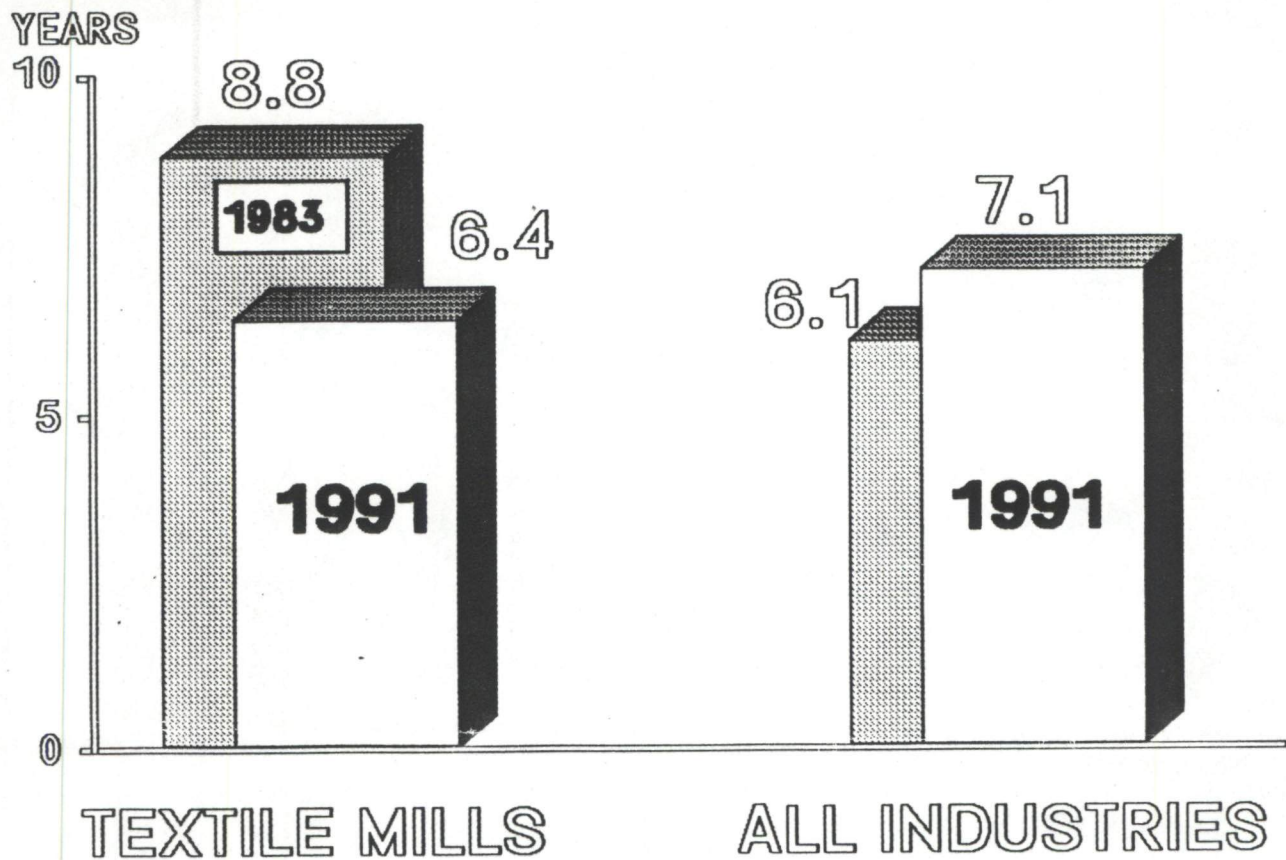
nologies in areas of greatest commercial and national need. That's because dual use is unlikely to target manufacturing sectors now suffering from a dearth of R&D funding, including steel and textiles. Not all important areas of scientific inquiry will necessarily meet the test of military relevance, nor would such a policy address critical national needs such as mass transportation, renewable energy, occupational health and safety, and education. A narrowly conceived military/high-tech agenda cannot build more housing, clean up the environment, or upgrade the nation's infrastructure.

An emphasis on state-of-the-art innovation would also divert resources from incremental improvements in process technologies and product design, areas that help support local and regional industry. In fact, it is at this middle ground that military and civilian interests diverge most strongly. For example, DARPA's test of a state-of-the-art parallel-processing chip for a smart missile would not remotely resemble industry's methods for evaluating the chip's potential for desktop computers.

In the final analysis, DARPA is an agency with a military mandate. Although the agency prides itself on links with commercial industry, the primary users of its products are the military and intelligence communities and their contractors. In fact, during the 1980s, DARPA was forced to tie its programs more firmly to military objec-

AGE OF FACILITIES

1983 and 1991



Source: ATMI based on Census QFR data.

"Document Control"

TYPE: ACTION

DOCUMENT NUMBER: 9202514

ORIGINATOR: 02

STATUS I

DIRECTORATE STATUS

FROM: KUYKENDALL, John W.: DAVIDSON COLLEGE

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/03/92

SUBJECT: HE IS WRITING WITH HIS RECOMMENDATIONS FOR THE PCAST
STUDY OF THE HEALTH OF U.S. UNIVERSITIES.

DIRECTORATE

STAFF

ASSIGNED: PCAST

ASSIGNED:

ACTION

STAFF

REQUIRED: AS APPROPRIATE

ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE: 08/04/92

STAFF DUE DATE

DATE COMPLETED:

DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

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DAVIDSON COLLEGE

DAVIDSON, NORTH CAROLINA 28036 704/892-2000

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JUL 3 1992
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OFFICE OF THE PRESIDENT

Mr. D. Allan Bromley
The Assistant to the President for Science and Technology
The White House
Washington, DC 20500

Dear Mr. Bromley:

Let me thank you for your letter of June 8, describing the initiative which the President's Council of Advisors on Science and Technology is about to undertake with regard to the relationship between the federal government and research-intensive universities. Certainly the effort you are beginning is worthwhile, and I have a sense that the topics of interest you have listed are entirely pertinent to genuine progress in the maintenance and enhancement of the relationship between the federal government and higher education.

I also want to thank you for the kind invitation to participate in one of the public meetings which are currently being conducted on this topic. Although I am personally unable to attend any of the sessions this summer, it is my hope that Davidson can be represented in one of these or some later conversation.

Quite candidly, my first reaction to your letter, given the nature of the institution I serve, was that we do not "have a dog in that fight" to echo a local aphorism in this part of the country. Upon reflection, though, I realize that other matters which are of special significance to Davidson and similar institutions may very well be at stake in the conversations in which you are currently engaged.

I am concerned, for example, that any serious reflection upon the potential involvement of the federal government in the scientific aspects of higher education take very seriously the essential -- indeed crucial -- role which is played by institutions of higher learning that are not to be categorized as research-intensive. It is a matter of verifiable fact, for example, that liberal arts colleges (such as the so-called "Oberlin Fifty") provide an inordinately large gathering of those who will be future leaders in the field of science, both as researchers and teachers, during the generations yet to come.

I trust that you and the other members of the President's Council will not foreshorten your vision with regard to the potential for good which is inherent in the support that you might give to liberal arts colleges and institutions with similar missions.

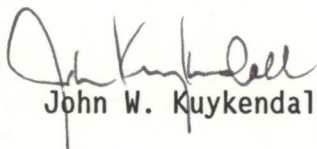
Letter to Mr. D. Allan Bromley
July 3, 1992
Page 2

While I am confident that colleagues such as Peter Likins and Harold Shapiro will not be slow to bring this to the attention of the entire Council, I do wish to express the hope -- which I believe to be shared by many others -- that you will avail yourself of an early opportunity to do a similar review of the partnership which should exist between the government and liberal arts colleges.

Be assured that a great number of us stand ready to be of assistance as you give thought to the prospects of such a study.

Thanks once again for your thoughtful letter and for the interest the Council is expressing in American higher education.

Sincerely yours,


John W. Kuykendall

JWK:dhh

cc: Dr. Peter Likins
Dr. Harold T. Shapiro

7847

THE JOHNS HOPKINS UNIVERSITY
SCHOOL OF MEDICINE

DANIEL NATHANS
UNIVERSITY PROFESSOR
(301) 955-8445
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DEPARTMENT OF
MOLECULAR BIOLOGY AND GENETICS
725 N. WOLFE STREET
BALTIMORE, MARYLAND 21205-2185

July 2, 1992

Dr. D. Allan Bromley
Assistant to the President for Science and Technology
The White House
Washington, D. C. 20500

Dear Allan:

I enclose a revised draft of the report of the PCAST Panel on Bioscience and Biotechnology for discussion at the July meeting of PCAST. A copy is also being transmitted by FAX.

Sincerely,

Daniel Nathans

DN:jml

Encl.

New words are in bold letters.
Deletions are crossed out.

Draft, June 30, 1992

Achieving the Promise of the Bioscience Revolution: the Role of the Federal Government

A Report of the PCAST Panel on Bioscience and Biotechnology

This report deals with the role of the federal government in achieving two goals:

- Promoting the health of the American people and all mankind through research in the biosciences
- Fostering a vigorous American biotechnology industry

These goals are inter-related. Discoveries in the biosciences are the basis for industrial development of more effective ways to prevent or treat illness, produce more nutritious foods, make use of renewable energy sources, and protect the environment. Many believe that the single most important factor in the success of America's biotechnology industry is the strength of the nation's bioscience research enterprise.

Over the past fifteen years there has been a far-reaching change in the biosciences and bioscience-related industry. Building on discoveries made in the preceding decades and imaginative new technologies, scientists have developed the capability of harvesting and making use of the fundamental molecules of life —genes and proteins— from every organism on earth. This capability has opened up many new opportunities in basic and applied research of great potential benefit to mankind; it has generated a new industry; and it is having a profound effect on more traditional bioscience-based industries.

The U.S. government has played a key role in the bioscience revolution. Since the end of World War II the federal government has fostered, primarily through the National Institutes of Health and the National Science Foundation, basic research in universities and its own laboratories that underlies recent advances. It has also provided the means for attracting bright students into the biosciences by supporting research and educational programs at universities, and by making opportunities available for talented young researchers who successfully complete advanced training. By many criteria—scientific discovery, impact on health, competitive position of U.S. industry, international recognition — the federal investment in research in the biosciences has been a notable success. In bioscience and biotechnology the United States is in the lead. We don't need to catch up with foreign competitors, but we do need to plan wisely to stay ahead.

Federal policy is an overriding factor in achieving the promise of the biosciences and the biotechnology industry. In addition to supporting scientific research and education, the federal government facilitates industrial application of research findings, regulates industrial practices and products, protects intellectual property, and sets tax policy that affects industrial research and development. In what follows we examine each of these facets of federal policy with particular emphasis on research. Some of these issues have been dealt with in previous reports, notably the February 1991 "Report on National Biotechnology Policy" by the President's Council on

Competitiveness and the February, 1992 report of the FCCSET Committee on Life Sciences and Health ("Biotechnology for the 21st Century").

Appended to this report are 1) a table of federal expenditures for bioscience (life science) research, and 2) papers by Experts who provided testimony to the Panel.

RESEARCH

The overall goal of federally supported research in the biosciences is to promote the health and well-being of the American people. Research relevant to this goal includes fundamental studies of the molecules basic to life and applied research in medical science, agriculture, and the environment. Although most federally supported research in the biosciences is health-related, sponsored primarily through the National Institutes of Health, a broad assortment of biological research is sponsored by other federal departments and agencies. Overall the 1992 federal budget includes \$ **10.23 billion in federal obligations for the life sciences**, ~~for research in the biosciences~~, of which \$**5.23** billion is for research outside government laboratories, primarily at universities. NIH accounts for **64.7%** of the total federal expenditures ~~or~~ **and** about **1.1%** of the annual national expenditure for health care (**1989 figures**). (See Appendix A for trends **in federal obligations for the life sciences**.) In keeping with the designation of biotechnology as a Presidential initiative for FY 1993, the proposed 1993 federal budget includes a 7% increase for biotechnology research. ~~and a _____ % increase overall for research in the life sciences.~~

The special role of federally supported research in the biosciences.

Federal R&D support in the biosciences is less than half the total national investment in bioscience R&D. The latest available data for national health-related R&D (1989) indicate a total national expenditure of \$20.9 billion, of which \$9.2 billion was from the federal government, \$1.5 billion from states, \$9.4 **billion** from private industry and \$0.8 billion from non-profit private organizations. In this national context, what should be the special role of federally supported research? In general terms the Panel suggests that the principal role of federally supported research in the biosciences should be to expand the knowledge base in areas of science and technology that are likely to have broad impact on health and on bioscience-based industry. In this category are basic research that cuts across many areas of the life sciences, and applied research that points the way to new approaches to solving pressing national problems or new generic technologies.

There is a natural, mutually-reinforcing division of effort between government-sponsored research and industrial research and development with some overlap both desirable and unavoidable. The government side should be weighted toward discovery of new knowledge and new technology, and the industrial side should be weighted toward exploiting the new knowledge for product development. Although university and government laboratories excel at discovery, they lack the market-driven incentives essential for effective product development. Conversely, industry, driven by market forces, is often unable to sustain long-term investment in non-targeted research that is the basis of new product development.

Opportunities in research

The recent revolution in the life sciences has opened many new areas of research with great promise for human welfare, from gene-based diagnostics and therapeutics to environmental protection. There is clearly more promising science to do than can be supported.

Wise investment of federal resources therefore requires periodic assessment of the promise of broad areas of scientific research for expanding the knowledge base that underlies applications to human welfare, including the development of useful products by bioscience-related industry. Such an assessment of federally supported research in biotechnology has recently been carried out by the FCCSET Committee on Life Sciences and Health. The panel supports the goals and priorities of the FCCSET committee set forth in their report "Biotechnology for the 21st Century." NIH is now developing a strategic plan to guide future allocation of its resources for health-related research. Major input from the private sector should be part of the assessment and planning process. Much of the NIH budget is understandably targeted to specific disease categories. These are of urgent concern to the American people. However, disease-related research has a common core rooted in chemistry, genetics, and public health sciences. It is therefore possible to select areas of science for priority support based on their broad impact across a spectrum of diseases. Examples include structural biology, molecular medicine, disease prevention, understanding the human genome, and neuroscience. Therefore while the government should continue to give high priority to applied research that meets urgent health needs of the American people, high priority should also be given to cross-cutting science that has an impact on many health-related problems.

Similar considerations apply to other areas of the life sciences. In agricultural science and forestry, increased understanding of plant genetics and molecular biology is often a limiting factor in applications of biotechnology to improvements in crop yield and quality. For example, although impressive technology exists for transplanting genes into plants, basic knowledge is generally lacking that would allow scientists to use the technology for optimizing food quality or plant fuel production, or for conferring resistance to environmental stress. In environmental biotechnology the discovery or engineering of microbes useful in bioremediation and waste treatment is one of the most promising approaches to protecting the environment. Microbes are also potential sources of new biomaterials, industrially useful enzymes, and pharmaceuticals. For these reasons there should be greater investment in the study of previously uncharacterized microbes.

Federally supported university research

University investigators remain the cornerstone of federal efforts in the life sciences and biotechnology. It is largely their creative talents that propel the discovery-applications continuum. It is important that individual imaginative investigators who meet the high standards of peer review be adequately supported, and that their initiative be given ample scope in any strategic plan. Review panels should put greater emphasis on originality and promise of research proposals. Equally important is adequate research infrastructure —facilities and instrumentation— essential for advanced research in the biosciences.

The primary organizational unit of university research in the biosciences is the externally supported laboratory of an individual investigator with perhaps three to twenty or so students and post-doctoral trainees. Interactions, cooperation and collaboration between laboratories is frequent. In some instances collaborations are formalized by named programs or centers funded as a unit. Such programs or centers can be quite effective when investigators from different

disciplines collaborate to attack a major problem, for example a specific form of cancer, protein engineering, or plant genetics. Small centers with well-defined goals should be given high priority.

Competitive grants and peer review

For the federal government to achieve its goals in bioscience and biotechnology research, high quality is essential. The competitive grant system based on review of grant applications by experts is the cornerstone of quality control. It should be used in every field, basic or applied. Similarly, research in federal laboratories should be evaluated with comparable rigor.

Growth

Recognizing the importance to the nation's prosperity of long term investment in basic research, the administration and Congress set a goal of doubling the NSF budget by 1994. The Panel suggests that the long term federal investment in bioscience and biotechnology also be examined to set an overall budgetary target for the next five years. This process should provide for growth of particularly promising areas of research and increased collaboration between agencies supporting overlapping research.

EDUCATION

Because of the recent rapid advances in the life sciences and their enormous promise, the field is attracting a growing number of post-graduate students headed for research and/or teaching careers. Between 1980 and 1990 the number of Ph.D. degrees in the life sciences awarded by U.S. universities increased by 17%, whereas the number of bachelors degrees conferred declined by 27%. Over the same period the rate of growth of private industry jobs in the life sciences increased by 6% per year. (All data are from Science and Engineering Indicators - 1991.) Although it is not possible to predict the precise future supply or need for bioscientists, two important factors on the demand side are the growth of the biotechnology industry and the availability of federal support for research in the biosciences. There is general agreement that the biotechnology industry is likely to continue to grow rapidly in the present decade. Some analysts project growth from a \$4 B to a \$50 B industry by the end of the century. Therefore there is likely to be increasing need for highly trained bioscientists and technical support staff for industry. On the assumption that federal support for research in the biosciences will also continue to grow as part of the nation's investment in extending the knowledge base that ~~underlies~~ **sustains the health of the American people and the vigor of our health** and the biotechnology industry, there will be additional need for bioscientists in universities, research institutes and the government. The Panel believes that universities (with federal support) should strengthen educational programs in the biosciences to meet these anticipated needs, particularly the anticipated needs of industry.

There was general consensus among the Panel's experts that the scientists of most value to the biotechnology industry are those with solid grounding in the fundamental quantitative sciences and rigorous advanced training in a traditional discipline. At present there is a particular need for chemists and bio-process engineers. Federally supported education programs should continue to emphasize traditional disciplines and interdisciplinary studies that retain rigorous quantitative science.. They should also encourage interactions between students and their

preceptors in universities and industrial or government scientists that would help students keep abreast of opportunities in industry and government.

To assure a supply of bioscientists to meet the country's anticipated needs more students must be attracted to science in the pre-college years and their interest sustained during the college years. These issues have been dealt with elsewhere. Our panel agrees that the pre-college and college years are crucial periods in the development of scientists **and deserve increased attention.**

REGULATION

One of the most critical and contentious issues for the biotechnology industry is federal regulation of biotechnology products. Many believe federal regulation is a major impediment to innovation. The regulatory process often results in lengthy, costly and unpredictable delays in bringing products to market. For smaller companies, frequently dependent on a single product, the regulatory process can bring disaster or success. However, companies large and small recognize the importance of a rigorous product review and approval by an internationally respected federal agency. They want a science-based review of risks and benefits, clear guidelines, single or lead agency jurisdiction, and greater efficiency in the review process. The Panel believes that these goals are in the national interest and should be given high priority in regulatory policy. The recent directive to regulatory agencies by the President to base risk assessment of biotechnology products on the product itself and not on the process by which it is produced, is a major step in this direction.

An important aspect of regulation of biotechnology products of particular concern to our Panel is the science base of regulatory agencies. Some biotechnology products present special regulatory challenges, for example, novel therapeutic proteins and transgenic plants. Additionally, traditional product development is accelerating due to rapid advance in the knowledge base and new technology. Agencies are beginning to respond to these challenges of the biotechnology industry by establishing advisory committees of outside scientists and by hiring additional scientists well trained in biotechnology. These initiatives should be supported. In addition, science careers in the regulatory agencies should be made rewarding enough to attract and keep highly qualified scientists. This will require competitive salaries, opportunities for professional growth, effective recruitment efforts, and periodic review by outside experts.

Regulation has a prominent and well-recognized social/political dimension. Strengthening science-based regulation will require not only better and more scientists, but also a change in public perception of biotechnology and its benefits and risks. The schools and the press have parts to play in this educational process. So do our elected officials. The American people need to be convinced that the products of the biotechnology industry will be of benefit to them, and that they carry no special risks. Here also the President's directive concerning risk assessment of biotechnology products is an important step.

PATENTS

The biotechnology industry as we know it would not exist without protection of intellectual property. Patents are also a fundamental vehicle in technology transfer from federally sponsored research laboratories to industry. The patenting process, and in particular the efficiency and competence of the Patent and Trademark Office (PTO) is often a crucial factor in business success or failure, especially for the small biotechnology companies (**In 1992 biotechnology pendency was 26.4 months.**)

Based on testimony of outside experts in commercial biotechnology, the Panel concludes that there is an urgent need to improve the quality of the review process and shorten the time from patent application to decision. Problems are said to include too few experienced examiners, an increasing backlog of cases, and inconsistencies in decisions. This situation will worsen as the surge of biotechnology products continues. As in the case of regulatory agencies, the PTO must attract qualified scientists by offering challenging careers and competitive salaries.

A second area of ~~concern~~ **importance** to the American biotechnology industry is international harmonization of patent practices, including universal recognition of patents on drugs. Among the differences between U.S. patent law and those of other developed countries is a one year grace period for filing patents allowed U.S. inventors after public disclosure. This provision is especially important for federally supported scientists whose patentable discoveries are often a by-product of their published research.

PRIVATE INVESTMENT

The biotechnology/pharmaceutical industry is research-intensive. For small companies financing for research is acquired through venture capital, partnerships, alliances with larger companies, and public offerings of equity or debt. For most larger companies a significant fraction of earnings is invested in research and development. An important factor in competing successfully is the size of the R&D investment. The Panel has no expertise in health care economics or tax policy. However, we point out that federal policies that influence funds available for R&D (e.g., tax incentives or price of drugs) have a major impact on R&D investment and hence on the ability of the industry to compete. Of particular value are incentives for long term R & D investment.

FROM FEDERALLY SUPPORTED RESEARCH TO INDUSTRIAL R&D

In the RESEARCH section of this report we argue that there is a natural mutually-reinforcing division of effort between federally supported research in the biosciences and industrial research and development. How do these two worlds interact? At present there are a number of different pathways. Most important is the extensive communication of research results by publication or presentation at scientific meetings or private conversations between scientists. Probably the most common formal arrangement is a consulting agreement between a company and a federally supported university scientist. Others include sharing of reagents in both directions, collaborative research, research support by companies of individual investigators or departments in exchange for commercial rights to inventions, licensing by companies of intellectual property owned by universities, and sharing of equity in start-up companies by

inventors or their institutions. Equity sharing by federally supported university inventors is probably the basis for most of the biotechnology companies in the country. For government scientists, CRADAs offer opportunities to participate in the development of their discoveries. In all of these cooperative arrangements, federal policies that encourage technology transfer from federally supported laboratories to industry have been crucial. They have provided social and financial incentives for scientists and their institutions to promote technology transfer.

Discoveries with potential commercial value are occurring at an increasing rate. For example, the Human Genome Project and related research will uncover many previously unknown genes (since only a small fraction of the total number of human genes has been identified so far). Many of these are likely to encode proteins (for example, hormones, neurotransmitters, anti-inflammatory factors, cell receptors) of commercial interest. However, a great deal of exploratory research will be needed to understand the role of such newly discovered proteins in the body and whether they have commercial value in themselves or as targets for drug development. Will the various present arrangements for technology transfer be adequate in the future?

Possible new vehicles for promoting technology transfer in both directions between federally supported laboratories and industry should be considered. One is the location of industrial research laboratories adjacent to universities or government research facilities coupled with increased interaction between the respective scientists. Another is large scale support of university research and associated capital costs by private industry in return for commercial rights and collaborative research arrangements. Programs of this type are already in existence at a few universities in the United States and in Great Britain. In all such initiatives federal policy in the form of tax incentives or shared funding could play an important part.

A recurrent issue is whether the Federal Government should adopt policies that would discourage the flow of biotechnology from federally supported university laboratories to foreign companies. The government has a clear interest in seeing its substantial investment in bioscience selectively benefit the domestic biotechnology industry. It also has a long term interest in international exchange of scientific information, both to advance science and technology and to promote America's international leadership in science. The problem is how to balance these interests. The issue is compounded by the fact that the biotechnology/pharmaceutical industry overall is multinational. Large companies, foreign and domestic, have research facilities outside their home countries. Cooperative arrangements on specific projects between domestic and foreign companies are common. In return for financial support, some foreign companies have privileged ties to American university bioscience laboratories that receive federal support, and some United States companies have similar arrangements with university bioscience laboratories in Europe. Restrictions on arrangements between U. S. university laboratories and foreign companies could incur reciprocal restrictions abroad for U. S. companies. Such restrictive policies are also likely to diminish world-wide scientific interchange. The panel believes that it is important to monitor the number and scope of university ties to foreign companies in the bioscience field. Our impression is that the situation is not of critical magnitude at present. However, the increasing financial pressures on research-intensive universities may lead to an expansion of such arrangements. Therefore, in the near future it may be desirable to consider formal policies that would encourage universities to provide preferential access to domestic industry.

Another contentious facet of technology transfer from federally supported laboratories to industry are potential conflicts of interest for university or government scientists. The increasing ties between industry and bioscientists at universities or federal laboratories and the occurrence of well-publicized instances of actual or perceived conflicts have stimulated the government and academic institutions to consider formal policies to avoid conflicts of interest. If taken too far, such policies can create undesirable barriers to productive collaborations between industry and academia. However, clear and rational safeguards against conflicts of interest can foster such relationships by providing an institutional framework within which they can flourish. A number of universities have adopted formal policies dealing with conflict of interest. The Panel believes that the primary responsibility for devising specific policies should remain with individual academic institutions. Such policies should include institutional scrutiny of proposed commercial ties, adequate disclosure of financial and other arrangements that could lead to a conflict of interest for the scientist or his institution, and monitoring of on-going collaborations for potential conflicts of interest.

Appendix A

FEDERAL OBLIGATIONS FOR LIFE SCIENCES BY AGENCY: FISCAL YEARS 1982 - 1992 (In Thousands of Dollars)

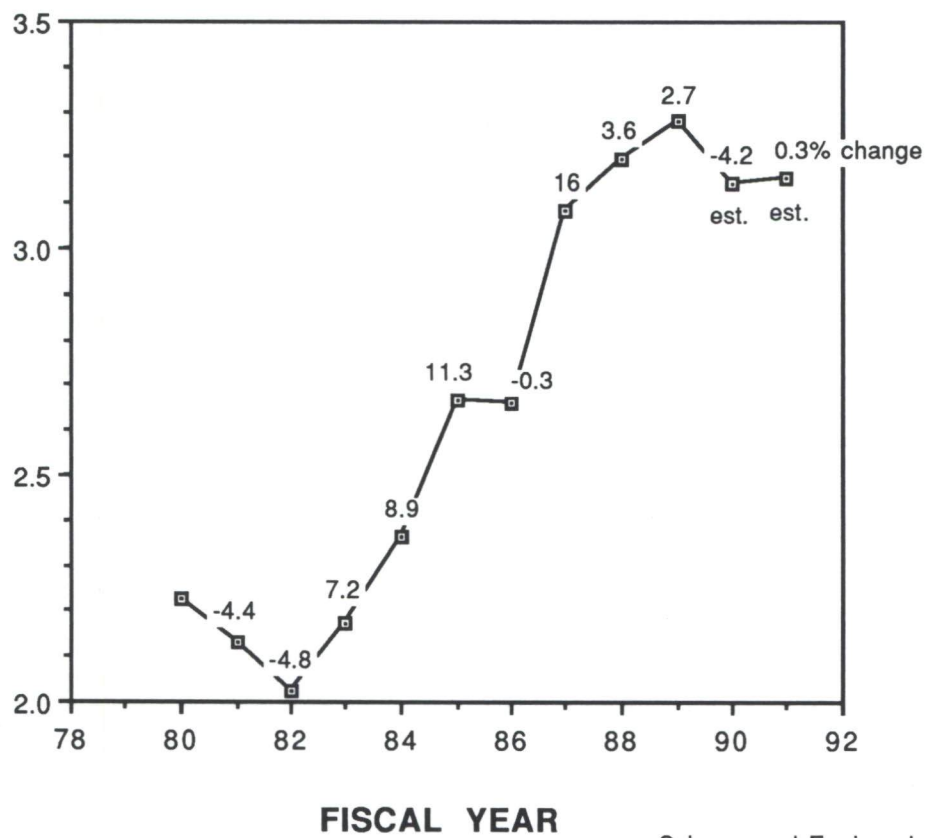
AGENCIES	1982	1983	1984	1985	1986	1987	1988	1989	1990	Est. 1991	Est. 1992
USDA	530,864	570,556	595,136	707,909	694,480	707,956	772,332	786,269	832,082	919,697	954,959
Commerce	58,827	12,702	13,446	14,633	17,113	12,634	12,274	14,401	14,303	14,624	10,527
Defense	208,840	222,755	244,937	271,951	267,531	293,553	280,414	334,218	284,459	301,410	309,475
Energy	162,393	146,205	143,830	157,468	143,591	160,759	185,244	222,917	214,162	287,729	220,417
DHHS - excl NIH	283,807	338,361	330,248	361,799	378,545	450,075	524,880	662,231	701,020	796,436	847,242
NIH	2,823,232	3,140,759	3,536,341	4,008,142	4,133,061	4,844,025	5,079,273	5,435,085	5,707,870	6,177,602	6,617,928
Interior	94,923	100,991	63,381	55,299	60,392	67,533	74,202	74,217	82,860	96,173	98,039
EPA	82,038	65,508	68,877	83,502	86,891	99,436	102,224	122,108	137,202	152,179	167,058
NASA	55,165	65,140	57,492	68,633	84,960	96,428	100,324	123,077	140,333	178,206	236,871
NSF	173,259	194,363	227,756	241,114	239,674	264,248	262,175	277,434	262,470	281,647	317,144
All Others	272,151	320,591	354,504	392,048	358,080	344,789	331,119	443,154	461,058	464,547	450,279
TOTAL-Current	4,745,099	5,177,931	5,635,908	6,362,098	6,464,318	7,341,436	7,724,461	8,695,111	8,837,819	9,670,250	10,229,339
TOTAL-Constant*	5,679,831	5,950,277	6,203,575	6,745,651	6,656,011	7,341,436	7,453,885	7,849,128	7,843,986	8,258,818	8,474,105
Percent change		+4.8	+4.3	+8.7	-1.3	+10.3	+1.5	+5.3	-0.07	+5.3	+2.6

*1987 Base

Source: Science Resources Studies Division, National Science Foundation

BILLIONS OF CONSTANT (1982) DOLLARS

NIH OBLIGATIONS FOR ACADEMIC R&D



Science and Engineering Indicators, 1991

"Document Control"

TYPE: INFORMATION

DOCUMENT NUMBER: 9207845

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: LIKINS, Peter: LEHIGH UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/02/92

SUBJECT: HE IS FORWARDING A COPY OF HIS LETTER TO DON BLANDIN
REGARDING THE PCAST STUDY OF U.S. UNIVERSITIES.

DIRECTORATE
ASSIGNED:

STAFF
ASSIGNED:

ACTION
REQUIRED:

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:
DATE COMPLETED:

STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
PCAST

WHITE HOUSE TRACKING #:

CONTACT PERSON:
PHONE:

EXT:

REMARKS:

OSTP RECEIVED: 07/06/92
FILE: P-PCAST

DEPT RECEIVED:

CENTRAL FILES:

Lehigh University



Peter Likins, President

7845

Alumni Memorial Building 27
Bethlehem, Pennsylvania 18015

telephone (215) 758-3155

fax (215) 868-6560

(215) 691-5420

July 2, 1992

Mr. Don M. Blandin
Director
Business-Higher Education Forum
One Dupont Circle - Suite 800
Washington, D.C. 20036

Dear Don:

I write in response to your request for suggestions for agenda topics and speakers in February.

The President's Council of Advisors on Science and Technology (PCAST) will be issuing in late 1992 a major report on "Research-Intensive Universities and the Federal Government." Hearings are being held over the next few months in Boston, Washington, Berkeley, Austin, Durham and Chicago, seeking input. When the report is out, I'm sure we'll want to generate discussion at the highest levels, including industry and academia as well as government. I think that the Business-Higher Education Forum is an ideal arena for such consideration.

PCAST is chaired by D. Allan Bromley, the President's Assistant for Science and Technology. The indicated study is co-chaired by David Packard and Harold Shapiro. This will be the product of PCAST as a whole, with membership including Norman Borlaug, Solomon Buchsbaum, Charles Drake, Mary Good, Ralph Gomory, Thomas Lovejoy, Thomas Murrin, John McTague and Daniel Nathans, as well as Bromley, Packard, Shapiro and myself. You should be able to get Allan Bromley to address BHEF unless he's otherwise absolutely committed, and I should think you'd want to invite all members of PCAST. If you can enlist half of PCAST you'll have enough "insiders" to stimulate substantial discussion in a set of "break-out" groups (as would be most appropriate for this topic.) You should make a special effort to engage Harold Shapiro, who would be a superb addition to BHEF.

Sorry to miss the assembly in Brussels. I'm in Prague on June 28th as I draft this letter, but I just couldn't manage to extend my European stay to include the BHEF affair.

Warm Regards,

Peter

PL:ets

cc: D. Allan Bromley

INFO . . .
cc: PCAST
DAB

"Document Control"

TYPE: ACTION

DOCUMENT NUMBER: 9202522

ORIGINATOR: 02

STATUS I

DIRECTORATE STATUS

FROM: GUSKIN, Alan E.: ANTIOCH UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/02/92

SUBJECT: HE IS FORWARDING HIS COMMENTS FOR THE PCAST PANEL ON
THE STUDY OF U.S. UNIVERSITIES.

DIRECTORATE

STAFF

ASSIGNED: PCAST

ASSIGNED:

ACTION

STAFF

REQUIRED: AS NECESSARY

ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE: 08/04/92

STAFF DUE DATE

DATE COMPLETED:

DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley

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CONTACT PERSON:

PHONE:

EXT:

REMARKS: ARN per AKD

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FILE: P-PCAST

CENTRAL FILES:

2522



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795 Livermore Street
Yellow Springs, Ohio 45387
513-767-6331

92 JUL 21 AM 2 5

OST
MAIL ROOM

July 2, 1992

D. Allan Bromley
Assistant to the President
for Science and Technology
The White House
Washington, DC 20500

Dear Mr. Bromley:

I very much appreciate being asked to respond in some way to your study on the relationship between the Federal government and research intensive universities. Since my University is not such an institution, I will limit my comments to one topic of interest to this study: The general commitment of the Federal government to the pool of highly trained scientists and engineers.

While it is appropriate to focus your efforts on the research-intensive universities regarding the pool of highly trained scientists, to do so without concern for any other institutions may miss an important reality. Time and again studies have shown that a disproportionate number of the pool of highly trained scientists received their undergraduate education at small liberal arts colleges. Surely, we must be concerned with doctoral training but our research-intensive universities tend, in all too many cases, not to do a very good job of educating undergraduate students because of their focus on graduate training.

I would urge the Council to always keep in mind that many of our nation's leading scientists were encouraged to study and/or remained in the sciences and technical areas because of the close relationships they had to faculty members at small liberal arts colleges.

Thank you for requesting my comments.

Sincerely,

A handwritten signature in dark ink, appearing to read "Alan E. Guskin".

Alan E. Guskin
President

AEG/saf

"Document Control"

TYPE: INFORMATION DOCUMENT NUMBER: 9207873
ORIGINATOR: 02 STATUS C DIRECTORATE STATUS

FROM: PRESS, Frank: NATIONAL ACADEMY OF SCIENCES

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/01/92

SUBJECT: HE IS ACCEPTING DR. BROMLEY'S INVITATION TO ADDRESS
THE PCAST MEETING ON JULY 24, 1992.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
PCAST

WHITE HOUSE TRACKING #: CONTACT PERSON:
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FILE: P-PCAST
CENTRAL FILES:

7873

NATIONAL ACADEMY OF SCIENCES

2101 CONSTITUTION AVENUE, NW WASHINGTON, D. C. 20418

OFFICE OF THE PRESIDENT

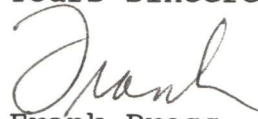
July 1, 1992

Dr. D. Allan Bromley
Assistant to the President
for Science and Technology
Director, Office of Science
and Technology Policy
Room 360, OEOb
Washington, D.C. 20506

Dear Allan:

I am delighted to accept your invitation to give
welcoming remarks at the PCAST meeting on July 24.

Yours sincerely,


Frank Press
President

cc: Dr. Alicia Dustira

Info

cc: DAB

PCAST

7850



AT&T
Bell Laboratories

Crawfords Corner Road
Holmdel, NJ 07733
908 949-5564

S. J. Buchsbaum
Senior Vice President
Technology Systems

June 30, 1992

Dr. D. Allan Bromley
Assistant to the President on
Science and Technology
17th St. & Pennsylvania Avenue, N.W.
Old Executive Office Building
Suite 358
Washington, DC 20506

Dear Allan:

I am writing this note because I may be unable to attend the July PCAST meeting. While much improved, my back continues to be sore preventing any sort of long distance travel.

I read the various drafts of the report on Research Intensive Universities (RIUs) and have a suggestion to make regarding Section I. I would start that section with a declaratory statement on why RIUs are uniquely important to the country:

1. Through research they uncover new scientific facts that almost always - in time - find application in technology - leading to improved national well being.
2. This they achieve by conducting the lion share of basic research done in the U.S. - cite fraction by other performers - Government Labs and Industry.
3. Who are the RIUs? Define RIU - SIMPLY as a school where faculty time effort is divided approximately equally between research on the one hand and education, both graduate and undergraduate, on the other hand. Research, at the cutting edge, is conducted under the leadership of the faculty member by graduate students and postdocs. This arrangement cannot be replicated on a large scale in industry or in government labs. But the RIUs usually have strong, synergistic working relationships with both industry and government labs which adds vitality to the RIUs and strengthens the overall R&D infrastructure of the country. In summary then, the RIUs, some 200 of them, are the lynchpin of \$70B R&D enterprise in the U.S.A.
4. I would then briefly summarize the problem PCAST sees with the deterioration in the ability of RIUs to continue to function with full effectiveness and why it is important to rectify the situation.

I think this approach would set the stage early and tell the reader what the problem is we are addressing and why.

Regards,

A handwritten signature in black ink, appearing to be 'Sol' or similar, with a stylized flourish.

Copy to
Alicia Dustira
Harold Shapiro

"Document Control"

TYPE: INFORMATION

DOCUMENT NUMBER: 9207884

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: PAYNE, Harry, C.: HAMILTON COLLEGE

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/30/92

SUBJECT: HE IS RESPONDING TO DR. BROMLEY'S INVITATION TO
PARTICIPATE IN THE PCAST STUDY OF THE HEALTH OF U.S.
UNIVERSITIES.

DIRECTORATE
ASSIGNED:

STAFF
ASSIGNED:

ACTION
REQUIRED:

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:
DATE COMPLETED:

STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
PCAST

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REMARKS:

OSTP RECEIVED: 07/16/92
FILE: P-PCAST

DEPT RECEIVED:

CENTRAL FILES:



Hamilton College

198 College Hill Road
Clinton, New York 13323

7884
The President (315) 859-4105
✓

June 30, 1992

Mr. D. Allan Bromley
Assistant to the President for
Science and Technology
The White House
Washington D.C.

Dear Mr. Bromley:

Thank you for your note of inquiry.

Hamilton College is a small, highly selective, liberal arts college. I fear we do not fit the model of the "research-intensive university" which is the subject of your new review and initiative.

I would offer, therefore, only one comment: Please do not lose sight of the vital role that the nation's fine liberal arts colleges play in nurturing our scientific talent. I do not have to rehearse for you the statistics which show just how disproportionately our science majors contribute to the nation's pool of Ph.D. candidates and scientists. The 1970s and 1980s saw a welcome growth in support from the government and foundations for science at our type of colleges. I hope that our role in the partnership will not be lost in more difficult budgetary times.

Best of luck in your endeavor.

Sincerely,

Harry C. Payne (signature) *gh* (initials)

Harry C. Payne

HCP/gh

(Signed in Mr. Payne's absence.)

"INVITATION FOR DR. BROMLEY"

TYPE: INFORMATION

DOCUMENT NUMBER: 9207880

ORIGINATOR: 02

SPEECH: YES NO

FROM: NELSON, Gordon C.: COUNCIL OF SCIENTIFIC SOCIETY
PRESIDENTS

DATE OF EVENT: THRU:
TENTATIVE DATES:

LOCATION OF EVENT:

TIME OF EVENT:

SUBJECT: A LETTER ACCEPTING DR. BROMLEY'S INVITATION TO
PARTICIPATE IN THE PCAST PANEL ON THE HEALTH OF U.S.
UNIVERSITIES.

RSVP:

CONTACT PERSON:

CONTACT NUMBER:

INVITATION ACCEPTED? YES NO

COPIES TO: D. Allan Bromley
PCAST

REMARKS:

DATE OF LETTER: 06/29/92

DATE RECEIVED: 07/15/92

FILE: P-PCAST

Info:

CC: DAB
PCAST
EDUCATION

Document Originally
Attached to
Following Page



COUNCIL OF SCIENTIFIC SOCIETY PRESIDENTS

1155 16th Street NW, Washington DC, 20036 • 202/872-4452 • FAX 202/872-4615

June 29, 1192

Dr. D. Allan Bromley, Chairman
The President's Council of Advisors on Science and Technology
Office of Science and Technology Policy
Executive Office of the President
Washington, D. C. 20506

Dear Dr. Bromley:

I refer to your announcement that the President's Council of Advisors on Science and Technology is undertaking a review of the partnership between the nation's research intensive universities and the Federal government.

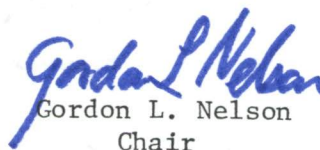
The Council of Scientific Society Presidents (CSSP) welcomes the Council's initiative to conduct an examination of this relationship which is clearly of central importance to the future health and vitality of American science and of advanced education in the sciences.

In accordance with your letter to many leaders at American universities and the announcement in the Federal Register for June 4th, the CSSP accepts your invitation to appear at the public meeting to be held in Washington, D.C. on July 24th, 1992.

On that occasion I will be prepared to present a statement on this subject on behalf of the CSSP, and, if agreeable to you, I will be accompanied, for the purpose of answering questions, by our chair-elect for 1993, Dr. Bonnie Brunkhorst.

The CSSP consists of the presidents, presidents-elect, and immediate past presidents of 58 science and science education professional societies with a combined membership of 1.4 million scientists and science educators.

Sincerely yours,


Gordon L. Nelson
Chair

1992 Executive Board

Chair: Gordon L. Nelson	Past Chair: Gerry G. Meisels	Treasurer: Shirley M. Frye	Members-at-Large: Nicolaas Bloembergen Jane Lubchenco Charles D. Spielberger	Executive Director: John D. Holmfeld
Chair-Elect: Bonnie J. Brunkhorst	Secretary: John Penick	Past Treasurer: Clayton F. Callis	Legal Advisor: L. Manning Muntzing	

The views expressed by CSSP are a consensus of its members and do not necessarily represent the official positions of their respective organizations.

1992 CSSP Members

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Acoustical Society of America

Marina Stajic
American Academy of Forensic Sciences

Basil T. Doumas
American Association For Clinical Chemistry

Joseph R. Robinson
American Association of Pharmaceutical Scientists

James H. Stith
American Association of Physics Teachers

Ernest L. Eliel
American Chemical Society

Keith Watenpaugh
American Crystallographic Association

Ralph J. Cicerone
American Geophysical Union

Thomas E. Lovejoy
American Institute of Biological Sciences

E. Gerald Meyer
American Institute of Chemists, Inc.

Karen Sharp
American Mathematical Association of Two-Year Colleges

Michael Artin
American Mathematical Society

Donald R. Johnson
American Meteorological Society

Robert L. Long
American Nuclear Society

Randy P. Juhl
American Pharmaceutical Association

Ernest M. Henley
American Physical Society

Jack G. Wiggins
American Psychological Association

Gordon H. Bower
American Psychological Society

M. J. Coon
American Society for Biochemistry and Molecular Biology

Donald D. Brown
American Society for Cell Biology

Thomas A. Fretz
American Society for Horticultural Science

Henry M. Fales
American Society for Mass Spectrometry

John L. Ingraham
American Society for Microbiology

Donald N. Duvick
American Society of Agronomy

John T. Lehman
American Society of Limnology and Oceanography

Mary Helen Goldsmith
American Society of Plant Physiologists

David B. Wake
American Society of Zoologists

John White
Association for Computing Machinery, Inc.

Ellen Weaver
Association for Women in Science, Inc.

Thomas J. Wilbanks
Association of American Geographers

William Culbertson
Botanical Society of America

Jill P. Mesirov
Conference Board of the Mathematical Sciences

Roy D. Gerard
Council for Chemical Research, Inc.

Gary H. Heichel
Crop Science Society of America

H. Ronald Pulliam
Ecological Society of America

Patricia G. Calarco
Electron Microscopy Society of America

Christopher D'Elia
Estuarine Research Federation

Dorothy Eichorn
Federation of Behavioral, Psychological and Cognitive Sciences

Francis X. Masse
Health Physics Society

John H. Litchfield
Institute of Food Technologists

Donald G. Morrison
The Institute of Management Sciences

Deborah Tepper Haimo
Mathematical Association of America

Alton Biggs
National Association of Biology Teachers

Mary M. Lindquist
National Council of Teachers of Mathematics

Wendell G. Mohling
National Science Teachers Association

Arnold L. Gordon
Oceanography Society

Charles J. McCallum, Jr.
Operations Research Society of America

Joseph W. Goodman
Optical Society of America

Edward E. Smith
The Psychonomic Society, Inc.

Rita R. Colwell
Sigma Xi, The Scientific Research Society

Robert E. O'Malley, Jr.
Society for Industrial and Applied Mathematics

Robert D. Schwartz
Society for Industrial Microbiology

D. Warner North
Society for Risk Analysis

Roger D. Meyerhoff
Society of Environmental Toxicology and Chemistry

Wolfhard Almers
Society of General Physiologists

Joe D. Goddard
Society of Rheology

John L. Emmerson
Society of Toxicology

William W. McFee
Soil Science Society of America



**COUNCIL OF
SCIENTIFIC
SOCIETY
PRESIDENTS**

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01a. Cover sheet	Cover Sheet for letter to OSTP [personal information redacted] (1 pp.)	7/13/92	(b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: Organization Files - PCAST
WHORM Cat.:
File Location: President's Council of Advisors for Science and Technology: General [5 of 7] [1992]

Date Closed:	5/14/2010	OA/ID Number:	62078-002
FOIA/SYS Case #:	2005-0336-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]
(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

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01b. Action sheet	Action Sheet for letter to OSTP [personal information redacted] (1 pp.)	7/13/92	(b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: Organization Files - PCAST
WHORM Cat.:
File Location: President's Council of Advisors for Science and Technology: General [5 of 7] [1992]

Date Closed:	5/14/2010	OA/ID Number:	62078-002
FOIA/SYS Case #:	2005-0336-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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Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01c. Letter	To: Administrative Officer, OSTP Re: FOIA appeal [personal information] (3 pp.)	6/25/92	(b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: Organization Files - PCAST
WHORM Cat.:
File Location: President's Council of Advisors for Science and Technology: General [5 of 7] [1992]

Date Closed:	5/14/2010	OA/ID Number:	62078-002
FOIA/SYS Case #:	2005-0336-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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(b)(9) Release would disclose geological or geophysical information

7911

DAVID PACKARD
26580 TAAFFE ROAD
LOS ALTOS HILLS, CALIFORNIA 94022

RECEIVED

June 19, 1992

92 JUN 30 A10:49

Dr. D. Allan Bromley
Assistant to the President for
Science and Technology
Old Executive Office Building
17th St. & Pennsylvania Avenue, N.W.
Washington, D.C. 20506

MAIL ROOM

Dear Allan:

I am very concerned about the President Bush campaign. Unless he can come out with some better issues he will certainly lose in California and probably not be re-elected.

I gave him a memo with some suggestions at the dinner out here last night. There was no opportunity to discuss the matter with him but I did discuss it with several of his aides, including Bob Teeter.

I am enclosing a copy of my letter. If you agree that something more imaginative must be done I think we should ask the PCAST members to help flesh out a recommendation.

I will discuss this matter with the members who will be at MIT next week.

For our get-away in August, I have decided that my Big Sur place would be the best choice. We can have accommodations for everyone there. I have discussed this with Alicia and I will be pleased to talk with you about it whenever you would like to do so.

I hope you are enjoying your vacation.

Sincerely,



David Packard

DP/gd

Enclosure

DAVID PACKARD
26580 TAAFFE ROAD
LOS ALTOS HILLS, CALIFORNIA 94022

June 18, 1992

President George Bush
The White House
Washington, D.C.

Dear Mr. President:

Your meeting with Yeltsin with the agreement to make major reductions in nuclear weapons was a real ten-strike and it should help your campaign.

Your position on the environmental problem is not acceptable to a very large number of voters and I think you will not be re-elected unless you make a radical change in your position on this issue.

I understand your position on abortion and you clearly can not change that.

You can, however, come out with a strong position on population control. Abortion is not an indispensable element of population control. In fact, with an effective population control program in place, abortion will be unnecessary.

The most important factor for an effective population control program is the education of women on the use of contraceptive techniques and devices. There are a number of other population control actions that have been effective as well.

I realize you could not come out with a strong population control message in Rio. The Developing Nations were afraid that an extensive discussion of population control might result in their being blamed for all of the problems. They wanted the industrialized countries to be blamed so they would have a logical base on which to request financial support.

An effective population control program could keep the growth down to one-half or less than that which would result without one over the next few decades.

Population control will have a major impact on the preservation of rain forests. People living around them have to make the decision whether to starve to death or cut down some trees so they and their families can survive. High level agreements will have little or no effect on controlling

President Bush
Page Two

people in this position.

There are valid reasons for going slow on actions to control the greenhouse effect. I am sure you understand these but I think a better case could be made to support your position on this issue.

I have not taken the time to provide numbers and data to support my recommendation. These are readily available and FCAST could prepare and document the case.

My comments so far relate to the international problems. I think a similar case could be made on the domestic problems and these will be the most important to many voters.

I strongly urge you and your advisors to come out quickly with a strong statement announcing and describing a policy along the lines I am suggesting.

I think this is the only choice you have to assure your re-election. If there is something I can do to be helpful in implementing these suggestions, please let me know.

Sincerely,

A handwritten signature in dark ink, appearing to read 'David Packard', written in a cursive style.

David Packard

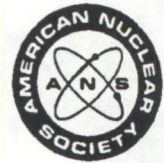
7856



AMERICAN NUCLEAR SOCIETY STUDENT CHAPTER
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

138 Albany Street

Cambridge, Massachusetts 02139-4296



Anthony E. Hechanova
President

NW13-240
(617) 253-3419/258-7437 fax
tehechan@athena.mit.edu

June 27, 1992

Dr. D. Allan Bromley
Executive Office of The President
Office of Science and Technology Policy
Washington, D.C. 20506

Dear Dr. Bromley:

I would like to thank you and the other PCAST panelists for the opportunity to let university researchers express their views and concerns at MIT on June 24, 1992. However, I was quite surprised to find that you were unaware of the Department of Defense directive prohibiting gays, lesbians and bisexuals serving in the military (attached). Immediately after your abrupt departure, Professor Nathans addressed another unrelated subject, thus, preventing this issue from further discussion.

In asking you about DOD policy, I was trying to draw a connection between DOD R&D funding and the friction produced by the DOD directive in the many research-intensive universities with anti-discrimination policies. This friction is epitomized by the DOD funded ROTC program and the MIT faculty resolution (attached) calling for ROTC's expulsion if, after five years, insufficient progress has been made towards reversing the ban. Please do not misunderstand me, Dr. Bromley, I would like to see ROTC remain on campus and be available for all students. I would also like to see DOD funding increase at research-intensive universities, especially MIT. However, in order for your assertion that it is "fundamentally important for the Defense Department to increase R&D" to research-intensive universities to become realized, I feel that it is equally fundamentally important that the DOD directive discriminating on the basis of sexual orientation be eliminated. The DOD directive is in direct conflict with MIT's policy of nondiscrimination and I foresee heated arguments in any dealings with the DOD even if in nondiscriminatory sectors of DOD R&D.

My appeal to you, Dr. Bromley, is to recognize the DOD directive banning gays, lesbians and bisexuals from serving in the military as a DOD policy that will have further ramifications on any increased involvement the DOD may want to have with research-intensive universities. Please advise President

Bush that overturning the DOD directive will have a definite positive impact on the relationship between the Federal government and research-intensive universities.

Sincerely,

Anthony Hechanova

Anthony Hechanova

cc: Professor Peter Likins, Chair PCAST panel
Representative Patricia Schroeder, (D-CO)
Professor Mark Wrighton, MIT Provost
Sarah J. Eusden, Asst to the President for Government Relations, MIT

Department of Defense Directive

"Homosexuality is incompatible with military service. The presence in the military environment of persons who engage in homosexual conduct or who, by their statements, demonstrate a tendency to engage in homosexual conduct, seriously impairs the accomplishment of the military mission. The presence of such soldiers adversely affects the ability of the armed forces to maintain discipline, good order, and morale; to foster mutual trust and confidence among soldiers; to insure the integrity of the system of rank and command; to facilitate assignment and worldwide deployment of soldiers who frequently must live and work under close conditions affording minimal privacy; to recruit and retain soldiers of the armed forces; to maintain the public acceptability of military service; and to prevent breaches of security."

Chapter 15, Policy 15-1a Army Regulations 635-200 Update, "Separation for Homosexuality."

Motion passed at the MIT Faculty Meeting of October 17, 1990

We, the Faculty of the Massachusetts Institute of Technology, responding to the conflict between Department of Defense and MIT policies on discrimination with regard to sexual orientation, request:

- 1) that the MIT Committee on ROTC report at least once each year on
 - i) MIT initiatives toward change in DOD policy with regard to sexual orientation
 - ii) the committee's assessment of progress at the national level
- 2) that the Executive Committee of the Corporation and the MIT Committee on ROTC begin a dialogue on the need for action and on the possibility of interschool cooperation by faculties, administrations, and corporations
- 3) that the administration develop and undertake a five year program of action by MIT individually and in collaboration with other schools to work for reversal of DOD policy
- 4) that a task force be established by the President near the end of the five year period to evaluate progress and to recommend a future course of action, with the expectation that inadequate progress toward eliminating the DOD policy on sexual orientation will result in:
 - i) making ROTC unavailable to students beginning with the class entering in 1998
 - ii) giving notice of the impending termination in all appropriate MIT publications beginning no later than the fall of 1996, should it be decided that ROTC is to be unavailable at MIT.

"Document Control"

TYPE: Action Item

DOCUMENT NUMBER: 9202204

ORIGINATOR: 02

STATUS I

DIRECTORATE STATUS

FROM: MURRIN, Thomas: DUQUESNE UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/10/92

SUBJECT: HE IS FORWARDING CURRENT AND PROJECTED U.S. AND
JAPANESE SCIENCE & TECHNOLOGY CAPABILITIES. HE ASKS
IF THEIR EXPECTATIONS ARE ACCEPTABLE TO THE U.S.

DIRECTORATE

STAFF

ASSIGNED: Dr. Wong

ASSIGNED:

ACTION

STAFF

REQUIRED: FOR DAB'S SIGNATURE

ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE: 07/24/92

STAFF DUE DATE

DATE COMPLETED:

DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
INTERNATIONAL/POLICY

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REMARKS:

OSTP RECEIVED: 06/17/92
FILE: P-PCAST

DEPT RECEIVED:

CENTRAL FILES:





"Document Control"

TYPE: ACTION DOCUMENT NUMBER: 9202204
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

FROM: MURRIN, Thomas: DUQUESNE UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
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IF THEIR EXPECTATIONS ARE ACCEPTABLE TO THE U.S.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

ACTION STAFF
REQUIRED: FOR DAB'S SIGNATURE ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 07/02/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
INTERNATIONAL/POLICY

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:

REMARKS: *reassign to Gene Wong*

OSTP RECEIVED: 06/17/92
FILE: P-PCAST

DEPT RECEIVED:

CENTRAL FILES:

THE WHITE HOUSE
WASHINGTON

July 22, 1992

Dear Tom:

Thanks for sending me the recent survey by the Japanese Science and Technology Agency comparing Japan and the U.S. in four "frontier technologies." Based on current trends, their expectation that Japan will dominate in materials and information technology is probably accurate, and a similar survey conducted here would not yield a very different conclusion. Clearly, we have to do everything that we can to prevent the forecast from becoming a reality. The question is: what should we do?

You will probably agree with me that, by and large, we still have a healthy infrastructure for creating technology and an intact though imperfect one for utilizing technology. In every one of the "frontier areas," the basic discoveries and inventions have been, and continue to be, made in the United States. The problem has been one of failing to capture an adequate share of the returns from exploiting technologies. This is not a simple problem, and any solution will require a carefully crafted and well executed strategy. I know that you have thought long and hard about these matters, and I look forward to working with you to try to work out a coherent strategy.

Let's discuss these issues at the next PCAST meeting.

Sincerely yours,



D. Allan Bromley
The Assistant to the President
for Science and Technology
and Director,
Office of Science and Technology Policy

The Honorable Thomas J. Murrin
Dean, School of Business Administration
Duquesne University
Rockwell Hall
Pittsburgh, Pennsylvania 15282

*I was good to see
you at Duke!
TJM*

STAFFING SHEET

[illegible]



DUQUESNE UNIVERSITY

ROCKWELL HALL • PITTSBURGH, PA • 15282

THOMAS J. MURRIN
OFFICE OF THE DEAN
A.J. PALUMBO SCHOOL OF BUSINESS
ADMINISTRATION
TELEPHONE (412) 434-5156
FAX (412) 642-9106

92 JUN 18 AM 11:25
June 10, 1992

OSTP
MAIL ROOM

Dr. D. Allan Bromley
Assistant to the President
for Science & Technology
Executive Office of the
President
Washington, DC 20506

Dr. Eugene Wong
Executive Office of the President
Office of Science and
Technology Policy
Washington, DC 20506

Dear Allan and Gene,

I expect that you get to see many more comparisons of current and projected U.S. and Japanese Science and Technology capabilities than do I --- but the following caught my attention:

ABSTRACT. Results of a survey conducted by the Science and Technology Agency on comparison of research in US and Japan in Life Sciences, Materials, Information/Electronics, and Oceanography/Geoscience.

The Japanese Science and Technology Agency (STA) recently published in STA TODAY April 1992, Vol. 4, No. 4, the results of a survey it conducted comparing US and Japanese technology in four areas it calls "frontier". The survey was conducted by questionnaire sent in May 1991 to researchers in Japan in the areas of life sciences, substances and materials, information and electronics, and oceanography and geoscience. STA's summary is given below, slightly edited for better English, along with a table giving percentages of respondents who felt that one country or the other was ahead.

Respondents considered the U.S. overwhelmingly predominant in the areas of life sciences and oceanography-geoscience basic research relative to Japan. In comparison with Europe, Japan is considered slightly predominant in the information-electronics area and equal in other areas.

When comparing technological levels, the U.S. was believed to maintain at present overwhelming predominance in the area of life sciences but the levels of both nations is predicted to be equal in 2000. In the oceanography-geoscience area, in which the U.S. is now considered slightly predominant, the levels of both sides will be roughly equal by 2000. The respondents forecast that Japan will enhance its technological level in comparison with the U.S. as we approach the end of the millenium.

With respect to mega-science project in which international cooperation may be indispensable, a majority of respondents said, "Cooperation is desirable, but it is necessary to take care to reduce possible negative effects on the areas". Thus, the prevailing opinion of the researchers is to mitigate possible negative effects of mega-science efforts on the ordinary research activities. [This opinion is probably consistent with that of researchers in the U.S.]

Comparison of Technology Levels between US and Japan

		(Unit: %)					
		Present			In 2000		
		US	Both Equal	Japan Leading	US Leading	Both Equal	Japan Leading
1.	LIFE SCIENCES						
(1)	Biotechnology	77	19	4	43	45	12
(2)	Medical equipment and diagnostic devices	55	33	13	32	41	27
(3)	Cancer treatment	66	32	3	40	45	15
2.	SUBSTANCES AND MATERIALS						
(1)	New raw materials	27	52	21	18	35	47
(2)	Superconductors	21	57	22	13	34	53
(3)	Substitutes for fluorocarbons	40	46	14	26	45	29
3.	INFORMATION AND ELECTRONICS						
(1)	High-performance superconductors	22	31	47	7	23	70
(2)	Digital imaging technology	25	49	25	7	42	51
(3)	High-density data storage	11	44	46	3	23	74
(4)	High-performance computers	60	31	9	33	40	26
(5)	Optoelectronics	10	53	37	4	30	67
(6)	Artificial intelligence	81	16	3	42	48	11
(7)	Production systems with softly (friendly) integrated computers	17	33	50	13	18	70
(8)	Sensor technology	24	48	28	7	44	49
4.	OCEANOGRAPHY-GEOSCIENCE						
(1)	Ocean and the earth	32	41	27	18	41	41
(2)	Carbon dioxide fixing technology	30	53	17	19	48	33
(3)	Desertification prevention technology	50	33	17	40	44	16

-----END OF REPORT-----

Are their expectations in regard to Substances and Materials,
and Information and Electronics "acceptable" to us?

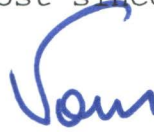
Happy to discuss!

Many Thanks!

Good Luck!

God Bless!

Most sincerely,

A handwritten signature in blue ink, appearing to read "Tom", with a large, sweeping initial "T" that loops around the name.

Thomas J. Murrin
Dean

TJM/lg

"Document Control"

TYPE: INFORMATION

DOCUMENT NUMBER: 9207921

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: MURRIN, Thomas J.: DUQUESNE UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/24/92

SUBJECT: HE IS FORWARDING A COPY OF HIS LETTER TO IAN ROSS
REGARDING MR. ROSS'S PROPOSED NATIONAL TECHNOLOGY
AGENDA.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
NATIONAL SECURITY
Dr. Wong

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: PHONE: EXT:

OSTP RECEIVED: 07/16/92
FILE: P-PCAST

DEPT RECEIVED:

CENTRAL FILES:



DUQUESNE UNIVERSITY

ROCKWELL HALL • PITTSBURGH, PA • 15282

THOMAS J. MURRIN

OFFICE OF THE DEAN

A.J. PALUMBO SCHOOL OF BUSINESS

ADMINISTRATION

TELEPHONE (412) 434-5156

FAX (412) 642-9106

June 24, 1992

Dr. Ian M. Ross
President Emeritus
AT & T Bell Laboratories
101 Crawfords Corner Road
P.O. Box 3030
Holmdel, NJ 07733-3030

Dear Ian,

Many thanks for sending me a copy of your proposed National Technology Agenda!

It is an insightful description of a frightful situation!

Good Luck!

God Bless!

Most sincerely,

Thomas J. Murrin
Dean

TJM/lg

Enclosure

bcc: Dr. A. Bromley & Dr. G. Wong

A NATIONAL TECHNOLOGY AGENDA

**Dr. Ian M. Ross
President Emeritus
AT&T Bell Laboratories**

PREAMBLE

This paper is meant to provoke thought and discussion on one major driver of America's economic future: high-technology industry. There is ample evidence that important sectors of this industry are eroding. There is, however, no consensus as to whether this is a temporary aberration or, without intervention, an irreversible trend. This paper presents arguments that suggest we are, indeed, on a long-term downward trend that could have widespread impact on our economic well-being. It is frequently suggested that our only recourse is to resort to a strong protectionist policy. The paper discusses the drawbacks to such an approach. Finally, an agenda is proposed that would use acceptable "American" concepts to maintain the Nation at the leading edge in high-technology industry. The style of the paper can be described as a logical ordering of propositions, any one of which could bear its own paragraph of elaboration, or its own dressing in rhetorical flair. With the objective of assembling the facts and arguments in a reasonably short space, I have preferred this concise approach.

INTRODUCTION

America's future is being foreclosed. The promise of prosperity is being broken. Foreboding reports are numerous: The United States has gone from the world's leading creditor to the world's leading debtor; real wages for the majority of Americans have fallen; the Nation has faced a persistent trade deficit; our students have consistently shown comparatively low academic achievement; we have been frustrated by our inability to solve problems of poverty at home, or to help the economically disadvantaged abroad; we have been vexed by the deterioration of our cities, roads and bridges, along with the transfer of our choicest assets and properties to foreign ownership; and we have endured an ominous recession, a recession from which jobs did not return, consumer confidence did not build, and business did not rebound, as we would have liked. All these reports suggest a single question: Will our standard of living survive?

A country's standard of living has many dependencies. A major one, well recognized as a driver of productivity, prosperity and economic growth in advanced nations, is high-technology industries, industries such as electronics, aerospace, chemicals, and biotechnology. Consider the ubiquitous role of high-tech: Our national security depends on state-of-the-art technology for weapons and intelligence. Our health care depends on sophisticated instruments for diagnosis and treatment, as well as advanced pharmaceuticals. We eat well because America has been "greened" by agricultural sciences. We have commerce and personal mobility because of the myriad technologies embodied in cars, planes, boats, and trains. We communicate and stay informed thanks to

complex telecommunications networks. Service and manufacturing jobs are everywhere dependent on computers and automation. Even the quality of our leisure time is based on consumer electronics and the technological wizardry of the entertainment industry. The things we need, need technology. And the providers of the things we need are those who possess the best technologies, the high-technologies. In the world of today, and increasingly in the world of the future, the technology-rich are the "haves," the technology-poor are the "have-nots."

WE HAVE A PROBLEM WITH HIGH-TECHNOLOGY INDUSTRY

America's future is being foreclosed in part because we are experiencing the erosion of our high-tech industry. Thus, the underpinnings of our national security and quality of life are weakening. Our steel industry, once the largest and most advanced in the world, suffered a decade of decline, and has been forced to fight for its return. Our auto industry is under siege. Our aircraft industry is fighting for market share with Europe while seeking financial support from Asia. Our consumer electronics manufacturing industry is lost, indeed most of the high-volume electronics industry is gone. Our computer industry is under attack and our semiconductor industry is steadily losing world market share. The erosion is even spreading to the service sector where three-quarters of Americans work, an erosion that has stopped the growth in service jobs seen in the '80s, is predicted to bring stagnation to the sector in the '90s, and could precipitate decline by the next century.

The overall electronics industry perhaps best illustrates the nature and the seriousness of the high-tech erosion. Electronics is the lifeblood of high-technology industry. Today, almost every high-tech sector is electronics-based, or dependent on electronics for its manufacture or operation. Yet, overall, the U.S. electronics industry has been losing about 3% of world market share per year since the mid-1980s, a market that today is about three-quarters of a trillion dollars, and is expected to be two trillion dollars by the beginning of the next century. The impact on American jobs, balance-of-trade, investment in R&D and plant, and the national store of knowledge and skills has been significant. The United States entered the '80s with a \$20 billion trade deficit. By 1990, it had grown 500% to about \$100 billion, with the deficit in manufactured goods equal to almost the entire amount, and electronic goods directly contributing at least 20% of the total. Today's weakness in the electronics sector is more than America bargained for. As J. Richard Iverson, President and CEO of the American Electronics Association, put it: "We're declining far more sharply than any of us really thought. It is obvious that American high-technology is at risk. This shrinking of the United States' market share must be reversed."

How did this situation in electronics come about? The problems started with the loss of on-shore manufacturing of consumer electronics products, and spread to most high-volume electronics industries, a category which includes consumer electronics and broadly covers lower-cost electronic equipment such as fax machines, printers and copiers, all of which are used in large numbers in the office and home.

The demise of the U.S. consumer electronics manufacturing industry had many causes: We

turned to cheap foreign labor and components as a method of reducing costs. We made business decisions to exit the difficult areas of commodity-type, low-margin products, characteristic of consumer electronics. We made strategic decisions not to invest substantially in plant and leading-edge technology. We underestimated the foreign potential to take advantage of these actions, especially of foreign government's willingness to support their industries with policies that ranged from tax breaks to low-cost capital, from trade restrictions to dumping practices. But, most critically, we lacked an appreciation of the value of consumer electronics to the entire electronics industry.

As consumer electronics manufacturing moved off-shore, locally-made components were substituted for U.S. products. In consequence, the U.S. semiconductor industry lost major customers. High-volume electronics products require high volumes of chips, and this type of mass market is essential because of the large economies of scale inherent in semiconductor manufacturing. In contrast, Japan's market for high-volume electronics products supported nearly all of its growth in integrated circuits. Japan now has about 50% share of the world semiconductor market; the U.S., going from virtually 100% market share, is around 40%.

The problem has spread more recently to other parts of the electronics industry. Although computer manufacturing may seem like a strong domestic industry, closer scrutiny shows that an increasing portion of the lower cost products are manufactured in the Far East, and for those still made in America, an increasing amount of the value-added is in components and subsystems from abroad. Our lower-cost telecommunications terminal products have largely followed the overseas route of consumer electronics.

As the U.S. manufacturing market share fell from almost 100% to zero in product after product, we were giving up much more than large and growing markets. We were also losing leading-edge technology drivers. Twenty years ago, the defense industry pushed state-of-the-art technology. Later, computers and telecommunications systems became the leaders. Now, high-volume electronics is increasingly becoming the dominant technology driver, and thereby exercising control over large portions of an underlying technology base, a base still needed for national security and our remaining high-tech industries. To give some examples: miniature TV has been a driving force in display technology; digital audio tape is a leader in storage technology; compact discs are driving laser technology, digital signal processor design, and optical storage techniques; camcorders are at the frontier of image processing power and miniaturization technologies. As a nation, we are presently facing lost skills in precision mechanics, storage media technologies, some branches of optics, copier-printer subsystems, ferromagnetics (i.e., audio and video heads), and display technology. And, of significant consequence, we have also lost high-volume manufacturing skills.

The history of electronics illustrates the process by which a major high-tech industry has been weakened. There is reason to fear that if we stay on our present course the erosion will continue. We could lose nearly all domestic manufacture of semiconductors and electronics, then automobiles and other high-tech industries, and eventually see the demise of our technology-based service industries. With high-tech industry gone, America could ultimately be forced to live on its natural resources, on the harvest of its land, and on the

low-wage service labor of its people. This is not the tomorrow we want. The reasons for this gloomy forecast can be better understood by looking closely at the nature of high-tech industry.

ATTRIBUTES OF HIGH-TECHNOLOGY INDUSTRY

High-technology industry has at least nine key attributes that, to different degrees in different sectors of the industry, define its requirements and dynamics. The drive of corporations and nations to cultivate these attributes helps explain the past and predict the future; it also provides a basis for developing a national technology agenda.

The first attribute is the **large knowledge-base** needed by high-tech industry. Basic technology generation needs research, often over long periods. The development of new technologies such as genetic engineering or nuclear power can take decades. There is a need to acquire a deep experience base; characteristically, one finds a broad build-up of intellectual property in high-technology. This translates into heavy investment in R&D. To cite some examples, it can take \$1 billion to bring to market an advanced electronic switching system for the telecommunications network, or a new jet engine for commercial airliners. In the semiconductor field, it takes about \$200 million to develop a new generation product, such as a memory chip; and the need to invest is not diminishing: by the end of the decade, we expect this number to triple. On average, it takes about 12 years and over \$200 million for a pharmaceutical firm to develop a new drug.

The second attribute of high-tech industry is the need for **large capital investment**. The advanced manufacturing equipment and complex process management required for production drives large capital demands across most high-tech industries. In the semiconductor industry, for example, a fabrication line can today cost about \$0.5 billion; by the start of the next century, it is expected to cost about \$2 billion. In the mid-1980s, the chemical industry had to capitalize at over \$90,000 per worker, compared with an average of \$43,000 for all manufacturing.

The third attribute is the **need for a highly-skilled workforce**. It is not always possible to apply the classical trade-offs of labor for capital; advanced equipment and automation are essential. Mechanization has always been a path to productivity; but the use of advanced manufacturing machinery is today often the only path to a high-tech product. Thus, high-tech production and service jobs will increasingly require technical literacy and strong basic skills. As a corollary, the labor market itself has split into the higher-wage, highly-skilled jobs that revolve around the core intellectual content of the product, and the low-wage, "tail-end" assembly jobs.

The fourth attribute concerns the **large economies of scale** inherent in many high-tech areas. Capital intensive manufacture and heavy investment in R&D tend to economies of scale, since large fixed costs must be amortized.¹ Even a "big ticket" item such as a new commercial aircraft requires production of 400 to 500 units to break even.

The fifth attribute is **accelerated time - cycles**. In some high-tech sectors, the rapid pace of technological progress has compressed product life cycles to years and shortened the life span of factories, thus amplifying the effects of economies of scale. Semiconductors and optical communications products -- the underpinning technologies of the Information Age -- double their price/performance every 12 to 18 months, a spectacular pace for any human endeavor. Technical progress is not new, but such speed and magnitude of progress has only been experienced in high-technologies during the last few decades.

The sixth attribute follows from the prior attributes: it is the need for **large market share**. In an effort to maximize market size, high-tech businesses must seek global markets and become fewer in number. To the economist this latter trend is called "fewness," and it reflects the simple fact that large market share cannot be held by many. High-tech sectors are increasingly ruled by a global business oligopoly. For example, about 12 major corporations supply over 80% of the world's telecommunications network products. The world's automobiles and commercial aircraft are produced by a relatively small number of giant corporations. Looking at the high-tech segments of the textile industry, we see that about 90% of all U.S. synthetic fiber is produced by 10 companies.

The seventh attribute is that there are **strong linkages**, both **horizontal and vertical**, in high-tech industries. There is a web of customer and supplier relationships that knit high-tech businesses closely together. Horizontal linkages are seen in the dependency of financial services on computers and communications, or of aircraft and automobile production on hundreds of subcontracted industries. A premiere example of horizontal linkages is provided by electronic systems, which, as already pointed out, are at the core of almost every high-tech industry, from aerospace to manufacturing, from medical to entertainment. And these linkages continue to grow: In the last decade, the cost of electronic systems in some American cars has tripled as a percentage of the total cost; at least one European car manufacturer already claims that 20% of its auto costs are in electronics; by the mid-1990s, it is projected that 30% to 35% of auto costs will be in electronic components and systems. Electronic systems are vertically dependent on advanced semiconductors and vice versa. Both are dependent on materials and manufacturing equipment and skills, and all are dependent on basic research, which, in turn, relies on the educational system for its talent, and on the prosperity of our society for its funding. These are important linkages; weakness in any link affects the strength of the

1. This implies the need for high-volume manufacture, where high-volume encompasses flexible manufacture of different products from common platforms, and is not synonymous with mass production.

whole.

The eighth attribute is the **importance of commodity, low-margin products**. There is temptation to exit low-margin,² high-volume, commodity-type areas, a temptation the U.S. yielded to in consumer electronics. We would prefer to work in higher-margin, but usually lower-volume, areas such as computers. But this, as already noted, is a dangerous strategy because high-volume, commodity production has many values: it generates large revenues needed to support investment, it advances our skills in high-volume manufacturing, and it increasingly drives leading-edge technology. Furthermore, there is growing evidence that high-volume commodities form a base for expansion into the higher-margin areas, such as demonstrated in the current challenge to the computer industry coming from high-volume electronics. Another example is found in the progression in the Japanese auto industry from economy cars to luxury class autos, or the advances made by Japan in multiple video and image areas (including film) from competencies in precision optics or micro mechanics gained from a base position in cameras. Indeed, it may not be possible to sustain a position in the higher-margin products without a strong position in that base.

The ninth attribute is concerned with the **barriers to entering or re-entering high-tech businesses**. If we were to talk to a classical economist, we might hear the following logic: If a country that is currently manufacturing an item finds it can be obtained cheaper elsewhere, it is in the best interest of the consumer to buy the product from the foreign supplier. Later, if the supplying country were to corner the market and raise the price, the buying country should simply go back into production. This logic encounters difficulties when the high-tech attributes are considered. In trying to re-enter a high-tech field, a manufacturer would lack the knowledge base, and would have to absorb large losses while building the market volume needed to compete. In modern economics, these are recognized barriers to entry into industries with large economies of scale. In particular, where technology moves very rapidly, those who drop out of the race -- or even fall behind for only a short period -- find it very difficult to catch those who have continued to run. This pace affects business plans in major ways: long-term commitment and staying power is often essential to succeed in high-tech enterprise.

To recapitulate, some key attributes of high-technology industry are:

- The large knowledge-base embodied in research, development, and manufacturing skills.
- The large capital investment required to build high-tech factories and advanced manufacturing equipment.

2. Commodities are not always low-margin; for example, there is often opportunity to establish good profit margins in the introductory phases of a commodity product.

- The highly-skilled work force mandated by high-tech production jobs.
- The large economies of scale inherent in high-technology.
- The accelerated time-cycles characterizing high-technology's rate of progress.
- The large market share needed to compete.
- The strong horizontal and vertical linkages which knit high-tech industries together.
- The importance of commodity, low-margin products as a high-tech base.
- The large barriers to entering (or re-entering) high-tech business.

From these attributes, one can make two observations relevant to a technology agenda. First, there is an opportunity for a poor country, for an emerging country, to increase productivity, create wealth, and raise its standard of living by creating, through high-tech industry, a comparative economic advantage, regardless of the country's natural wealth. This opportunity becomes an imperative in most nations that care about their people. Facing established industry in advanced countries, the barriers to entry are high and can only be surmounted by a national initiative. Technical knowledge must be acquired by purchase (as in patent licensing), by negotiation (as perhaps a condition of doing business in the country), or even by ignoring intellectual property rights (which amounts to theft). Large investments must be made in R&D and in plant facilities. Operating losses must be sustained over a period of years while the emerging industries acquire markets and gain economies of scale. Markets must be made available by protecting home markets and subsidizing entry to overseas markets, even to the point of dumping. In the recent past, we have seen all of these tactics successfully employed to break the entry barriers. These are the actions that characterize how the "have-nots" become the "haves" in the high-tech game.

It is interesting to note that, according to this analysis, the emerging nations do not abide by the principles of free trade, despite the benefits that are supposed to accrue. Under the theory of free trade, all nations benefit by increased specialization in their areas of natural comparative advantage. Thus, under free trade, one might expect an emerging nation to improve its standard of living by more effective provision of agricultural products, handicrafts, and available raw materials. However, the standard of living would also increase in the advanced nation it traded with, and the standard of living gap would not be closed. Importantly, under free trade there is no way for the emerging nation to surmount the barriers to building high-tech industries, industries which offer a preferred route to economic equality. Thus, managed trade rather than free trade is in the emerging nation's best interests. As long as we have prosperity gaps between nations, and recognizing that populations are not generally free or able to migrate, we will not see free trade adopted worldwide. We should not criticize a nation for taking actions that are in the best interests of its people; we should, however, recognize what is happening and, if it is detrimental to our interests, take action on our own behalf.

The second observation relates to a threat to established high-tech industry in advanced

nations. In effect, industries in these nations often find themselves competing against foreign governments. Given the tactics discussed above, they can find their overseas markets foreclosed and their domestic markets eroded. In consequence, the advanced nation's industry may be less able to afford investment. Thus, the industry falls behind, further eroding its position, and the process starts feeding on itself, potentially moving at a very rapid pace. Even though only a few industry sectors may be targeted by foreign competitors, the "linkage" and "commodity base" attributes can undermine strength in non-targeted sectors. Finally, once an industry is lost, the advanced nation is then itself faced with the barriers to re-entry. This is how the "haves" become the "have-nots," and this is the course we are on!

THE COURSE WE ARE ON - THE CURRENT AGENDA

What will be the outcome if we stay on our present course? Based on the nine attributes, our high-tech industry could follow, in all or in part, the following extreme (but plausible) scenario:

- The erosion in the electronics industry continues to spread into higher-margin products.
- As a consequence, our semiconductor industry continues to lose market share.
- In the face of a decline in its market share, the semiconductor materials and equipment industry, a critical supplier to the semiconductor industry, cannot afford the escalating investment required to stay at the high-tech frontier.
- Hence, the semiconductor materials and equipment industry goes totally overseas.
- The combined effect of diminishing market share and foreign dependency for materials and manufacturing equipment finally destroys the broad-based U.S. semiconductor industry.
- This will leave the U.S. with few, if any, critical electronic components manufactured on shore.
- The remainder of the electronics industry -- computers, network communications equipment, medical instrumentation -- erode at an accelerated rate because they are now "hollowed out" of domestic content (i.e. chips and value-added subsystems): All that survives on American soil are low-wage assembly jobs.
- The auto industry, already weak, becomes dependent on overseas suppliers for electronic systems which constitute 30% or more of the vehicle's value. The auto industry can no longer compete.
- Other high-tech manufacturing industries, linked to electronics, fail over time.
- With high-tech manufacturing gone, our service industries, deprived of support linkages, will be targets for foreign takeover. (Foreign enterprises already display expertise in running railroads, airlines, hotels, and financial institutions.)

- Software eventually collapses as a strong domestic business. (Sony bought Columbia because they wanted the software to run on their hardware. Why wouldn't this thinking continue? -- It is a natural line of expansion, and a logical aspect of linkages. We should also observe the aggressive plans in Japan and elsewhere to build software capabilities.)
- We cease to use U.S. taxpayers' money to fund basic research because the benefits accrue mainly to industry overseas.
- Our agriculture, which presumably will remain government-supported, continues to be strong.
- We thus export our agricultural products (produced by less than 3% of our population) to pay for our imports of fuel and high-tech products.
- Economic theory tells us that, in the long run, the balance of trade must tend to zero. In the case of a declining high-tech industry, this will be accomplished by exporting lower value, lower skill-content products to pay for the import of high-value, high-tech products. **The net result will be a decline in America's relative standard of living -- a process that already appears to be under way.**

I admit this is an extreme scenario. But even if it were partially fulfilled, the future prospects for our standard of living appear gloomy. The risk of even partial fulfillment of this scenario is unacceptable. Yet, on the present course, this is the type of scenario we will inevitably face, not by the malice of any group or institution, but because the dynamics of industry and world trade have changed significantly for high-tech products.

DRASTIC ACTION - THE PROTECTIONIST AGENDA

If permitted to continue, the effects of our present course will eventually become so intolerable that the public will demand a change. At this point, the erosion could be so advanced that our only option will be to take drastic action. Foreign nations and current ideologies will be labeled the culprit. Too late for moderate measures, extreme positions will be seen as solutions, and the protectionists, many of whom are already agitating, will take over.

We will look to the successful measures adopted by Japan, Korea, and Taiwan in entering and developing high-tech industries. Indeed, we would be irresistibly inclined to emulate them. Thus, in a time of reaction and crisis, the nation would have little choice but to resort to actions of the following kind:

- We would target specific strategic and "hard hit" industries for support.
- We would use national influence and coercion to obtain know-how from overseas.
- We would restrict the flow of intellectual property abroad.

- We would mandate specific R&D and manufacturing consortia.
- We would protect fledgling industries with subsidies and tariffs as they gain market share.
- We would erect barriers to imports of unwelcomed products.
- We would raise taxes substantially as part of an effort to curb the budget deficit.
- And we would intervene dramatically in our educational system as part of an effort to put a long-term solution in place.

These are not things we do well. We do not have the government infrastructure suited for such action, nor do we have the appropriately-skilled government employees qualified to exercise such responsibility. Some nations, with different cultural and political roots, do. To learn from the experience of others is wise; but blindly to apply foreign approaches -- assuming that what works in Japan or Korea will work here -- is an error. Nevertheless, if we persist on the current course, these erroneous measures will be the ones demanded by a nation feeling desperate. In the short term, some problems may be ameliorated, but the true problems of the Nation will ultimately have been compounded. These actions would suppress our greatest assets, our free enterprise system. Excessive interference with freedoms that have been at the core of America's strength through its history is not the way. In the long run, a drastic solution creates a drastic problem.

Neither the current course nor the drastic alternative is acceptable. While there is ample evidence that the present approach is not working, we also recognize that massive government intervention and a protectionist retreat from the global marketplace is a mistake of major proportion. We are not the only advanced nation that has faced challenges to its high-tech industries. The U.K. and Europe have lost a number of high-tech industries, and Japan will face increasing challenge from the present and emerging Asian "tigers." But we are the nation which can seize an opportunity: the opportunity of arriving at an early understanding of the solution to the "have and have-not" problem. Therefore, we must find a better way.

THE BETTER WAY - A NATIONAL TECHNOLOGY AGENDA

The starting point for a national technology agenda is to declare that leadership in high-technology industries is a national objective. This must be a bipartisan objective, led by the President, supported by Congress, endorsed by business, and recognized as vital by the American people. The connection between leadership in high-tech industry and an increased standard of living must be understood and supported by all. The resultant benefits to all Americans must be proclaimed, perhaps debated, but ultimately accepted by the nation as a whole. This is not "picking winners and losers"; rather it is choosing to be a winner instead of a loser!

THE ELEMENTS OF A NATIONAL TECHNOLOGY AGENDA

First, we must establish a level playing field for our high-tech industry, a field at least as favorable as that in other advanced nations:

- **We need to facilitate investment** in R&D, plant, and worker training. For more than a decade the real cost of capital to business -- not just the interest on debt -- has been higher, by a factor of two or more, for U.S. firms than for many foreign competitors. In consequence, our competitors are out-investing America in R&D and plant, and are investing for a longer term pay-off. We must employ a range of tactics aimed at making capital available at lower cost. Balancing the national budget and creating incentives for Americans to save will serve this objective. New tax and fiscal policies, such as investment tax credits, R&D tax credits, and accelerated depreciation schedules are needed. This will, of course, require difficult trade-offs -- trade-offs of short- versus long-term gain, of consumption versus savings in order to create the proper environment of capital formation if our high-tech industry is to flourish.
- We need to **establish fair trade** in our global markets. Our persistent trade deficits cannot be totally blamed on the quality or inappropriateness of American products for foreign markets; a lack of reciprocal market openness has been a major factor. Washington's concern, in GATT and elsewhere, for America's business interest must match the concern of foreign capitals. Free trade is a commendable long-term objective, but fair trade is an immediate imperative.³
- We need to **strengthen our national education system** as a means to creating a globally competitive workforce. High-tech jobs are knowledge-intensive, not just in the research laboratory, but on the factory floor or at the business workstation. National technical literacy is a clear priority. However, we cannot wait for improvement in our school systems to produce results in the workplace, since this can take decades. We need to seek short-term remedies together with permanent, long-term cures.

Second, we must stimulate, and in some cases repatriate, our high-volume electronics industries. While high-volume electronics is not the only industry that we may want to bring back on-shore, it is a critical one, and exemplifies strategies that can be used for high-tech repatriation. Re-entering manufacture of mature products in the face of large, established foreign competitors is a very tough uphill fight. However, there are opportunities where the technology or the marketplace is going through major changes or discontinuities.

3. And we should not neglect the importance of a large and strong home market, where "home" can extend beyond our political borders, as organizations such as NAFTA demonstrate.

In these cases the barriers to entry are somewhat equalized for all players, providing openings for those with ingenuity and determination. Examples where technology discontinuities may be expected include broadband communications, intelligent vehicle and highway systems, advanced displays, speech and image processing, education systems, and HDTV.

There is the possibility, however, that relying on technology discontinuities will not be enough in some areas. With effectively zero U.S. manufacturing market share, and recognizing the large size and rapid growth of our foreign competitors, the barriers in consumer electronics may be too high to be surmounted, at least in a timely way, only by relying on emerging markets. We may need our government to ensure technology transfer from Asia for consumer electronics, and we may need to arrange import and export agreements on specific products while our manufacturing capability matures. Were we to decide on such action, such proposals must be embraced cautiously, with full understanding of the hazards, and with strict limitations on duration and scope.

Third, we must make changes to our culture to support the coordination of pre-competitive technology development, and to encourage the formation of consortia, alliances and collaborations. Other nations have benefited from the economies of cooperating in the early phases of technology development, even extending the benefits to the development and manufacturing phases; yet they have retained the ability to compete fiercely in the marketplace. We in the U.S. have been late to recognize this opportunity and to learn how to cooperate and compete at the same time. We have, however, made some progress in this direction. The Administration has concluded that it is proper for government to encourage and fund generic, pre-competitive technology. The task of identifying strategic technologies which are candidates for such treatment has already been accomplished: The White House, The Department of Defense, The Department of Commerce, and the Council on Competitiveness have published lists of strategic technologies with a remarkable consensus. And not only is there domestic agreement in these lists, but America's view is essentially the same as the Japanese and European Community view. So, again, there is no issue of picking winners and losers. What remains is to select areas that are appropriate for cooperative programs between government, industry and academia, and to make it work. In this, too, we have already made some progress, although there is still much to be learned from our successes and failures. Sematech has demonstrated that U.S. institutions can cooperate in developing generic technology for the semiconductor industry, thereby providing a model. But we do lack a process for selecting specific areas for cooperation. We need at least a forum in which enthusiastic, knowledgeable, and influential members of government and business can meet and recommend suitable action. Importantly, forums without enthusiastic membership are doomed to fail.

We must not too narrowly interpret this agenda item. This does not imply that the U.S. should not continue to build international partnerships. Some high-tech industries of the future will be the property of large, world-wide consortia. But, in any world-wide consortia, the U.S. must have a strong and equitable position. This agenda item does say that America must maximize its domestic strength through cooperation, and thus be a strong, not a weak, player in global high-tech activities.

Fourth, we need a renewed commitment to a total quality program, including high-quality manufacturing skills. We have erred in the past by not insisting on product quality as essential to customer satisfaction, corporate profitability, and international competitiveness. We have, in some cases, lost sight of customer needs in designing and delivering products. The Malcolm Baldrige award is an example of an instrument that can build quality awareness in U.S. business. We know today what has to be done and we have an increasing number of examples of success; what we need is total commitment.

* * * * *

This agenda is not foreign to the American way. We have long benefited from encouraging broad classes of industry such as aerospace and agriculture. What is proposed here is the encouragement of the very broadest class of industry, one that leads to improved living standards for all our people. This can be achieved by providing an environment that nurtures the basic attributes of the industry. No special targeting is needed.

How practical is this technology agenda? I believe we have the resources to carry out this program: Our basic science and technology is the envy of much of the world. Our research universities are the first choice for aspiring scientists and engineers from around the globe. Our North American market is large enough to provide a powerful competitive base. Our best factories meet world-class quality standards, and our best workers and managers can compete with anybody. Our productivity is still unmatched in many areas. Our country is rich in many natural resources, and our agriculture is without equal. With these assets, what can get in the way? What must we do?

Clearly, our national priorities must be reordered: A number of tough decisions must be made. To begin, the leaders of government, industry and academia must embrace the concept of leadership in high-tech industry as a national goal. This concept must be discussed and understood widely so that the electorate can support the Administration, the Congress and business in the actions that must be taken. We must decide to save and to invest adequately for the future of our industry, albeit at the expense of some short-term benefits. Economic advantage must be given proper weight relative to military advantage. We must, as a people, value wealth creation over consumption, and demand industry promotion as our ultimate goal. We must build a degree of understanding and trust between government and industry so they can work effectively together in the national interest. We must make the tough decisions, country by country, to establish conditions of fair trade that serve U.S. interests. Industry, with the support of government, must learn to cooperate in the pre-competitive phases of their activities while competing vigorously in the world marketplace. We must identify and implement short-term and long-term measures to improve our education and training. And all this must be done promptly, while we still have an asset base strong enough on which to build.

ACKNOWLEDGEMENTS

Few of the ideas in this paper are original. Most have been expressed by others, too numerous to mention, who are concerned about competitiveness issues. If there is value here, it is mainly from bringing these ideas together in one place. I specifically wish to

acknowledge the benefits from sharing ideas over the past three years with my colleagues on the National Advisory Committee on Semiconductors. Indeed, part of the stimulus for writing this paper came from the observation that its strategy for the semiconductor industry was more widely applicable. I have borrowed liberally from that strategy in developing thoughts on high-tech industry. I am particularly indebted to those who have read early drafts of this paper and provided valuable commentary. I am also indebted to Christopher G. Harrington of AT&T Bell Laboratories for his ideas and assistance in preparing and organizing the paper.

* * * * *

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Final

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DIRECTORATE STATUS

FROM: COOK, DuBois Samuel: DILLARD UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/23/92

SUBJECT: HE IS WRITING TO THANK DR. BROMLEY FOR INVITING HIM
TO THE REGIONAL PCAST MEETINGS ON THE HEALTH OF U.S.
UNIVERSITIES.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
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DILLARD UNIVERSITY
NEW ORLEANS, LOUISIANA 70122-3097

June 23, 1992

OFFICE OF THE PRESIDENT

Dr. D. Allan Bromley
The Assistant to the President
for Science and Technology
The White House
Washington, D.C.

Dear Dr. Bromley:

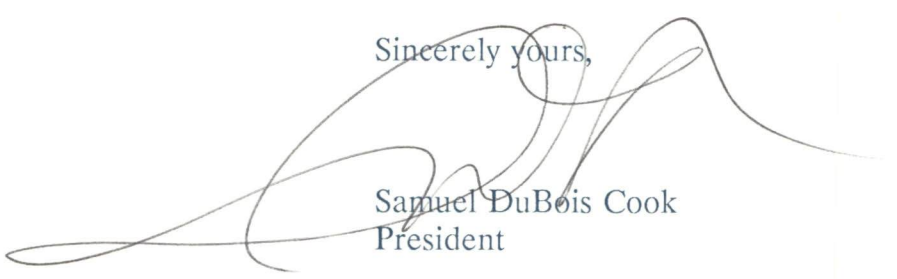
This is to acknowledge the receipt of, and to thank you for, your letter of June 8, 1992 that I received on June 12, concerning the President's Council of Advisors on Science and Technology (PCAST).

I am appreciative of the invitation to join PCAST in one of six public meetings to discuss the "appropriate nature of the partnership between the Federal government and the Nation's research-intensive universities." I shall keep the dates of these public meetings in mind.

Finally, I shall share your letter with the appropriate officials of the University.

All good wishes,

Sincerely yours,



Samuel DuBois Cook
President

SDC:mvh



"Document Control"

TYPE: INFORMATION

DOCUMENT NUMBER: 9207918

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STATUS C

DIRECTORATE STATUS

FROM: PINGS, Cornelius J.: UNIVERSITY OF SOUTHERN CALIFORNIA

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/22/92

SUBJECT: HE IS INFORMING DR. BROMLEY OF STEVEN SAMPLE'S
INABILITY TO RESPOND TO DR. BROMLEY'S INVITATION TO
PARTICIPATE IN THE PCAST MEETINGS, DUE TO TRAVEL. he
WILL RESPOND UPON HIS RETURN.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
PCAST

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS:

OSTP RECEIVED: 06/25/92
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UNIVERSITY OF SOUTHERN CALIFORNIA
UNIVERSITY PARK
LOS ANGELES 90089-4019

PROVOST

TELEPHONE 213-740-2101
FAX 213-740-7606

June 22, 1992

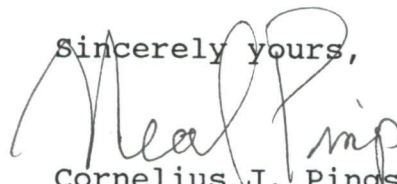
D. Allan Bromley
The Assistant to the President
for Science and Technology
Old Executive Building
Room 358
Washington, D. C. 20506

Dear Dr. Bromley:

In the absence of President Steven B. Sample, I am responding to your letter of June 8 with its thoughtful invitation to one of the six regional meetings. I know that Steve Sample is vitally interested in the basic issue of the relationship between the Federal government and the nation's research universities. Unfortunately, he does not return to his office until July 13, at which time he can let you know whether he can schedule one of the remaining dates.

Best regards.

Sincerely yours,



Cornelius J. Pings
Provost

cc: Steven B. Sample

TYPE: ACTION
ORIGINATOR: 02

STATUS I

DOCUMENT NUMBER: 9207803
DIRECTORATE STATUS

FROM: DANFORTH, William H.: WASHINGTON UNIVERSITY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/22/92

SUBJECT: HE IS WRITING TO EXPRESS HIS ENTHUSIASM FOR
PARTICIPATING IN THE PCAST MEETING ON THE HEALTH OF
U.S. UNIVERSITIES.

DIRECTORATE STAFF
ASSIGNED: PCAST ASSIGNED:

ACTION STAFF
REQUIRED: AS NECESSARY ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: 07/14/92 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
Pierre Perrolle

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS:

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FILE: P-PCAST
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Washington

WASHINGTON · UNIVERSITY · IN · ST · LOUIS

Office of the Chancellor

June 22, 1992

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

Dear Allan:

I look forward to participating in your review of the partnership between the Nation's research-intensive universities and the Federal government. David Packard and Harold Shapiro are terrific choices to lead the study.

You are right on the mark when you say that universities are already rethinking their future roles in our society. As current Chairman of the Business-Higher Education Forum, I have recently begun an effort to pull together a task force that will prepare a vision statement about what American colleges and universities should be like in the coming century. Ideas from your initiative to ensure the effectiveness of the university-government partnership are certain to play a role in our business-higher education efforts as well.

I will be sure to send your letter around to the Washington University community. The questions you pose are tough to get ones arms around, but the best way to try and do so is through the collective thinking of many good minds. You will receive my comments in the near future.

Thank you for your efforts on behalf of higher education and particularly research universities. I look forward to attending one of your public meetings, most likely the one to be held in September.

Yours sincerely,

WHD

William H. Danforth
Chancellor

Washington University
Campus Box 1192
One Brookings Drive
St. Louis, Missouri 63130-4899
(314) 935-5100
FAX: (314) 935-5188

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ACTION: PCAST

cc: DAB
Pierre Perrotte

"Document Control"

TYPE: INFORMATION DOCUMENT NUMBER: 9203254
ORIGINATOR: 02 STATUS C DIRECTORATE STATUS

FROM: SIBLEY, William A.: UNIVERSITY OF ALABAMA AT BIRMINGHAM

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/18/92

SUBJECT: HE IS FORWARDING HIS COMMENTS FOR THE PCAST STUDY OF
RESEARCH INTENSIVE UNIVERSITIES.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: PCAST
Pierre Perrolle

WHITE HOUSE TRACKING #: CONTACT PERSON:
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FAX: _____ MAIL: ☒

OSTP #: _____

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Date of Correspondence: 6/18/92

Date of Receipt of Correspondence: 6/30

From: W.A. Sibley

Affiliation: University of Alabama
@ Birmingham

Subject: Comments on Study of Research- intensive
universities

Action: Pierre Ferrall
FYI: Pierre Ferrall

Assign to: _____

Due Date: _____

Copies to: _____

*

UAB THE UNIVERSITY OF
ALABAMA AT BIRMINGHAM

Office of the Vice President for Academic Affairs

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June 18, 1992

OSTP
MAIL ROOM

Dr. D. Allan Bromley
The Assistant to the President
for Science and Technology
The White House
Washington, DC 20500

Dear Dr. Bromley:

President McCallum has shared with me your letter of June 8, 1992, concerning the new study on research-intensive universities and their relationship with the federal government. As a scientist who has done research on laser materials and was supported by NSF and DoD for over twenty years, I commend you both on the choice of subject and on the panel. This topic is extremely important.

The future aspect of science and engineering that concerns me most for our country is the interaction between research-intensive universities, the federal government, and industry. The researchers with whom I have been associated while serving on advisory committees for the National Academy and the National Science Foundation agree that we will need more well educated, vigorous scientists and engineers in the future to compete. On the other hand, the business/industry chief financial officers, or in some cases, chief executive officers, with whom I interact, indicate they are not interested in adding new researchers in the future because of financial considerations. This is disturbing, but perhaps it is an opportunity for a new mode of operation. For example, if the universities can be encouraged to do more applied research, without weakening our excellent fundamental research base, the National Laboratories, including NIST and DoD labs, persuaded to do more device development, and industry convinced to support university research in cooperative ventures, then technology transfer would prosper. Of course, this hinges on communication and active, cooperative research teams.



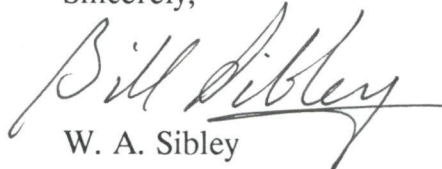
Dr. D. Allan Bromley
June 18, 1992

Page 2

As Chairman of the Materials Science and Engineering Council for the Southeastern Universities Research Association, I asked that a meeting be held on this topic last month in Atlanta. The meeting, hosted by Professor Steve Antolovich of Georgia Tech, was successful and the results encouraging. I believe many universities are now ready for a change and, hopefully, industry in re-evaluating its position for the future will be in the same mood. The federal government should be a catalyst for these relationships through the National Laboratories and the federal funding agencies. I hope the PCAST will be able to include in its discussions how the federal and/or state government in the coming years will be able to facilitate more effective relations between universities, government laboratories and industry. I look forward to participating in one of the public meetings.

Again, let me express my appreciation for your efforts in the difficult task of formulating an effective science and engineering research policy.

Sincerely,


W. A. Sibley

WAS:ygh