Pat Chair - SAO - Merck
Dr. Roy Vagelos

(Hinchliffe/Gershowitz)
June 18, 1992 3 p.m.
MEDAL Draft One

PRESIDENTIAL REMARKS: SCIENCE AND TECHNOLOGY MEDALS PRESENTATION
TUESDAY, JUNE 23, 1992 1:30 P.M.
ROSE GARDEN

[ACKNOWLEDGEMENTS] As I look out at the men and women we honor today, I'm reminded of something Albert Einstein once said to his fellow scientists: **"Concern for man himself and his fate must always form the chief interest of all technical endeavors ... in order that the creations of our mind shall be a blessing and not a curse to mankind."** Today we honor men and women whose lifework answers Einstein's challenge. They bless mankind not only with the brilliance of their minds -- but with the integrity of their hearts.

I'm proud to present the National Medals of Science and Technology to our 16 recipients -- to these men and women of persistent and, at times, clairvoyant determination. They have expanded the frontiers of science on canvases as infinitesimal as a single human cell -- and as infinite as space itself.

We honor them for reaching their goals, but we honor them also for having the courage to undertake the journey. There's a church in Sussex, England which has a wonderful inscription I'd like to see serve as the epitaph for these recipients' pioneer spirit of innovation and invention. The inscription says: "A vision without a task is but a dream; a task without a vision is drudgery; [but] a vision **with** a task is the hope of the world."

The hope of our world lies in individuals who asked **why** -- and then followed wherever that question led. Scientists like

Nobel Prize laureate **Howard Temin**, a truly seminal thinker in the history of biology who reshaped our thoughts about RNA and DNA. Entrepreneurs like **Bill Gates**, co-founded Microsoft and led the revolution of the information industry. Visionaries like **Eugene Shoemaker**, who helped to transform our world not only through the astounding breadth of his contributions to space exploration, but also through the infectious enthusiasm of his imagination. And inventors like **Norman Joseph Woodland**, who developed a simple device of our daily lives -- bar coding. You've seen first-hand how impressed **I** am by how bar coding works.

FROM bio Sketches, Provided by Technology Doc

You all prove that America's greatest resource is the genius of our people. We must encourage and support it -- that's why we need Congress to double the budget of the National Science Foundation by 1994. And that's why I'm committed to increases in R&D funding: to let our most talented people push the limits of their imaginations, and use the results **to create jobs and futures for others**. I've also established a National Technology Initiative to bring government officials together with private businesses to let them know what can be offered in technology -- to move new discoveries **out of federal labs and into the marketplace**.

The '93 Budget, Pt 1, 118
The '93 Budget, Pt-1, 93
Pt 1, Pg 96 of Budget
Oak Ridge speech, 2/19/92 pg 2, 97

And I believe we need to stimulate private sector investment -- the engine of any entrepreneurial economy. That's why I'm fighting so hard to get Congress to **slash the capital gains tax**; and make the research and experimentation tax credit **permanent**.

Part 1, 91 '93 Budget (?)

The world economy of the 21st century will demand **a new age of American competitiveness** in a fiercely challenging global

marketplace. In order to compete we must make immediate, drastic changes: beginning with the need for well-educated workers.

Many of you are still teachers, still influencing one dream at a time. You know that education is the basis of our future. You know the terrible fact that in some math and science studies we rank almost last among the industrialized nations. **Rest assured: we will turn that around.** Technical competence is so vital that one of our six national education goals is to be first in the world in math and science by the year 2000. In order to reach that goal, my budget invests $768 million in precollege math and science education -- an increase of 18% over last year.

Our nation can remain strong only by investing its resources and talents in science, technology and education. I want to recognize a group of special people who are dedicating their lives to that quest -- our first class of Presidential Faculty Fellows, 30 young faculty members named for their excellence and promise in research and teaching. These scientists and engineers represent the best investment we can make in our future. But I'd like to remind them of something. As you look at the Medalists we honor today, remember that whatever work you do -- you will be standing on the shoulders of giants.

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THE WHITE HOUSE

WASHINGTON

this is a terrific idea. I was enormously impressed by how it teams high-schoolers with high-powered engineering teams from major corporations -- a great example of the private-public partnership that will lead us to excellence in the next century. "Maize craze" is part of US FIRST, a national alliance of business, education and government working to reverse declining student interest and performance in science and math. Well, I invited Dean Kamen to bring his winners here: sponsors Xerox and NYPRO, and teams from Wilson Magnet and Clinton High Schools.

Congratulations to all of you here today -- especially our distinguished Medalists, who show us the triumph of the human mind and the unfolding drama of the human imagination. May God bless you all.

# # # # #

From Fact sheet-N.Y.T Business Day US First,

From 'Mission statement U.S. First, page 4 of FAX

Fact sheet, US First, Maize-craze

Hand-Written Memo GB wrote aboard Air Force One inviting Kamen to the White House.

Page 2, USFIRST Memo to Jane Leonard + Burt Berry-RE: List of Attendees for June 23, ceremony.

(Hinchliffe/Gershowitz)
June 18, 1992 3 p.m.
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From Fact Sheet-N.Y. Business Da US First

From 'Mission statement U.S. First page 4 of FAX

FACT sheet US Firs Maize-cr

good

HAND-WRITTEN MEMO GB WROTE ABOARD AIR FORCE ONE INVITING KAMEN TO THE WHITE HOUSE.

PAGE 2, US FIRST MEMO TO JANE LEONARD + BURT BERRY-RE: LIST OF ATTENDEES FOR JUNE 23, CEREMO

(Hinchliffe/Gershowitz)
June 17, 1992 2 p.m.
MEDAL Draft One

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TUESDAY, JUNE 23, 1992 1:30 P.M.
ROSE GARDEN

[ACKNOWLEDGEMENTS] As I look out at the men and women we honor today, I'm reminded of something John F. Kennedy said here to a reception of Nobel Prize winners. He said: **"this is the most extraordinary collection of talent, of human knowledge, that has ever been gathered together at the White House, with the possible exception of when Thomas Jefferson dined alone."**

Truly, though, I am honored to present the National Medals of Science and Technology to our 16 recipients -- to these men and women of persistent and, at times, clairvoyant determination. They have exploded the frontiers of science on canvases as infinitesimal as a single human cell -- and as infinite as space itself. We honor them for reaching their goals, but we honor them also for having the courage to undertake the journey. I came across an inscription on a church in England that I'd like to serve as the epitaph for these recipients' pioneer spirit of innovation and invention. The inscription says: "A vision without a task is but a dream; a task without a vision is drudgery; [but] a vision **with** a task is the hope of the world."

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this stat should be easy to find. have Gary plug it in.

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what is it? Corn-induced insanity?

invited Dean Kamen to bring his winners down to the White House: winning sponsors Xerox and NYPRO, and winning teams from Wilson Magnet and Clinton High Schools. Though I want to make clear I hope you're the **only** Clinton to get in the White House this year.

All of you here, Medalists, Fellows, and US FIRST winners, live up to the challenge set by Albert Einstein. He said to his fellow scientists: "Concern for man himself and his fate must always form the chief interest of all technical endeavors ... in order that the creations of our mind shall be a blessing and not a curse to mankind." Your work is a blessing for mankind -- we congratulate and thank you. God bless you all.

# # # # #

I wouldn't end w/ this — a bit too open ended for closer.

Great job, but ...

Pat Steve Q: Isn't make you for Do this??

THE WHITE HOUSE

WASHINGTON

June 18, 1992

CEREMONY TO PRESENT THE NATIONAL MEDAL OF SCIENCE AND THE NATIONAL MEDAL OF TECHNOLOGY

DATE: JUNE 23, 1992
LOCATION: ROSE GARDEN
TIME: 1:35 p.m.
FROM: D. ALLAN BROMLEY

I. PURPOSE

You will present the National Medal of Science to 8 outstanding individuals and present the National Medal of Technology awards to 7 outstanding individuals and 1 company.

You will recognize the student winners, corporate sponsors and university volunteers of the US FIRST "maize craze" competition held in Hew Hampshire on February 12, 1992.

You will recognize the recipients of the first awards under the new Presidential Faculty Fellows Program, to be used for research and teaching purposes as the awardees decide.

II. BACKGROUND

The National Medal of Science was established in August 1959, to provide recognition for individuals who make outstanding contributions in the physical, biological, mathematical, and engineering sciences (P.L. 86-209). Under this statute, not more than twenty individuals shall be awarded the Medal of Science annually and the awardees must be U.S. citizens. This year there are 8 individual awards to be presented.

The National Medal of Technology was established by Congress in 1980 as part of the Stevenson-Wydler Technology Innovation Act to give Presidential recognition for outstanding contributions to the well-being of the United States from the development or application of technology. There is no annual limit to the number of Medals of Technology which may be awarded. This year there are 7 individual awards and 1 to a company.

On February 12, 1992, you visited the US FIRST "maize craze" competition in New Hampshire and invited the winners to the White House. As a follow up to your

invitation, the group is being recognized in today's science ceremony. Mr. Dean Kamen, "the inventor" who you met in New Hampshire at the competition will be seated in the front row to your right in the first seat on the aisle. Mr. Kamen is the founder of US FIRST, an organization dedicated to inspiring young people in the fields of science and math.

At last September's Medals of Science and Technology ceremony, you announced the creation of a new award program to recognize, honor, and support outstanding young scientists and engineers in America's colleges and universities. Known as the Presidential Faculty Fellows Program, it will provide awardees with $100,000 each year for five years. In the audience are the 30 recipients of this "first class."

The purpose of honoring these three groups, MOS/MOT, US FIRST and PFFs, at the same ceremony is to demonstrate your commitment to science education on a variety of levels including high school students, young faculty and senior scientists.

III. PARTICIPANTS

The President
Secretary Franklin - Department of Commerce
Dr. D. Allan Bromley - Assistant to the President for Science and Technology
Dr. Frederick M. Bernthal - Deputy Director, National Science Foundation (reading citations)
Recipients of Medals and their invited guests
Audience will also include:
- 80 student winners, corporate sponsors and university volunteers of the US FIRST "maize craze" competition
- 30 recipients of the Presidential Faculty Fellows Program

IV. PRESS PLAN

Pooled White House Press coverage

V. SEQUENCE OF EVENTS

-- Enter Rose Garden and proceed directly to the dais

-- Greet Secretary Franklin and Dr. Bromley, who will be standing on the dais

-- Give remarks

-- At conclusion of remarks, you step to the side of the stage with Secretary Franklin and Dr. Bromley

-- Dr. Bernthal proceeds to the microphone to read the citations of the award recipients

-- Recipients come forward, receive Medal from you, and have their photograph taken with you and Secretary Franklin (Technology) and Dr. Bromley (Science)

-- Depart Rose Garden

VI. REMARKS

To be provided by speechwriters

The 8 MOS recipients and the 8 MOT recipients will be announced by name and walk to the President and receive their medals. In total, 16 individuals will come to the dias to receive a medal from the President while Dr. Bernthal reads the citations.

The Presidential Faculty Fellows (30 in number) will be there as a group to be recognized in the President's speech only. At the September 16, 1991 MOS/MOT ceremony, the President announced the program. These 30 Fellows are the "first class" to "graduate."

The group known as US FIRST (70 in number) will arrive 5 minutes earlier in the day than the above groups to have their picture taken with the President. The group will then stay in the Rose Garden and hear the rest of the ceremony. This group should also be recognized in the President's speech. Jane Leonard, Public Liaison, is the staff person handling the US FIRST kids and corporate sponsors.

Any questions call Damar Hawkins, x6272

The National Medal of Science

FACT SHEET

NATIONAL SCIENCE FOUNDATION
1800 G Street, NW • Washington, D.C. 20550 • (202) 357-9498

What is the National Medal of Science?

It is the Nation's highest scientific honor bestowed by the President of the United States.

How was it established?

By Public Law 86-209, 86th Congress, August 25, 1959. The law also provides that the design of the Medal is based on recommendations by the National Science Foundation and that no more than 20 medals can be awarded in any given calendar year.

How are recipients selected?

Executive Order 10961, signed on August 23, 1961 by President Kennedy, established the Committee on the National Medal of Science. The Committee receives nominations from the National Academy of Sciences and other scientific and engineering sources. The Committee selects its candidates from among these nominations and transmits its recommendations to the President for final decision.

What are the selection criteria?

The total impact of an individual's work on the present state of physical, biological, mathematical, engineering, behavioral or social sciences. In addition, achievements of an unusually significant nature are considered and judged in relation to the potential effects of such achievements on the development of scientific thought. Also, consideration is given to distinguished service in the general advancement of science and engineering when accompanied by substantial contributions to the content of science at some time.

Who provides nominations?

Letters are sent to approximately 150 universities and colleges, approximately 160 scientific, engineering, and other professional societies and organizations, members of the National Academy of Sciences and National Academy of Engineering. Approximately 3,500 letters of invitation are sent each year.

How many new nominations/renominations are received each year?

Approximately 150. Candidates remain eligible for three years following the year of nomination.

How many Medals have been awarded?

304 since 1962.

How are the activities carried out?

The National Science Foundation (under E.O. 10961) provides staff and administrative services necessary for the performance of the functions of the Committee.

Short Biographical Sketch of Eleanor J. Gibson

Eleanor Gibson, nee Eleanor Grier Jack, was born December 7, 1910 in Peoria, Illinois to William Alexander Jack and Isabel Grier Jack. She graduated from Smith College in 1931, and received a Ph.D. in Psychology from Yale University in 1938. She was married in 1932 to James Jerome Gibson and has two children, James J. Gibson, Jr. and Jean Grier Gibson.

She taught at Smith College (except for four years during World War II when she followed her husband to various Army Air Force posts) until 1949, when James Gibson joined the faculty of Cornell University. She was a research associate at Cornell until 1967, when she became Professor of Psychology. In 1974, she was awarded the Susan Linn Sage Professorship. She retired from the Cornell faculty as Professor Emerita in 1979, after which she filled a number of Visiting Professorships (Univ. of Minnesota, Univ. of Pennsylvania, Dartmouth College, Univ. of Connecticut, Emory University, Univ. of California at Davis, Massachusetts Institute of Technology) as well as continuing her research. She has been a Fellow at the Institute for Advanced Study at Princeton, the Center for Advanced Study in the Behavioral Sciences at Stanford, and the Salk Institute.

She was elected to the National Academy of Sciences in 1971 and the American Academy of Arts and Sciences in 1977, and has been the recipient of several medals, including the Gold Medal Award from the American Pychological Asociation, the Wilbur Cross Medal from Yale University, and the Howard Crosby Warren Medal from the Society of Experimental Psychologists, and several honorary degrees.

She is the author of articles in many scientific journals and of several books. *The Principles of Perceptual Learning and Development*, *The Psychology of Reading* (with Harry Levin), and *An Odyssey in Learning and Perception*.

Eleanor J. Gibson
Susan Linn Sage Professor of Psychology Emeritus
Cornell University
Ithaca, New York

Citation: For her conceptual insights in developing a theory of perceptual learning; and for achieving a deeper understanding of perceptual development in children and basic processes in reading.

Summary of Achievements

Eleanor J. Gibson is continuing her long and distinguished research career with important empirical and theoretical contributions. Her career began with a Ph.D. dissertation on principles of conditioning applied to verbal learning under the direction of Clark Hull at Yale University in the late thirties. The concepts of generalization and differentiation fundamental in her subsequent work first began to be clarified in her dissertation.

While investigating conditioning and maternal-infant interaction with different species (young goats) at Cornell University, she made an observation that overshadowed some of her most well known research. She noticed that newborn kids, who had never experienced visual depth, would stand motionless when placed on a small platform several feet above the ground. Students of psychology and other fields of animal behavior the world over now learn about the "visual cliff" studies of the sensitivity of the young of many species to information for a drop-off. At the time this observation was incidental to Gibson's research explicating the idea of a two-stage process as a basic form of learning.

Her belief that differentiation was an essential form of learning, especially in learning to perceive, led her back to an examination of this process. One direction was a consideration of improvement in psychophysical sensitivity. That is, subjects often improve in their sensitivity, over trials, in the detection of near-threshold stimuli or the detection of differences in nearly identical stimuli. This kind of learning or improvement occurs without reinforcement in the traditional sense or even without knowledge of results. She published an important analysis of psychophysical literature from this perspective in the 1953 *Psychological Review*. A second direction stemming from this interest in perceptual learning was an investigation of the effects of the early visual experience of animals (rats) on subsequent form perception. Her experiments indicated that exposure to 3-dimensional shapes facilitated later discrimination of similar 2-dimensional forms, but paradoxically no facilitation resulted from prior exposure to identical 2-dimensional forms.

This and other research on improvement in perception with experience and age culminated in the 1969 classic book, Principles of Perceptual Leaning and Development, which defined the domain of perceptual

AWARDED BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

The National Medal Of Technology

WILLIAM H. GATES III

United States Department of Commerce • Washington, D.C. 20230

"For his early vision of universal computing at home and in the office; for his technical and business management skills in creating a world-wide technology company; and for his contribution to the development of the personal computer industry."

William H. (Bill) Gates III is chairman and chief executive officer of Microsoft Corporation, a multinational company that offers the most advanced family of microcomputer software with a mission to put a computer on every desk and in every home.

Gates started his career in computer software at an early age. Both Gates and Microsoft co-founder Paul Allen worked as consultants in the mainframe/minicomputer programming field during their high school years in Seattle, Washington. In 1974 Gates, then an undergraduate at Harvard University, worked with Allen to develop a BASIC programming language for the first commercially available microcomputer, the MITS Altair. After successful completion of the project, the two formed Microsoft to develop and market software for the emerging microcomputer marketplace.

In the years that followed, Microsoft has gone on to set standards for the software industry in languages, operating systems and applications software. Mr. Gates continues to provide the company's vision on new products and technology. He is also actively involved in significant operating and strategic decisions and plays an important role in the technical development and management of Microsoft.

Founded in 1975, Microsoft has become the worldwide leader in software for personal computers. The company offers a wide range of products and services for business and personal use, each designed with the mission of making it easier and more enjoyable for people to take advantage of the full power of personal computing every day.

Microsoft finished the latest fiscal year in June 1991 with $1.18 billion in revenue. The company employs more than 10,000 people worldwide and Mr. Gates believes that Microsoft's success is highly dependent on its ability to attract and retain qualified employees.

The National Medal Of Technology

AWARDED BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

W. LINCOLN HAWKINS

United States Department of Commerce • Washington, D.C. 20230

"For his invention and contribution to the commercialization of long-lived plastic coatings for communications cable that have saved billions of dollars for telephone companies around the world; and for his leadership in encouraging minorities to pursue science and engineering careers."

During a 34-year Bell Labs career, Dr. Hawkins was granted 18 U.S. and 129 foreign patents related to the conservation and reclamation of materials used in communications equipment.

He was co-inventor (with the late Vincent Lanza) of an additive that stabilizes the plastic protective covering of telephone cables, a process that has saved billions of dollars for telephone companies around the world.

A native of Washington, D.C., Dr. Hawkins holds degrees from Rensselaer Polytechnic Institute, Howard University and McGill University. He taught at McGill and was a National Research Council Fellow at Columbia University before joining AT&T Bell Labs in 1942.

He retired from Bell Labs as assistant director of the Chemical Research Laboratory in 1976, and became a consultant to the company on educational and employment opportunities for minorities.

He has been active in the Urban League's Black Executive Exchange Program, lectured at black colleges and universities, and has worked with black educators to help expand science programs at minority colleges.

A member of the American Chemical Society for more than 50 years, Dr. Hawkins received the Burton C. Belden Award in recognition of his many technical and professional contributions. He was the first chairman of Project SEED, the ACS program to expose minority students to chemistry as a profession.

He is a member of the National Academy of Engineering and a Fellow of the American Institute of Chemists and the New York Academy of Sciences. He also served on several influential American Chemical Society committees.

He received the Honor Scroll of the American Institute of Chemists, the Percy Julian Award of the National Organization of Black Chemists and Chemical Engineers, the Award of Merit of the National Technical Association, the International Medal of the Society of Plastics Engineers, and the Achievement Award of the Black Professional Engineers. He recently was elected to the New Jersey Inventor's Hall of Fame. He holds four honorary doctoral degrees and has published [illegible]

AWARDED BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

The National Medal Of Technology

JOSEPH M. JURAN

United States Department of Commerce • Washington, D.C. 20230

"For his lifetime work of providing the key principles and methods by which enterprises manage the quality of their products and processes, enhancing their ability to compete in the global marketplace."

Joseph M. Juran, Chairman Emeritus, Juran Institute, has since 1924 pursued a varied career in management as engineer, industrial executive, government administrator, university professor, impartial labor arbitrator, corporate director, and management consultant. His career has been marked by a search for the underlying principles which are common to all managerial activity. Applied to the specialty of management for quality, this search has produced leading international reference literature, training courses, training books and videocassettes, including:

Juran's Quality Control Handbook (Fourth Edition 1988) is his international standard reference work on the subject.

Making Quality Happen: Upper Management's Role (Fifth Edition 1988) is the pioneering training manual dealing with the strategies needed to attain and hold quality leadership, the roles of upper managers in leading their companies to that goal and the means to be used to provide that leadership.

Juran on Quality Improvement (1981) is a series of 16 videocassettes and related training manuals on the subject of quality improvement and cost reduction.

Planning for Quality (Second Edition 1990) is the book of notes for the course that provides managers with a structured approach to company-wide planning.

Quality Planning and Analysis (with F. M. Gryna, Jr., Second Edition 1980) is the leading textbook at the engineering level.

Juran on Quality Planning is a series of videocassettes plus training manuals on the subject of quality planning. In the field of general management, Dr. Juran's book Managerial Breakthrough generalizes the principles of creating beneficial change (breakthrough) and of preventing adverse change (control).

A holder of degrees in engineering and law, Dr. Juran maintains an active schedule as author and international lecturer while serving as a consultant to various industrial companies, government agencies and other institutions.

AWARDED BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

The National Medal Of Technology

CHARLES D. KELMAN

United States Department of Commerce • Washington, D.C. 20230

"For his innovations in cataract surgical technology resulting in reduced rehabilitation time for millions of Americans, significant cost savings, and the creation of a new industry."

Dr. Kelman has been acknowledged as the leading innovator in ophthalmology over the past 25 years by the most respected organizations in ophthalmology. He introduced sophisticated concepts and equipment to a surgical specialty which previously had employed only simple scalpels.

In 1962 Dr. Kelman devised the cryo-probe, a freezing instrument for the extraction of cataracts within their capsules. This became the most widely-used method for cataract removal in the world until about 1978 when it was supplanted extracapsular cataract extraction with irrigation and aspiration, also introduced by Dr. Kelman and still the technique used by a majority of cataract surgeons today. In 1963 Dr. Kelman pioneered the use of freezing for the repair of retinal detachment. Retinal cryopexy remains a frequent adjunct to retinal surgery to this day.

Kelman phacoemulsification, introduced in 1967, became the impetus for today's outpatient cataract surgery. The procedure employs a small ultrasonic tip whose vibrations break up the mass of the cataractous lens within its capsule and suction it out through a small needle.

Clinical professor of ophthalmology at New York Medical College, Dr. Kelman holds the position of attending surgeon at the New York Eye and Ear Infirmary and Manhattan Eye, Ear and Throat Hospital. He is consultant surgeon at many hospitals throughout the world.

He was born in Brooklyn, New York on May 23, 1930. After graduating from Forest Hills High School and Boston's Tufts University, he completed medical studies at the University of Geneva, Switzerland; an internship at Kings County Hospital, Brooklyn; and residency in ophthalmology at the Wills Eye Hospital, Philadelphia. He has been in private practice in New York City since 1960.

In 1970, Dr. Kelman won the American Academy of Achievement Award. He was the first recipient of the Outstanding Achievement Award for excellence in cataract surgery from the American Society of Contemporary Ophthalmology. In 1985 he won the first Innovators Award in Ophthalmology given by the American Society of Cataract and Refractive Surgery. In 1990 he was awarded the Ridley Medal from The International Congress of Ophthalmology. In 1991 Dr. Kelman returned to Wills Eye Hospital where he was honored as the Arthur J. Bedell Memorial Lecturer. Later that year, the American Academy of Ophthalmology awarded him their Special Recognition award. In 1992 he received the Distinguished Service Award from Tufts University and was awarded the "Inventor of the Year Award" from the New York Patent, Trademark and Copyright Law Association for his development of the Kelman phacoemulsification procedure.

The National Medal Of Technology

AWARDED BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

MERCK & CO., INC.

United States Department of Commerce • Washington, D.C. 20230

"For sustained innovation focusing on the discovery, development and worldwide commercialization of superior human and animal health products while maintaining proper concern for the environment."

Merck & Co., Inc. is a worldwide research-intensive health products company that discovers, develops, produces and markets human and animal health products and specialty chemicals. Innovation, in science and in business, always has been a top priority to Merck. Through a century, Merck scientists and engineers have built a solid record of accomplishment in discovering and developing innovative medicines, in producing high-quality products, and effectively marketing or otherwise providing these products to those who need them. Merck remains committed to discovering and developing innovative products and in 1992 plans to spend $1.1 billion on research and development. Merck's scientists are now working on treatments for cardiovascular, endocrine, respiratory, infectious, ophthalmic, and bone diseases. Merck's goal is to have the strongest research program in the industry in every major disease category. Innovation does not occur in a vacuum; it depends on a mutually beneficial interaction with society. This is why Merck is committed not only to being innovative ourselves, but also in helping to assure a national and world environment that appreciates and highly values innovation.

Merck's commitment to preserving health and improving the quality of life has benefited millions of people with medicines that reduce the risk of stroke, heart attack or fatal infection; with vaccines that protect children and adults from contagious diseases; and with drugs that preserve eyesight from glaucoma and river blindness or alleviate the crippling pain of arthritis. Other Merck innovations protect livestock and crops from parasites.

Merck has made a strong commitment to minimize environmental impact. In 1990, Merck established a program to reduce all environmental releases of toxic chemicals by 90 percent worldwide. This represents perhaps the most ambitious program in all of industry. Merck has made significant progress toward achieving this goal and continues to develop and introduce innovative technology to reach our environmental commitments.

P. Roy Vagelos, M.D., Merck chairman and chief executive officer, has led the company during a period of unprecedented growth. Dr. Vagelos has provided the vision and the action to develop new techniques and greater insight to the pharmaceutical industry. His mastery of technical management has led to new ways of speeding development of life-saving drugs from discovery through evaluation and licensing to manufacture and, ultimately, into the hands of the medical community. Under his guidance, Merck has become the world leader in pharmaceutical innovation.

The National Medal Of Technology

AWARDED BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

DELBERT H. MEYER

United States Department of Commerce • Washington, D.C. 20230

"For his discovery of the process for making purified terephthalic acid (PTA), the building block in the production of polyester, which resulted in greatly accelerated growth of polyester products such as fabric, recording tape, tire cord, food packaging, and bottles."

Delbert H. Meyer joined Amoco in 1953 as a research chemist at the company's Whiting, Ind., research and development center. He transferred in 1970 to Amoco's current research and development center in Naperville, Ill., where he held various positions within Amoco Chemical Company including research supervisor of Aromatic Acids, research supervisor of Exploratory Research, and director of Exploratory and New Products Research. When he retired in February 1992, Meyer was a research consultant, the highest technical research position at Amoco.

Meyer is often referred to as the "father of PTA." He was awarded a patent in 1971 for developing a less complex, less expensive process for making purified terephthalic acid, or PTA, which today is the preferred raw material for polyester. This process has profoundly impacted Amoco, the industry and, ultimately, society.

In 1990, PTA contributed revenues of more than $1 billion to Amoco Chemical, which is currently the world's largest producer of PTA. Total production from Amoco's wholly-owned and jointly-owned or licensed ventures approaches 12 billion pounds annually, which translates into more than 13 billion pounds of polyester.

End products made from Amoco's PTA—polyester fabrics, recording tapes, tire cord, food packaging, and soft-drink bottles—touch every corner of the world.

For developing the PTA process, Meyer was awarded the first Amoco William M. Burton Award in 1989 by former Amoco Chairman Richard M. Morrow. This prestigious award recognizes the tradition of progress and problem solving exhibited by Amoco's William M. Burton, whose 1913 patent covering the cracking of gas oil into gasoline more than doubled the yield of gasoline from crude oil.

Meyer was also awarded 25 other patents and co-authored numerous articles during his 38 years with Amoco. A native of Maynard, Ia., Meyer earned his bachelor of science degree in chemistry from Wartburg College in Waverly, Ia., and his Ph.D. in organic chemistry from the University of Iowa.

Allen Newell
U. A. and Helen Whitaker University Professor
of Computer Science and University Professor
Carnegie Mellon University
Pittsburgh, Pennsylvania

Citation: For his seminal contributions to the development of artificial intelligence, the theory of human cognition and the software and hardware of computational systems for complex information processing.

Summary of Achievements

Allen Newell is a preeminent scientist and leader in both psychology and computer science. Within psychology he is recognized as a founder of information processing psychology. Within computer science he is recognized as a founder of artificial intelligence. He has also made outstanding contributions in computer science relating to both hardware design and programming languages. Newell has continued to make fundamental research contributions for over three decades, and has steadfastly pursued his vision of building computational models of human thought, greatly expanding our knowledge of both thinking and computation.

In the late 1950's, Newell recognized that there was a large gap between computational models of intelligent action and the models of computation embodied in then current machines. In particular, intelligent action required nonnumeric as well as numeric processing, and flexible memory architecture without arbitrary fixed bounds in either depth or complexity. To provide this flexibility, Newell and coworkers invented the stack machine and the notion of list processing. They used these ideas to implement a sequence called Information Processing Languages (IPLs). The power of the language ideas as applied to computer science can be appreciated from the fact that today almost all computer language processors use stacks and lists. With these IPLs, Newell and his colleagues programmed the first artificial intelligence (AI) programs, including the first program that proved mathematical theorems (Logic Theorist), and a general problem solving program (GPS).

These early AI systems were more than the isolated constructions of a few programs that carried out tasks needing intelligence; they were part of an on-going study of human behavior. Together with his colleague Herbert Simon, Newell developed the information processing psychology methods for analyzing verbal protocols of humans solving problems. The use of these protocols as verbal evidence were a reaction to then dominant methods in psychology which focussed on inputs and outputs, not on processing for getting from one to another. Together they developed information processing models and used them to construct detailed and convincing comparisons between computers and people solving the same problems and apparently going through similar sequences of intermediate states.

Calvin F. Quate
Leland T. Edwards Professor
Stanford University
Senior Research Fellow, Xerox Parc
Stanford, California

Citation: For his contributions to microscopy, particularly the scanning acoustic microscope and the atomic force microscope.

Summary of Achievements

Calvin Quate's contributions to microscopy and, in particular, his coinvention of the scanning acoustic microscope and atomic force microscope, covered novel materials, concepts, and systems. His work is principally responsible for the present widespread use of the acoustic microscope for nondestructive testing applications.

The acoustic microscope allows for the examination of the interior of an optically opaque object, and it does so at a resolution greatly exceeding that of the optical microscope. The microscope operates by focusing and scanning a beam of acoustic waves and detecting the reflected acoustic wave. The acoustic wave has a frequency in the MHz to GHz spectral region. In water this allows the acoustic beam to be focused to about 0.5 m; in the liquid He microscope, a spot size and therefore a resolution of about 300 A is obtainable. Because the acoustic microscope responds to the elastic properties of the material instead of to its electromagnetic properties, the contract which is obtainable with the acoustic microscope may vastly exceed that of either an optical or an electron microscope.

Though acoustic microscopy had been proposed and previously attempted, it was the Quate-Lemons invention of the diffraction limited single surface sapphire lens and its later integration with cryogenic techniques that have allowed the present scientific and commercial application of this device.

The tunneling microscope, as invented by Binnig and Rohrer, requires an electron current and therefore can only be used to image conducting surfaces. The atomic force microscope, invented by Binnig and Quate removes this limitation by mounting a top on a microscopic cantilevered beam which deflects in proportion to the atomic force acting on the top. This extraordinary invention not only allows imaging of insulating surfaces, but also allows the direct measurement of atomic forces.

Quate and his students have contributed to the science of microscopy by field-initiating inventions, discoveries and technological advances, and by demonstration of new domains of applicability. Such advances in tunneling microscopy include a 3-dimensional piezoelectric drive and cantilever, in turn, allowing the development of an entire microscope on a single chip as well as the first imaging of molecules

Howard E. Simmons, Jr.
Vice President for Central Research & Development
E. I. du Pont de Nemours
Wilmington, Delaware

Citation: For his fundamental contributions to synthesis, molecular structure, and the theory of organic chemistry, and for his productive management of the premier industrial chemical research program in the United States.

Summary of Achievements

Howard Simmons' scientific accomplishments span an unusually wide range of contemporary chemistry, including organic synthesis, physical organic chemistry, and theoretical chemistry. In each area, he has made important contributions.

In synthetic organic chemistry, he discovered a general route to cyclopropanes (the Simmons-Smith reaction) and provided the definitive evidence for the existence of benzyne. It is notable that both of these signal achievements, cited today in hundreds of monographs and textbooks of organic synthesis, came within the first 5 years of his scientific career. He also made fundamental contributions to cyanochemistry, cycloaddition reactions, and the structural chemistry of bicyclic systems. In his work on the latter, he elucidated a new form of structural isomerism. In more recent years, his interests have centered on the intersection of structural chemistry and pure mathematics, and he has broken new ground in interpreting bond-order data in conjugated systems of varying topology.

In the field of physical organic chemistry, his work on reactive intermediates, reaction mechanisms, and novel structures, all had major impact on the field.

His first discovery came early in his career when he provided proof for the existence of benzyne. It was Simmons' coauthored landmark paper on the ammonolysis of ^{14}C-labeled chlorobenzene which provided definitive evidence for the intermediacy of a highly unstable C_6H_4 intermediate, now universally known as benzyne. This paper has been cited in virtually every published text and monograph on organic reaction mechanisms, both as evidence for benzyne and as an archetypical example of isotopic labeling to probe mechanisms. After joining du Pont, Simmons began a detailed experimental program aimed at trapping benzyne. This led him to conclude that this molecule is truly aromatic but with a high-energy multiple bond; this is still the prevailing view of the electronic structure of benzyne.

Isotopic-labeling techniques also played a crucial role in Simmons' work on the elucidation of cyanogen azide and cyanonitrene reaction mechanisms. In these elegant studies, he was able to show that

bond-strength variations within the molecule which agrees well with quantum mechanical calculations. Although the field of finite topology and its application to chemistry is still in its infancy, his contributions have already begun to influence the thinking of other chemists.

As a research administrator, Simmons played a major role in maintaining one of the nation's largest technology companies, Du Pont, at the forefront of scientific research excellence. Under his stewardship, the Du Pont Central Research and Development Department has been broadened and significantly expanded with major new thrusts in the life sciences and the materials sciences, while maintaining a strong core effort in organic and physical chemistry, and catalysis. He has guided the organization in effectively linking its research effort to the technological needs of the industrial segments of du Pont. The organization continues to maintain a world-class scientific effort and to make important scientific advances.

Howard Simmons has frequently been called upon to help advise the government on technical issues, and is deeply concerned about maintaining the nation's scientific excellence. He has served on the advisory boards of many of the nation's premier chemistry journals. He is a member of the National Science Board, American Chemical Society, and National Academy of Sciences, and has served on the National Research Council's Commission on Physical Sciences, Mathematics and Resources.

Biography
EUGENE M. SHOEMAKER, GEOLOGIST

Born: Los Angeles, California, April 28, 1928

Attended: California Institute of Technology, 1944-1948; B.S. 1947, M.S. 1948; Princeton University, 1950-1951, 1953-1954; M.A. 1954, Ph.D. 1960.

Career

Exploration for uranium deposits and investigation of salt structures in Colorado and Utah, 1948-1950. Regional investigations of the geochemistry, volcanology, and structure of the Colorado Plateau, 1951-1956. Research on structure and mechanics of meteorite impact and nuclear explosion craters, 1957-1960; discovered coesite (high pressure form of silica) at Meteor Crater, Arizona with E.C.T. Chao, 1960. Investigation of structure and history of the moon, 1960-1972. Established a lunar geological time scale and developed methods of geological mapping of the moon, 1960. Application of television systems to investigation of extraterrestrial geology, 1961--. Organized the Branch of Astrogeology of the U.S. Geological Survey, 1961. Established the Center of Astrogeology at Flagstaff, Arizona, 1965. Established, with D. P. Elston, the Flagstaff Paleomagnetics Laboratory of the U.S. Geological Survey, 1972. Initiated the Palomar Planet-crossing Asteroid Survey, 1973, and the Palomar Asteroid and Comet Survey, 1983. Investigation of the impact history of the Earth, 1976--. Current research is on impact processes in the solar system and the effects of large body impacts on the evolution of life.

Principal Professional Activities

Geologist, U.S. Geological Survey, 1948-present.
Chief, Branch of Astrogeology, 1961-1966.
Chief Scientist, Center of Astrogeology, U.S. Geological Survey, 1966-1968.
Visiting Professor, California Institute of Technology, 1962 and 1987.
Research Associate, California Institute of Technology, 1964-1968.
Professor of Geology, California Institute of Technology, 1969-1985.
Acting Director, Manned Space Sciences Division, National Aeronautics and Space Administration, 1963.
Co-Investigator, Television experiment, Project Ranger, 1961-1965.
Principal Investigator, Television experiment, Project Surveyor, 1963-1968.
Principal Investigator, Geological field investigations in Apollo lunar landings, 1965-1970.
Chairman, Division of Geological and Planetary Sciences, California Institute of Technology, 1969-1972.
Co-Investigator, Television experiment, Project Voyager, 1978-1990.

Honors

Doctorate of Science, Arizona State College, Flagstaff, 1965. Wetherill Medal of the Franklin Institute, co-recipient with E.C.T. Chao, 1965. Arthur S. Flemming Award, 1966. Doctorate of Science, Temple University, 1967. NASA Medal for Scientific Achievement, 1967. U.S. Department of the Interior Honor Award for Meritorious Service, 1973. Member, National Academy of Sciences, 1980. Department of the Interior Distinguished Service Award, 1980. Arthur L. Day Medal of the Geological Society of America, 1982. G. K. Gilbert Award of the Geological Society of America, 1983. Rieser Kulturpreis, co-recipient with E.C.T. Chao and Richard Dehm, 1983. Doctorate of Science, University of Arizona, 1984. Barringer Award of the Meteoritical Society, 1984. Kuiper Prize of the American Astronomical Society, Division for Planetary Sciences, 1984. Leonard Medal of the Meteoritical Society, 1985. Distinguished Alumni Award of the California Institute of Technology, 1986. Rittenhouse Medal of the Rittenhouse Astronomical Society, co-recipient with C. S. Shoemaker, 1988.

Fellow of Geological Society of America, Mineralogical Society of America, and American Geophysical Union.

Eugene M. Shoemaker
Geologist
U. S. Geological Survey
Flagstaff, Arizona

Citation: For his pioneering research and inspiring leadership in the geological exploration of the solar system; for his entrepreneurial creation and direction of the Branch of Astrogeology of the U.S. Geological Survey; and for his research on earth-approaching asteroids and comets and their potential impact effects.

Summary of Achievements

Eugene Shoemaker's contributions to earth and planetary science go far beyond his own innovative approaches to understanding the dynamics and consequences of impacts, chronology and evolution of lunar and planetary surfaces, application of paleomagnetic methods, organization of deep continental drilling, and characteristics of Earth-approaching bodies. His successes rest both on a superior command of the basic physics and chemistry involved in natural processes and on an infectious enthusiasm that motivates coworkers, students, and peers.

His early perception that space technology and the human desire to be in space would lead to a revolution in scientific understanding about the solar system and, most importantly, about the Earth, placed Shoemaker ahead of the vast majority of his peers. He brought the U.S. Geological Survey and many of his associates into the Space Age with the formation of the Astrogeology Studies Group, later named the Branch of Astrogeology. A string of successful research proposals to NASA followed. These projects made sophisticated earth science the foundation for the scientific design and analysis of early lunar and planetary probes. Ranger, Surveyor, Orbiter, Mariner, Viking, Voyager, and Apollo are projects of the 1960s and 1970s that owe their scientific success in significant measure to Shoemaker.

The profound influence of Eugene Shoemaker's clairvoyance, persistence, and imagination on the scientific return of the six Apollo landings on the moon has been recognized by many. He insisted that the Apollo astronauts could accomplish significant scientific work while on the moon and saw to it that they received sound geological training and field experience. Harrison H. Schmitt, the only scientist to set foot on the moon, was a Shoemaker protege.

Shoemaker and his colleagues mapped the Moon and Mars, producing relief maps of both scientific and aesthetic value; invented the concept of planetary geologic maps; and did an enormous amount of painstaking work necessary to map and interpret the geology of those bodies. The planetary mapping was a large-scale team effort in data generation, mostly done many years ago. In recent years, Shoemaker and his wife have carried on a systematic search for Apollo asteroids - bodies whose orbits cross the orbit of the Earth and which

MAXINE F. SINGER

BIOGRAPHICAL SKETCH

Maxine Singer received the Ph.D. degree in Biochemistry in 1957 from Yale University. Her interest in nucleic acid enzymology began with studies on the enzyme polynucleotide phosphorylase during her post-doctoral work in Leon Heppel's laboratory at the National Institutes of Health. Until 1975, she was a Research Biochemist in the National Institute of Arthritis and Metabolic Diseases, NIH. During that period she worked on the synthesis and structure of polyribonucleotides and applied this experience to the synthesis of polymers and trinucleotides for use in the elucidation of the genetic code. She described and studied the exonucleolytic RNase II of E. coli and proved its processive mechanism of RNA degradation. After a sabbatical leave in the laboratory of Ernest Winocour in 1971-72, she began work on aspects of simian virus 40. Moving to the National Cancer Institute in 1975, she continued this work studying defective SV40 viruses and also carried out investigations on interaction between histone H1 and superhelical DNA and on the highly repeated DNA sequences in primate genomes. She became Chief of the Laboratory of Biochemistry in the National Cancer Institute in 1979. In 1988 she became President of the Carnegie Institution of Washington, retaining her laboratory and the title Scientist Emeritus at the

Maxine F. Singer
President
Carnegie Institution of Washington
Washington, D.C.

Citation: For her outstanding scientific accomplishments and her deep concern for the societal responsibility of the scientist.

Summary of Achievements

Maxine F. Singer has a record of outstanding scientific acccomplishment during 32 years of service at the National Institutes of Health. The sustained high quality and exciting nature of research spanning this extended period has earned her an outstanding international reputation.

Dr. Singer has a concurrent appointment with the Laboratory of Biochemistry in the Division of Cancer Biology and Diagnosis of the National Cancer Institute, where she actively continues her research. She accepted a position at the Laboratory of Biochemistry and Metabolism of the Arthritis Institute to work on nucleic acid enzymology in 1956. Her experiments on the enzyme, polynucleotide phosphorylase, provided an important impetus for developments in the field of molecular biology. On the basis of her studies on the enzymology of nucleic acid metabolism, it was possible to synthesize model nucleic acid molecules with which many of the ideas of molecular biology could be rigorously tested.

As a reflection of her interest in the biological implications of her chemical work, Dr. Singer turned her attention in 1971 to the problem of DNA replication in animal viruses, in particular the mechanism of replication of the cancer producing monkey virus SV40. She found that genetic material from the monkey becomes associated with the virus DNA and the "hybrid" DNA becomes replicated. This led to her interest in cancer-producing viruses and in 1974 she moved to the National Cancer Institute as Head of the Nucleic Acid Enzymology Section. She has made several important discoveries concerning the mechanism of replication of the DNA of Simian Virus 40, a virus that produces cancer in animals. She discovered that certain parts of monkey cell genes become incorporated into the virus and grow with it. This has led to new understandings of genetic information that is repeated in many copies of animal and human cells. The results of her studies represent a true breakthrough in our understanding of the interaction of tumor viruses with mammalian cells.

Dr. Singer was one of the scientists who first brought to the attention of the scientific community and general public the question of the safety of recombinant DNA research. She has acted as a spokesman on recombinant DNA research for the National Institutes of Health, as a representative of the scientific community at large, and has appeared before numerous groups of scientists, of the lay public,

SINGER, Maxine F.

Member NAS, IOM, and Pontifical Academy of Sciences
1988 recipient of Distinguished Presidential Rank Award, the highest honor given to civil servant.

TEMIN, Howard M.

Member NAS, IOM
1975 Nobel Laureate for Physiology or Medicine (shared prize)

WHINNERY, John R.

Member NAE, IEEE

NIH. Current research in her laboratory at the NIH aims to elucidate the mechanism whereby the only known human transposable element replicates and disperses copies to new genomic locations, a process which can be mutagenic. A member of the Pontifical Academy of Sciences and the National Academy of Sciences of the USA and its Institute of Medicine, Dr. Singer served as chairman of the Editorial Board of the Proceedings of the National Academy of Sciences of the USA. Previously she served on the editorial boards of the Journal of Biological Chemistry and Science magazine. Dr. Singer was a fellow (trustee) of the Yale Corporation (1975-1990), is a member of the Governing Board of the Weizmann Institute of Science and co-chairman of its Scientific and Academic Advisory Committee, a director of the Whitehead Institute, chairman of the Smithsonian Council, and a member of the Board of Directors of Johnson & Johnson. In 1988, Dr. Singer received the Distinguished Presidential Rank Award, the highest honor given to a civil servant.

Howard M. Temin
American Cancer Society, Rausch and Steenbock Professor
McArdle Laboratory for Cancer Research
University of Wisconsin
Madison, Wisconsin

Citation: For his demonstration of the existence of RNA-directed DNA synthesis, leading to the discovery of specific proto-oncogenes within Eukaryotic cells and the role of such genes in oncogenesis by viruses and other agents, laying the foundation for our knowledge of the replication of HIV in human cells.

Summary of Achievements

Howard M. Temin has been an outstanding scientist since his graduate and postdoctoral work in the late 1950's when he, with Harry Rubin, demonstrated for the first time the transformation in tissue culture of cells infected with the Rous sarcoma virus. These changes were first defined by their morphology, which led to subsequent definition by numerous other investigators of similar morphologic changes resulting from transformation by viruses, chemicals, and radiation. Subsequent to his postdoctoral training and after his move to the McArdle Laboratory for Cancer Research, Dr. Temin proposed a revolutionary concept on the basis of experimental data developed in his laboratory that retroviruses possess the ability to transcribe information from RNA into DNA. This reverse transcription was not generally accepted by the scientific world until 1970 when Temin, along with his colleague Dr. Mizutani, proved that retroviruses did possess this capability.

This discovery laid the basis for many new findings that have led to major advances in our basic understanding of the malignant process. These include the discovery of viral oncogenes and their counterparts, proto-oncogenes in eukaryotic cells, and most of our knowledge of RNA sequence and structure through recombinant technology, which is dependent on the reverse transcriptase reaction. This includes detailed characteristics of the structure and sequence of messenger RNA and its protein product, messenger RNA processing, and the molecular basis for much of our knowledge of the metabolism and synthesis of RNA molecules. He revised our view of the directions in which genetic information can flow within our cells; led us to a new family of viral pathogens, including the AIDS virus; provided a vital tool for the technology of recombinant DNA; gave essential impetus towards subsequent important discoveries in cancer research; and advanced our understanding of how life itself originated and evolved on our planet. The discovery of reverse transcriptase was immediately recognized as one of the seminal events in the history of biology and secured for Temin a permanent place among the most distinguished ranks of scientists.

In 1975, Dr. Temin shared a Nobel Prize for his revolutionary studies

AWARDED BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

The National Medal Of Technology

PAUL B. WEISZ

United States Department of Commerce • Washington, D.C. 20230

"For his basic discoveries and management in the field of zeolite catalysis, in conjunction with his colleagues at Mobil Corporation, leading to chemical and petroleum technologies now producing products valued at billions of dollars per year."

Dr. Weisz's career has focused on innovation and invention in major segments of technology, especially in the petroleum and chemical industries. He has demonstrated new principles and ways to accomplish unique chemical conversions -- specifically, performing chemical reactions in the interior of crystalline materials called zeolites and creating chemical processes of unusual selectivity by molecular shape-selective catalysis.

Dr. Weisz managed Mobil's Central Research Laboratory in Princeton (a part of the Mobil Research and Development Corporation) from 1969-1982. He provided transfer of knowledge and incentives across Mobil's laboratories and beyond. Zeolite catalysts synthesized by Mobil scientists have shape-selective properties and great thermal stability. They have led to commercial realization of large-scale shape-selective processes envisioned by Dr. Weisz's exploration group. Discoveries led to the development of several petroleum refining processes and petrochemical processes that create raw materials for plastics and polyester fibers, and to the commercialization of the first process for converting natural gas to synthetic gasoline.

One can summarize the many processes that have emerged by quoting an editorial in Chemical and Engineering News (1982): "In the twenty years since shape-selectivity was first described by Paul B. Weisz and his co-workers at Mobil's Central Research Laboratory, a remarkable proliferation of industrial processes has been based on one or more of the numerous synthetic zeolites."

John R. Whinnery
University Professor Emeritus
(Electrical Engineering)
University of California
Berkeley, California

Citation: For his research contributions to microwaves, lasers, and quantum electronics; for his excellence as a teacher and author; and for his extensive services to government and professional organizations.

Summary of Achievements

John R. Whinnery is one of the world's most distinguished electrical engineering educators. For over 50 years, he has made superb contributions to research in electrical sciences, in teaching, both in formal classes as a research mentor, and as a senior counselor and statesman in his professional activities.

His research has evolved from vacuum triodes at General Electric to microwave tubes such as traveling-wave tubes in his early work at Berkeley, and on to lasers and related topics more recently. In each of these evolving fields he has made important contributions. The two helix backward wave amplifier with Malcolm Currie isolated input from output in a voltable voltage tunable amplifier and in a very important way. His thermal focusing of laser beams in gas lasers which developed while he was at Bell Labs helped pave the way for important understanding and application there.

In research, Whinnery's early work led to advances in the understanding and operation of microwave circuits and triodes and to traveling-wave tubes, still in use in communication satellites. He contributed to the understanding of high-frequency electrical noise in electronic devices, and was an early leader in the field of lasers and fundamental quantum electronics. Recently he has been a pioneer in the production and utilization of very short pulses that can be used to study fast processes in materials and chemistry. He has published over 160 papers.

In education, Whinnery has been a leader in all aspects and contributed to the education of thousands of students. He has had over 30 doctoral students who are leaders in present day engineering research, education, and electronic business. Perhaps even more important was the leadership he gave to the University of California at Berkeley as a Professor, Chairman, Dean of Engineering, and then senior statesman. He advised the University concerning the desirability of engineering at the University of California at Santa Cruz, and became the first engineer who was a University Professor in the University of California system, perhaps the highest honor that

JOHN R. WHINNERY
University Professor Emeritus
Electrical Engineering

BIOGRAPHY

John R. Whinnery was born in Read, Colorado on July 26, 1916. He received the B.S. degree in Electrical Engineering from the University of California, Berkeley, in 1937, and the Ph.D. from the same institution in 1948. From 1937 to 1946 he was with the General Electric Company, Schenectady, New York, working on problems in waveguide discontinuities, microwave tubes, and applications to radar. During that period he was active in war training classes, and in 1945-46 held a part-time lectureship at Union College, Schenectady. Dr. Whinnery has been on the faculty of the University of California, Berkeley, since 1946, holding appointments as Lecturer, Associate Professor, and Professor. In 1980 he was appointed University Professor at the University of California. From 1952 to 1956 he directed the Electronic Research Laboratory; from 1956 to 1959 he was Chairman of the Electrical Engineering Department; from 1959 to 1963 he was Dean of the College of Engineering at Berkeley. On leaves from the University, he acted as head of the Microwave Tube Research Section of the Hughes Aircraft Company in 1951-52, and engaged in research in quantum electronics at the Bell Laboratories, Inc., Murray Hill, New Jersey, in 1963-64. He has held Visiting Professorship at the University of California, Santa Cruz and at the Stanford University. In 1959 he held a John Simon Guggenheim Fellowship at the ETH, Zurich, Switzerland; in 1973-74 he held a Research Professorship in the Miller Institute for Basic Research in Science at UC Berkeley; in 1986 he had an appointment at the California Institute of Technology on a Sherman Fairchild Distinguished Scholarship; in May 1986 he was invited to the People's Republic of China to receive the award of Honorary Professor of Chengdu Institute of Radio Engineering.

He was elected as a Fellow of the American Academy of Arts and Sciences; Fellow of the American Association for the Advancement of Science; Fellow of the Optical Society of America; a Fellow and Life Member of the Institute of Electrical and Electronic Engineers and a Life Member of the American Society for Engineering Education. He was also elected to the National Academy of Sciences and National Academy of Engineering. He has served on numerous advisory committees to government agencies and other educational institutes. He has received from IEEE the Education Medal, Microwave Career Award, Centennial Medal and Medal of Honor Award. From ASEE he received the Lamme Medal. From the University of California, Berkeley he received the Distinguished Alumnus Award. From the Catholic University of Chile he received the University Anniversary Commemorative Medal. From the National Academy of Engineering he was the recipient of 1986 Founders Award. In 1987 he received the Berkeley Citation from University of California, Berkeley for distinguished achievement and for notable service to the University. In 1989 he became a Berkeley Fellows at the University of California, Berkeley. He was selected as a MTT-S Distinguished Lecturer for the U.S. by the IEEE MTT-S in 1990.

The National Medal Of Technology

AWARDED BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

N. JOSEPH WOODLAND

United States Department of Commerce • Washington, D.C. 20230

"For his invention and contribution to the commercialization of bar code technology which improved productivity in every industrial sector and gave rise to the bar code industry."

Few inventions in recent decades have had the pervasive influence in United States industry as the one created by Norman Joseph Woodland. In 1948, a year following his graduation from Drexel University in Philadelphia with a Bachelor of Science in mechanical engineering, Woodland began research on a new technology to encode data in machine readable form. One year later, while teaching at Drexel, he and a faculty colleague, Bernard Silver, applied for a patent on their bar code system.

The approved patent, "Classifying Apparatus and Method," was granted in 1952 and laid the foundation for what has become a $1.4 billion industry (total 1990 revenues in the U.S.). Woodland was instrumental not only in devising the basic bar code technology, but in continuing to improve it after joining IBM as a design engineer in 1951. When laser technology became sufficiently refined to make widespread use of the bar code practical, Woodland created the Universal Product Code (UPC) system. He also helped IBM establish the UPC's counterpart in Europe.

Woodland's UPC symbol, selected as the U.S. standard by the grocery industry in 1973, has become ubiquitous in the retail sector, and in manufacturing, wholesaling, transportation and distribution, chemical, medical, and other industries. In fact, while most are long-familiar with the bar code's use in supermarkets, its use in other industries now outstrips its presence in retailing by more than a four-to-one ratio.

Woodland's bar code technology is one of the most successful of the many information technologies that have transformed American business. His creation has had myriad applications in helping to improve quality, productivity and cost control, giving U.S. industry a competitive advantage in domestic and foreign markets. Today, bar coding's future worldwide impact appears limitless as new applications continue to be found for the technology.

In 36 years with IBM, he held a variety of positions in mechanical and optical design, system development management, store systems marketing, long-range market planning, product planning, and artificial intelligence development. While with IBM, his work led to 14 successful patent applications. He received several awards from IBM for outstanding performance, and was recently named one of Drexel University's 100 most outstanding alumni during the university's centennial observance. He also holds a Master of Science in mechanical engineering from Syracuse University.

rent investments in technology will later pay off in new capabilities for scientific research, communications, robotics, launch vehicles, and other space-related areas.

BASIC RESEARCH

These initiatives lead to the creation of new knowledge which will enable future innovation.

Doubling the National Science Foundation (NSF) Budget by 1994.—The budget proposes an increase of 18 percent overall for NSF, including a 21 percent increase for basic research. This will continue the Administration's commitment to double NSF's budget by 1994. This increase is targeted toward investments in the people, equipment and unique research facilities that underpin the U.S. scientific enterprise.

Increasing Support for Individual Investigators.—The budget proposes nearly $8 billion for the support of individual investigators funded by the Departments of Health and Human Services and Energy and the National Science Foundation. This is an increase of over 9 percent over 1992. Individual investigators are the backbone of the U.S. scientific and engineering enterprise. These researchers, located primarily at the Nation's colleges and universities conduct most of the fundamental research on which technological progress is founded. In addition, and perhaps more importantly, they educate and train the next generation of scientists and engineers.

Human Genome Project.—The budget proposes an increase of $11 million, or 7 percent, to a total of $175 million in the Departments of Energy and Health and Human Services (National Institutes of Health). The goal of the project is to analyze within 15 years the entire complement of human genetic material at the molecular level. The Departments are developing capabilities and tools, constructing maps, sequencing human chromosomes, developing accessible data bases, and characterizing disease-related genes. Both agencies are also addressing ethical, legal, and social issues surrounding the uses of knowledge about the human genome and are developing educational activities on genome issues for the general public.

Superconducting Super Collider (SSC).—The budget proposes an increase of $166 million for the SSC to a total of $650 million. This will support continued work toward the transition from prototype superconducting magnets to production and continued construction of support facilities. It will also provide for the construction of a tunnel segment for testing purposes. The funding level maintains the 10-year design and construction schedule approved last year. The total cost of slightly over $8 billion assumes one-third non-Federal contributions including $233 million in 1993.

U.S. Global Change Research Program (USGCRP).—The budget proposes an overall increase of $262 million, or 24 percent, to a total of $1,372 million for this Presidential Initiative–the most advanced program on global change research issues in the world. The proposed increase will assist efforts to understand more fully the earth's climate system. That understanding will facilitate development of sound policies concerning global environmental issues such as ozone depletion and global warming.

Astronomy and Astrophysics.—The budget proposes a total of $890 million for these two closely related disciplines which are funded primarily by the National Science Foundation and the National Aeronautics and Space Administration. The objective of these programs is to increase our understanding of the universe. The budget proposals are consistent with the recommendations of a recent report of the National Research Council ("The Decade of Discovery in Astronomy and Astrophysics") concerning ground- and space-based astronomy and astrophysics research for the next decade, including increased operations and maintenance support for existing facilities, increased support for individual investigators, and the development of small and medium-sized instruments.

National Agricultural Research Initiative.—The budget continues the commitment to the National Research Initiative (NRI), first proposed in the 1991 budget, by proposing $150 million, an increase of $52 million, or 53 percent, over 1992. In 1991, $100 million was proposed as the initial installment, to be increased by $50 million each year to

THE NEED FOR INCREASED R&D INVESTMENTS

The goals of R&D are to generate new knowledge; train the future skilled workforce; and to provide a catalyst for economic activity. Taken together, these goals provide the most compelling rationale for increased Federal support for R&D.

The combination of public and private national investments in R&D have contributed to the unprecedented advance of human knowlege and improvement in the quality of life for much of the world. All of the available empirical evidence suggests that "more is better" in that (1) increased total R&D investment adds to the productivity of the Nation, and (2) Federal R&D investments are important. Thus, there is ample justification for increased Federal investment in R&D as well as for Federal action to increase the levels of private R&D investment.

One measure that historically has been used to gauge the appropriate level of R&D is the total size of the national R&D investment relative to the Gross National Product (GNP). Using this measure, R&D as a share of GNP stood at about 2.7 percent in the early 1960's, fell during the decade of the 1970's, and returned to that level in the 1980's. Total U.S. R&D investments have increased in absolute terms over that period. Compared with our major trading partners, U.S. R&D as a percent of GNP is less than that of Japan and Germany, but larger than France or the United Kingdom.

Over the past decade, the ratio of Federal R&D outlays to GNP has hovered at about 1.2 percent. In each of the past three budgets, President Bush has proposed increases that would have increased this share. Congress has not fully funded these requests.

Recently, the Federal Government has begun to use the Gross Domestic Product (GDP) as an indicator of the overall strength of the economy, rather than the more traditional GNP. When a similar comparison is made to GDP, it shows that R&D as a share of GDP declined through the 1970's and most of the 1980's. Since 1989, R&D has been steadily increasing as a share of GDP. The budget provides increases and incentives designed to continue to increase R&D investment as a percent of GDP.

THE FEDERAL R&D BUDGET: OVERVIEW AND TRENDS

The budget proposes to allocate $76.6 billion for R&D, including R&D facilities. This is an increase of nearly $2 billion, or 3 percent, over 1992. Within this total, $14.3 billion will be allocated for basic research, an increase ofover $1 billion, or 8 percent, and over $59 billion for applied research, an increase of about $1.5 billion, or 3 percent, over 1992. Federal civilian R&D will increase by 7 percent while defense-related R&D (in the Departments of Defense and Energy) will increase by 1 percent.

As a percentage of total Federal domestic discretionary spending, total civilian R&D has declined from a peak of 26 percent in the Apollo years to a trough of 10 percent in 1983. It has begun to increase again to about 14 percent in recent years. The President proposed to increase this share to 15 percent in 1992, but Congress cut this request. The budget seeks to increase this share once again to 15 percent in 1993.

The Federal Government currently accounts for about 44 percent of the total U.S. investment in R&D. Industry, academia, and nonprofit organizations make up the remaining 56 percent. In 1991, it is estimated that total U.S. R&D expenditures, Federal and non-Federal, were $151.6 billion, an increase of over 4 percent over 1991. In total, the U.S. investment in R&D is about 2.7 percent of GDP. Trends in industry R&D funding, and initiatives to spur increased industry investment through making permanent the tax credit for research and experimentation, are discussed later in this chapter.

publications, (2) "quality" of publications as measured by citation indices, (3) patents and (4) Nobel and other prizes.

By all of these measures, the U.S. continues to lead the world in the generation of knowledge. For example:

- The number of science articles published by U.S. academic researchers (which produce about two-thirds of all U.S. science and engineering articles in major journals) has increased markedly. By this measure, the U.S. is maintaining its large share of world scientific and engineering literature.
- The influence of publications as measured by the level of citation of U.S. papers by foreign researchers suggests that U.S. researchers continue to exert a substantial impact on foreign research, and thus on the world's store of scientific knowledge.
- U.S. universities received 2 percent of patents awarded to U.S. inventors in 1988, more than double the share in 1978, thus new ideas that have potential value in the marketplace are flowing from universities in even greater numbers.
- The U.S. continues to dominate the Nobel lists, and Americans often win other major, internationally-recognized prizes such as the Fermi, the Wolf and the Lasker. This provides evidence of the strong and consistent support for basic research over the last 30 years.

This lead can be lost without adequate investment in knowledge. The Administration's strategy of investing in basic research is designed to maintain and strengthen America's leadership in scientific innovation.

The budget recognizes that the level of support for individual and small groups of investigators, primarily at academic institutions, is an important indicator of the vitality of the Nation's basic research effort. These "individual investigators" are the wellspring of many of the Nation's discoveries and inventions and they form the backbone of American science. Therefore, the Administration has proposed significant 1993 increases for this group.

Budget Initiatives in Basic Research

The budget proposes a number of major increases or new programs reflecting the President's support for basic research. These increases are intended to bolster basic research funding, especially that which supports individual investigators, and to provide those researchers with state-of-the-art equipment and specialized world-class research facilities. Overall, the budget proposes over $14 billion for basic research, an increase of over $1 billion, or 8 percent, over 1992.

Doubling the Budget of the National Science Foundation by 1994.—The President remains committed to doubling the budget of the National Science Foundation (NSF) by 1994. The budget proposes $3,026 million, an overall increase of $454 million, or 18 percent, over 1992. Over 70 percent of NSF's budget supports basic research, primarily at universities and colleges. These funds provide support for individual investigators and small groups ($1,581 million), research centers ($148 million) and research instrumentation and specialized research facilities ($483 million), including the National High Field Magnet Laboratory, the Laser Inferometer Gravity Wave Observatory, and two matched 8-meter optical telescopes. Each of these elements are keys to maintaining the preeminent U.S. position in science and basic research.

The budget proposes $33 million for NSF's instrumentation initiative. This initiative, funded at about $17 million in 1992, will continue to provide state-of-the-art instrumentation, costing from $200,000 to $4 million, to university researchers through a merit-based competitive process. The Federal funding will be matched 50:50 from non-Federal sources.

NSF also plays a significant role in the government-wide initiative to improve the quality of science, mathematics, and engineering education, particularly at the precollege level. These education activities are highlighted in Chapter 4, "Reforming American Education and Investing in Human Capital".

Increasing the Support for Individual Investigators.—The budget proposes a significant increase for individual investigators located primarily at universities and colleges.

Table 6–10. **THE BUDGET INCREASES FUNDING FOR BASIC RESEARCH**[1]
(Dollar amounts in millions)

Department or Agency	Budget Authority					Outlays				
	1989 Actual	1992 Enacted	1993 Proposed	Dollar Change: 1992 to 1993	Percent Change: 1992 to 1993	1989 Actual	1992 Enacted	1993 Proposed	Dollar Change: 1992 to 1993	Percent Change: 1992 to 1993
Health and Human Services	4,413	5,459	5,800	+341	+6%	4,234	5,143	5,541	+398	+8%
(National Institutes of Health)	(4,052)	(5,019)	(5,328)	(+309)	(+6%)	(3,988)	(4,748)	(5,109)	(+361)	(+8%)
National Science Foundation	1,563	1,839	2,221	+382	+21%	1,455	1,730	1,917	+187	+11%
Energy	1,383	1,789	1,859	+70	+4%	1,377	1,695	1,771	+76	+4%
National Aeronautics and Space Administration	1,385	1,860	2,068	+208	+11%	1,346	1,715	1,851	+136	+8%
Defense-military	951	1,170	1,203	+33	+3%	929	1,134	1,230	+96	+8%
Agriculture	486	611	639	+28	+5%	477	576	589	+13	+2%
Other Agencies[2]	434	526	532	+6	+1%	438	498	505	+7	+1%
Total	10,615	13,254	14,322	+1,068	+8%	10,256	12,491	13,405	+914	+7%

[1] Amounts reported in this table are included in totals for conduct of R&D.
[2] Includes the Departments of Interior, Commerce, Veterans Affairs, Education, Labor, the Treasury, Justice, the Smithsonian Institution, Environmental Protection Agency, Tennessee Valley Authority, Agency for International Development, and the Corps of Engineers.

Three agencies support the majority of individual investigators: the National Science Foundation, and the Departments of Health and Human Services and Energy. In total, the budget proposes over $7.9 billion, an increase of over 9 percent, for these investigators.

For HHS, the budget proposes $5.9 billion, an increase of $389 million, or 2 percent real growth, for investigator-initiated research. This sizeable increase will allow a record total of 24,600 grants to be supported, an increase of 500 over 1992's record levels. For NSF, $1,581 million is being proposed in this area, an increase of $230 million or 17 percent over 1992. For Energy, the budget proposes a total of $482 million, an increase of 11 percent, for support of university-based basic research by the Office of Energy Research.

Increasing Basic Research in HHS.—HHS is the largest supporter of both government basic research and individual investigators in the Federal Government. The budget continues to focus on basic biomedical and behavioral research at HHS, and proposes $5.8 billion in 1993. Building on the record levels reached in 1992, this $341 million, or 6 percent, increase will allow HHS research agencies to further extend the frontiers of knowledge which will enable future life-extending and life-enhancing therapies to be developed. By focusing these additional resources on basic biomedical research, the budget helps to ensure that continued advances against disease will take place.

Unlocking the Secrets of Human Heredity—the Human Genome Project.—The budget proposes a 7 percent increase, to a total of $175 million, for the fourth year of this 15-year effort to decode the information locked in the chemical building blocks that form human genetic inheritance.

The Project is being conducted jointly by the Departments of Energy and Health and Human Services. The budget proposes a total of $175 million for the project, $65 million at Energy and $110 million at Health and Human Services. These funds are also included in the totals for the broader Biotechnology Research Initiative involving many other Federal agencies.

DOE and HHS are working together to develop capabilities and tools, to construct gene "maps", to discern the chemical sequence of human chromosomes, and to characterize disease-related genes.

(Hinchliffe/Gershowitz)
June 17, 1992 2 p.m.
MEDAL Draft One

PRESIDENTIAL REMARKS: SCIENCE AND TECHNOLOGY MEDALS PRESENTATION

--Franklin (Commerce); Bromley; Bernthal (reading citations)
--a few months ago, in NH at opening of "maize craze" competition, Dean Kamen, invited winners -- enormously impressed by level of cooperation between major corporations and high schools --Dean Kamen, wonderful work, liberated private sector support, created enormous amount of enthusiasm in sceicne and tedhnology; Clinton High School and NYPRO (machine--NYalator); -- Xerox Corporation, Wilson Magnet High School, real team; make as fun and rewarding as sports; Chairman's award, best involvement between school and sponsor;
--where does US FIRST fit in? -- natinal aliance of business, educastion and government to reverse declining levels of student interest and performacne in science and math
--unique in teaming high schoolers with high-powered engineering teams from big companies or universities

--NATIONAL MEDAL OF TECHNOLOGY:
--contributed to country from development or application of technology
--individuals and companies, improving well-being of US through development or commercialization ofstechnology or contributions to establishment of technically-trained workforce
--8th presentation ceremony
--Commerce;

FACULTY FELLOW AWARDS:
--15 scientist and 15 engineers named last May, first recipients, recognition and support for young faculty members who demosntrate excellence and promise in researh and teaching future generations -- they're the best investment we can make in our future
--competence and leadership in research, teaching, service sto community

NATIONAL MEDAL OF SCIENCE:
--outstanding contribution;
--30th year of award

--our nation can remain strong only by investing its resources and talents in science, technology and education -- education goal -- while we honor innovation and accomplishments of National Medalists, we must recognize that their contribtuions are special because they are about the future -- so we also recognize first class of Presidential Faculty Fellows -- teach, hold young people and our future in their hands, wouldn't be surprised if were to

rejoin us one day as National Medalists of SCience and TEchnology, they

?
--how many nominations/finalists;

As JFK said -- since TJ dined alone

hundreds of patents and prizes; the elite, the royalty; artificial intelligence; young goats; zeolite catalysis; conceptual insights -- asking why and not stopping with the questions, see where it leads us -- the spirit of pioneer innovation and invention
--people who didn't acccept couldn't be done --
--inspiring leadership, not just in science
--entrepreneurial creation -- maybe even some getting together today;
--in elegant studies; persistent and clairoyant determination;
--exploding the frontiers of science, from replication of HIV in tiniest human cell to outer space exploration
--from individuals like Dr. W. Lincoln Hawkins, 34 years in Bell Labs, to corporation -- Merck & Co., for worldwide development and marketing

SCIENCE:
--Nobel Prize laureate Howard Temin, reshaped our thinking about RNA and DNA, seminal thinker in history of biology,
--Eugene Shoemaker, not only for the astounding breadth of his contributions but also for infectious enthusiasm -- far ahead of his peers, brought US Geological Survey into Space Age -- profound impact on space exploration of 60s and 70s, from Surveyor and Mariner to Apollo moon landings
TECHNOLOGY:
--Bill Gates, co-founder of Microsoft, revolution of information industry [COMPUTER JOKE];
--Norman Joseph Woodland -- bar code
(science -- extra)--Dr. Maxine Singer, new understandings in genetic information, no stranger to WH ceremonies, recipient of Distinguished Presidential Rank Award, highest honor given to civil servant

--tax cuts to revitalize entrepreneurial economy
--~~pushing~~ for r&d funding -- jobs for future
--create new jobs by stimulating private sector invement -- do this by pushing Congres to slash capital gains tax, getting rid of passive loss rules for venture capital, by making the Research and Experimentaiton tax credit permanent.
--National Technology Initiative, under Watkins, to bring government officials together with private businesses to let them know what gov. can offer in technology -- moves new discoveries out of federal labs, into the marketplace to create jobs
--world economy of 21st century -- new age of Am. competition in fiercely challenging global marketplace -- have to make changes to compete -- intensified need for well-educated workers

A --America's greatest resource is the genius of its people

A --inscription on church in Sussex; "A vision without a task is but a dream, a task without a vision is drudgery, [but] a vision with a task is the hope of the world." 1730

?

D --we've proposed record funding levels for r&d; urged Congres to approve xxx% increase in funding for National Science fopoudnation -- we will meet our commitment to double spending on its research by 1994;

E --America 2000 -- education is the basis of everything -=- you know it, so many of you teach -- influence the future one dream at a time -- challenge to literally reinvent Am. education -- shame that we rank dead last of industrialized nations in math and science -- one of our six education goals by year 2000 -- so this year's budget invests xxxx in precollege math and science education -- an increase of XX%;

Curie
Einstein
Newton
Galileo
Schmidt

Tech
Science

F 6 - US First 7 teams
G 7 - Fellows
H - Conc. (need quote - educ, future, dream)

~~A1~~ - Gen. on importance
~~B2~~ - Space/Cartoon
~~C3~~ - winners
D 4 - Gov. action/funding
E 5 - Education

U.S. Department of Education

Office of Educational Research and Improvement

Date: 6/18/92

To: Gary Goshorn

From: Gene Bowen

Number of pages transmitted (includes cover sheet): 12

If you did not receive the complete transmission, please call 219-4668.

UNITED STATES
DEPARTMENT OF EDUCATION NEWS

FOR IMMEDIATE RELEASE
February 5, 1992

Contact: Melinda Kitchell
(202) 401-1008

STATEMENT BY U.S. SECRETARY OF EDUCATION LAMAR ALEXANDER REGARDING INTERNATIONAL COMPARISON OF STUDENT ACHIEVEMENT

This is the best international comparison of student abilities in 25 years. We should pay attention to it. We want our children to grow up as Americans in American schools with American values, but we also want our children to learn enough to be able to live and work and compete with children in Taiwan, Amsterdam and Seoul.

The survey shows, first, that our best students can compete with the best students in any country; and second, that 90 percent of our students, on average, are learning below the international average -- sort of a reverse Lake Wobegon effect.

This means that many children with families that care, in communities with "good" schools, aren't learning what they should be learning. It means this is not just an inner-city problem. It is a problem in the suburbs, too.

This is not the kind of report that an America that likes to be first should be happy about.

If we want to achieve the National Education Goal of being first in the world in math and science by the year 2000, the worst thing we could do is not pay attention to this news. Nearly as bad would be to panic and start blaming a lot of people.

We simply need to acknowledge the challenge, set our goals higher, and get busy in our hometowns, radically changing our attitudes toward education and our schools.

The federal response to the challenge is this:

1. The National Science Foundation and Department of Education are forming an alliance to target 697 million federal dollars toward helping our children learn math and science to World Class Standards. We have signed a memorandum to that effect today.

2. More than a dozen agencies, after two years' work, are focusing $2 billion of spending for math and science education.

-MORE-

For Technical Prints - Shay Phillips 301.219.1761
Ordering - EIS - 1-800-223-0267
$1.50 each

3. We will continue to support efforts to create a national consensus about what it really means for our children to learn math and science to a World Class Standard. We will help change state curricula and work to develop voluntary national tests in math and science so families and communities can know how their children and schools are doing.

Finally, these international comparisons are one more clear warning that business as usual will not move America to the six National Education Goals by the year 2000. Our education system needs radical change.

To push this change, Congress should enact the President's AMERICA 2000 proposals for higher academic standards, a voluntary national examination system, more flexibility for teachers, break-the-mold New American Schools, and more choice of schools for middle- and low-income families.

And Congress should enact the President's new budget, which includes $2.1 billion to improve the nation's math and science education through more than a dozen federal agencies. For elementary and secondary education math and science programs, this would mean an 18 percent increase over last year and 130 percent increase since 1989. The focus on the spending of this new money is training and retraining teachers to help children reach newer, higher World Class Standards of learning in math and science.

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LEARNING MATHEMATICS

Archie E. Lapointe Nancy A. Mead Janice M. Askew

Prepared for the National Center of Education Statistics,
U.S. Department of Education and the National Science Foundation

February 1992 Report No. 22-CAEP-01

The International Assessment of Educational Progress IAEP

EDUCATIONAL TESTING SERVICE

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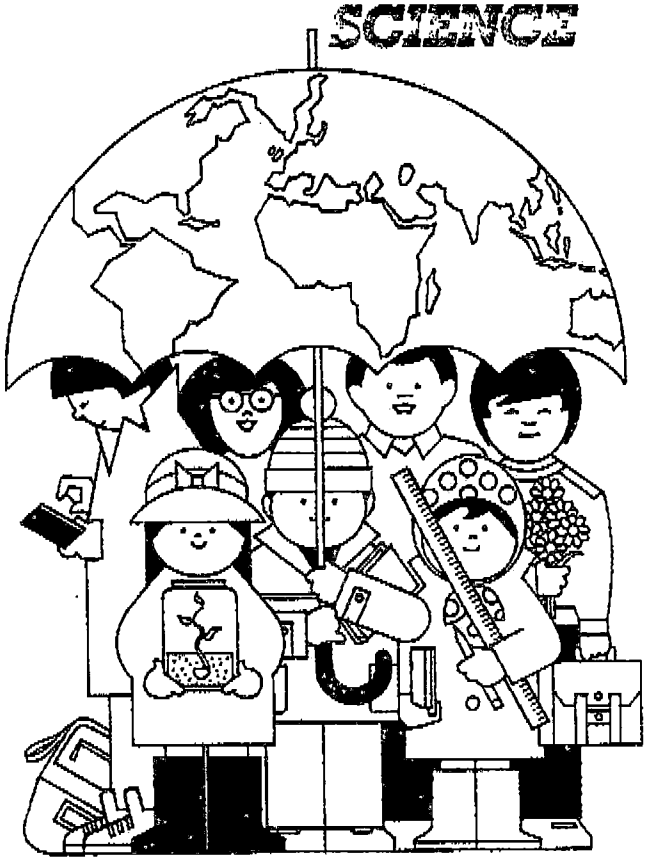
LEARNING SCIENCE



Archie E. Lapointe Janice M. Askew Nancy A. Mead

Prepared for the National Center of Education Statistics,
U.S. Department of Education and the National Science Foundation

February 1992 Report No. 22-CAEP-02

The International Assessment of Educational Progress IAEP

EDUCATIONAL TESTING SERVICE

The Study in Brief

Participants: Twenty countries assessed the mathematics and science achievement of 13-year-old students and 14 assessed 9-year-old students in these same subjects. In some cases, participants assessed virtually all age-eligible children in their countries and in other cases they confined samples to certain geographic regions, language groups, or grade levels. In some countries, significant proportions of age-eligible children were not represented because they did not attend school. Also, in some countries, low rates of school or student participation mean results may be biased.

Participants

Brazil	Cities of São Paulo and Fortaleza, restricted grades, in-school population
Canada	Four provinces at age 9 and nine out of 10 provinces at age 13
China	20 out of 29 provinces and independent cities, restricted grades, in-school population
England	All students, low participation at ages 9 and 13
France	All students
Hungary	All students
Ireland	All students
Israel	Hebrew-speaking schools
Italy	Province of Emilia-Romagna, low participation at age 9
Jordan	All students
Korea	All students
* Mozambique	Cities of Maputo and Beira, in-school population, low participation
Portugal	Restricted grades, in-school population at age 13
Scotland	All students, low participation at age 9
Slovenia	All students
Soviet Union	14 out of 15 republics, Russian-speaking schools
Spain	All regions except Cataluña, Spanish-speaking schools
Switzerland	15 out of 26 cantons
Taiwan	All students
United States	All students

Samples: Typically, a random sample of 3,300 students from about 110 different schools was selected from each population at each age level; half were assessed in mathematics and half in science. A total of about 175,000 9- and 13-year-olds (those born in calendar years 1981 and 1977, respectively) were tested in 13 different languages in March 1991.

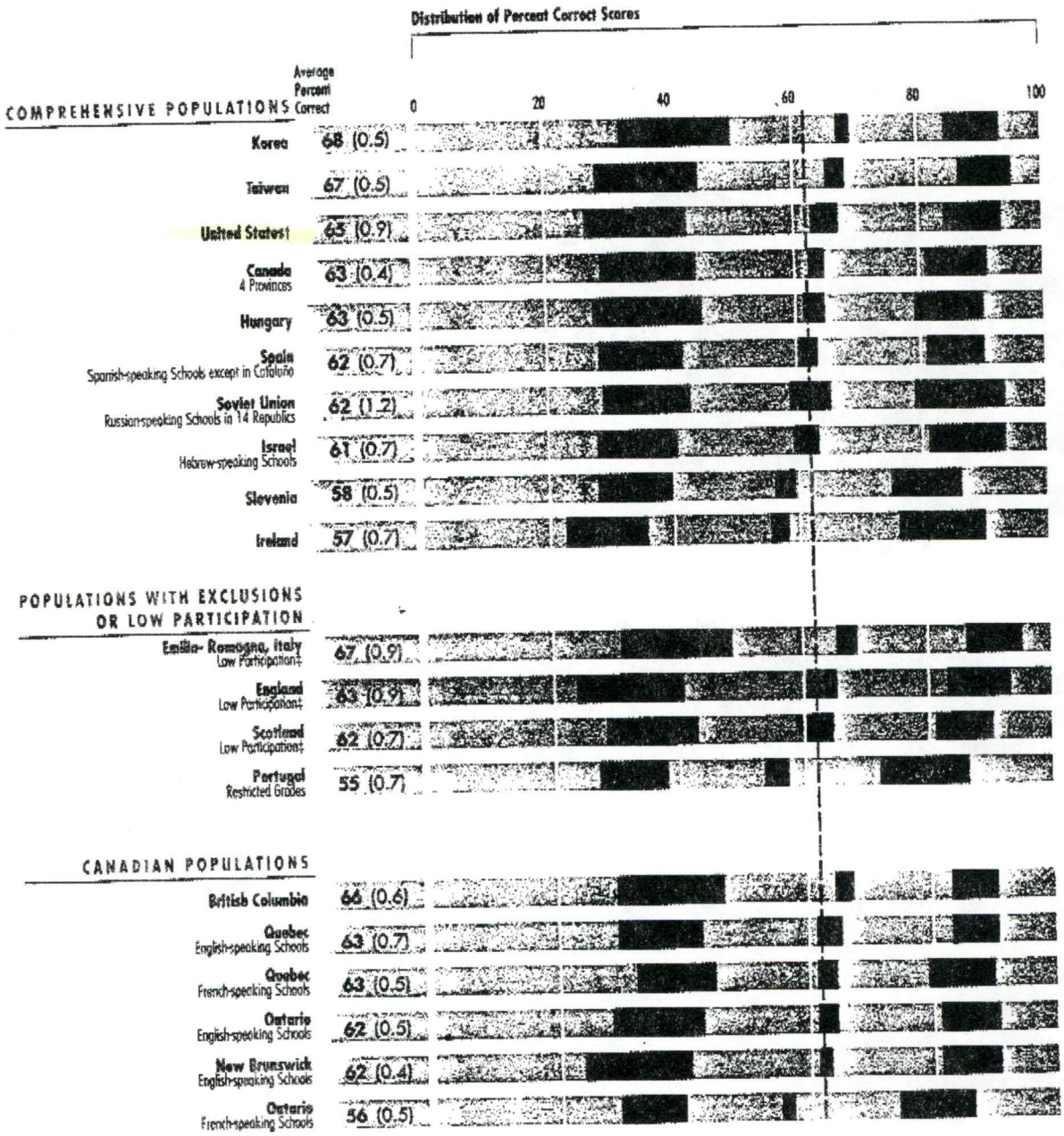
Assessment: The achievement tests lasted one hour. These tests, given to 9-year-olds, included 62 questions in mathematics and 60 questions in science. Those for 13-year-olds included 76 questions in mathematics and 72 questions in science. In addition, students at each age spent about 10 minutes responding to questions about their backgrounds and home and school experiences. School administrators completed a school questionnaire.

* Mozambique, one of the 20 participants in IAEP did not assess its students in science.

FIGURE 6.1

Science, Age 9

Distribution of Percent Correct Scores by Country*



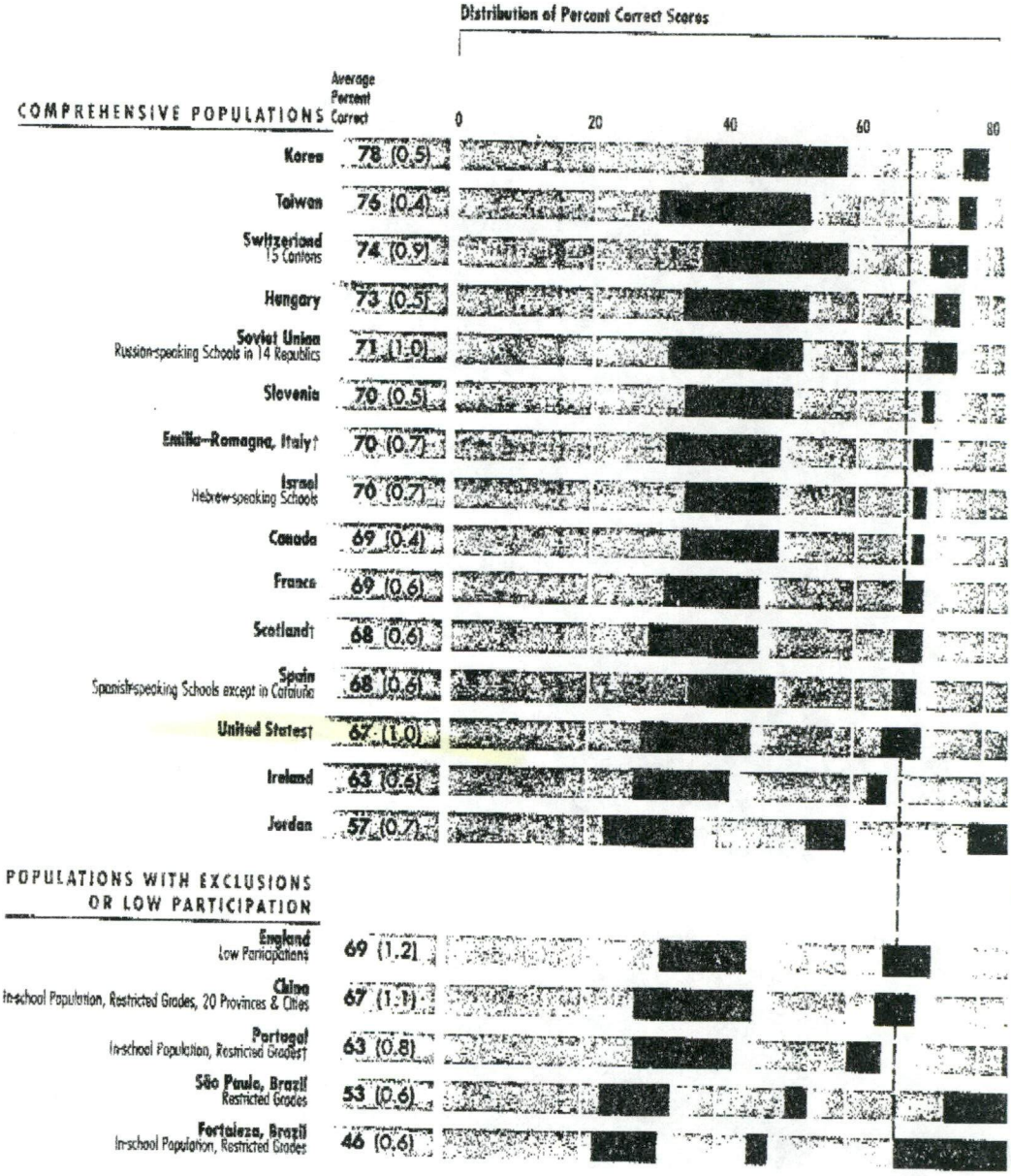
Average percent correct with simultaneous confidence interval controlling for all possible comparisons among comprehensive populations, populations with exclusions or low participation, and Canadian populations based on the Bonferroni procedure (the average ± 2.62 standard errors).
Bullet is 5th and 95th percentile. One 1st to 10th percentiles and 90th to 99th percentiles.
| IAEP Average
* Jackknifed standard errors are presented in parentheses.
† Combined school and student participation rate is below .80 but at least .70; interpret results with caution because of possible nonresponse bias.
‡ Combined school and student participation rate is below .70; interpret results with extreme caution because of possible nonresponse bias.

IAEP

Science, Age 13

Distribution of Percent Correct Scores by Populatio Part 1

FIGURE 1.1



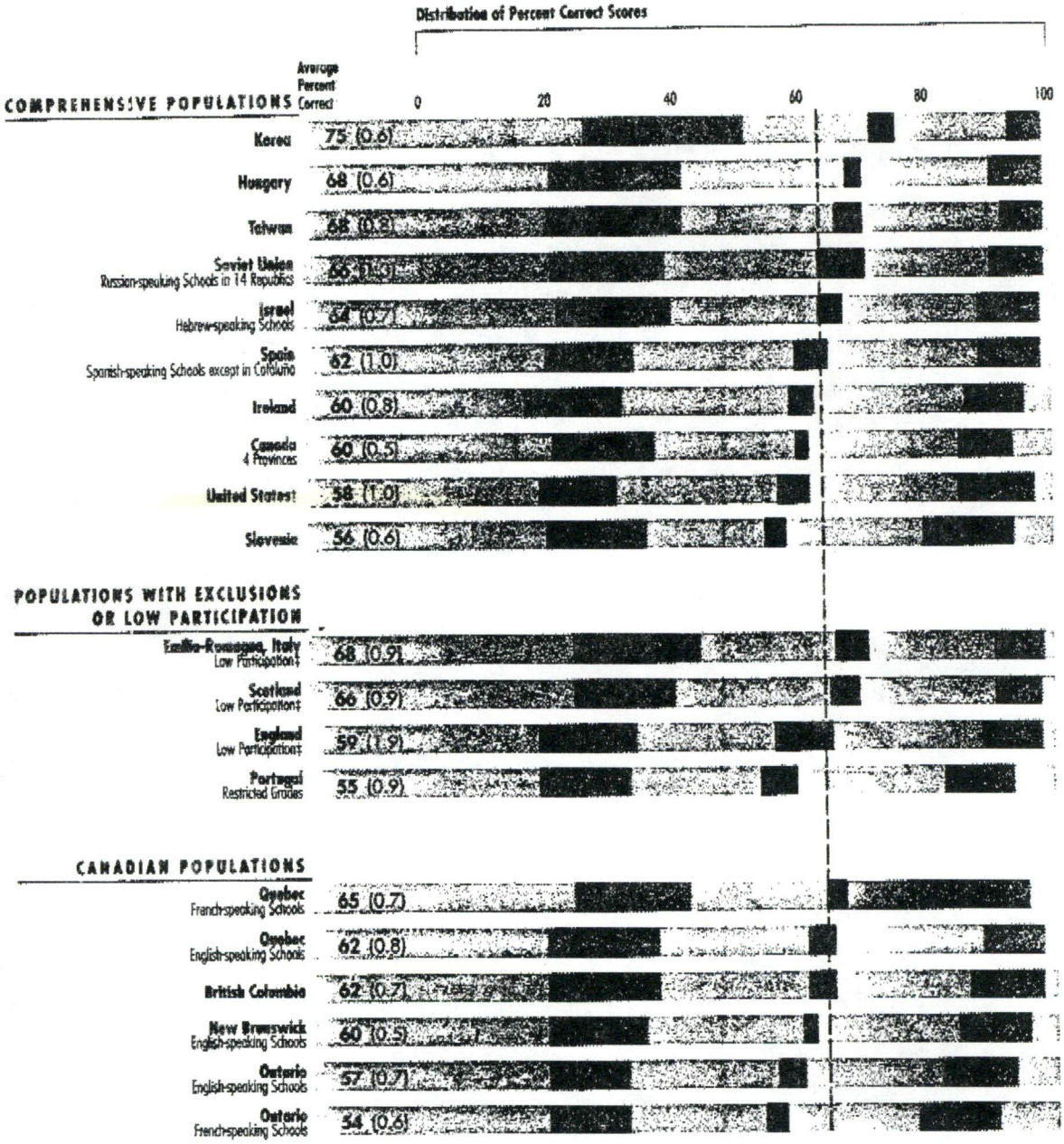
Average percent correct with simultaneous confidence interval controlling for all possible comparisons among comprehensive populations, population exclusions or low participation, and Canadian populations based on the Bonferroni procedure (the average ±2.78 standard errors).
Bullet is 5th and 95th percentile. One 1st to 10th percentiles and 90th to 99th percentiles.
IAEP Average

* Jackknifed standard errors are presented in parentheses.
† Combined school and student participation rate is below .80 but at least .70; interpret results with caution because of possible nonresponse bias.
‡ Combined school and student participation rate is below .70; interpret results with extreme caution because of possible nonresponse bias.

FIGURE 6.1

Mathematics, Age 9

Distribution of Percent Correct Scores by Country*



Average percent correct with simultaneous confidence interval controlling for all possible comparisons among comprehensive populations, populations with exclusions or low participation, and Canadian populations.

Bullet is 5th and 95th percentile. Bar are 1st to 10th percentiles and 90th to 99th percentiles.

‡ IAEP Average

* Jackknifed standard errors are presented in parentheses.

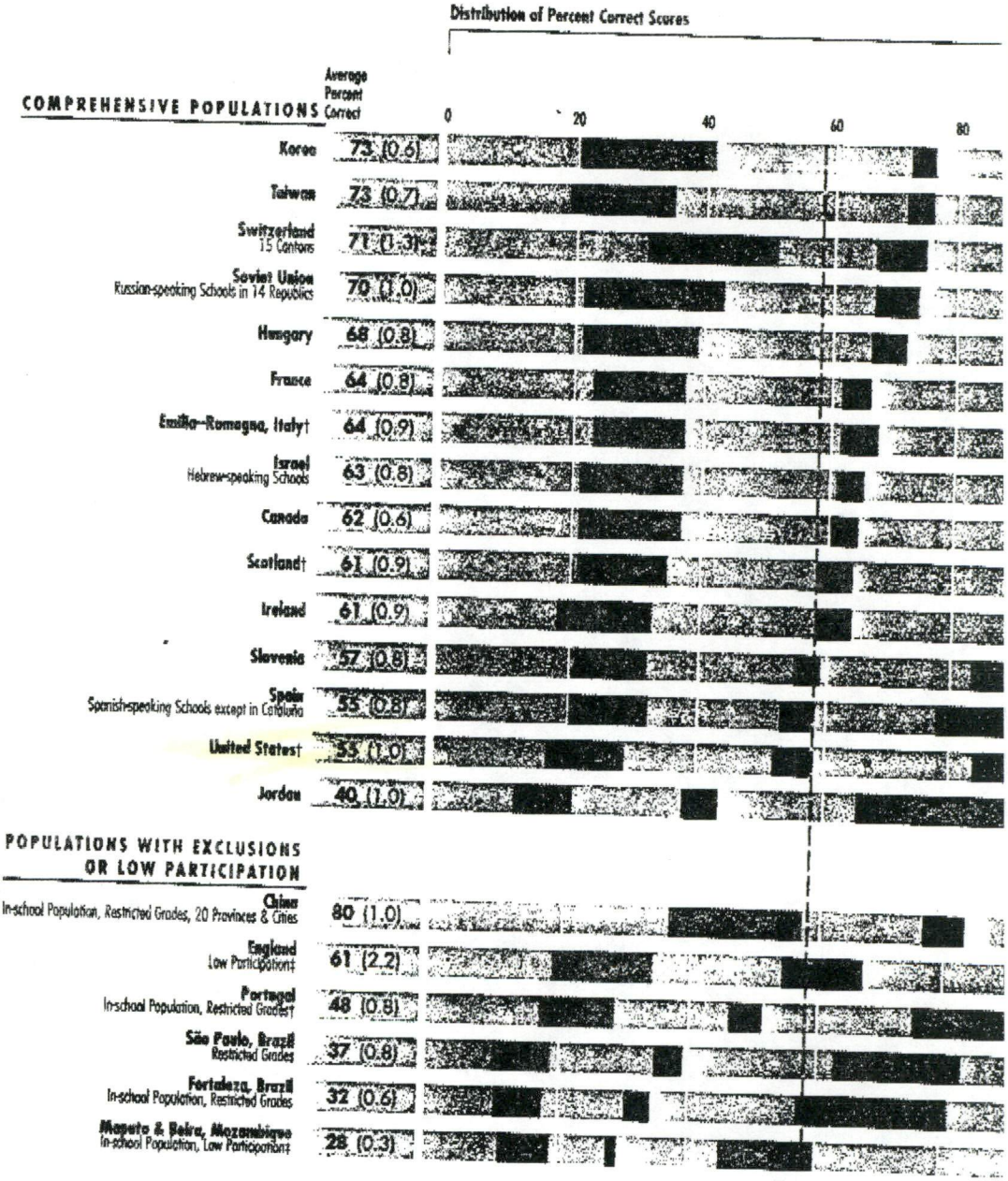
† Combined school and student participation rate is below .80 but at least .70; interpret results with caution because of possible nonresponse bias.

‡ Combined school and student participation rate is below .70; interpret results with extreme caution because of possible nonresponse bias.

FIGURE 1.1

Mathematics, Age 13

Distribution of Percent Correct Scores by Population* Part 1



Average percent correct with simultaneous confidence interval controlling for all possible comparisons among comprehensive populations, populations with exclusions or low participation, and Canadian populations based on the Bonferroni procedure (the average ±2.79 standard errors).

Bullet is 5th and 95th percentile. are 1st to 10th percentiles and 90th to 99th percentiles.

! IAEP Average

* Jackknifed standard errors are presented in parentheses.

† Combined school and student participation rate is below .80 but at least .70; interpret results with caution because of possible nonresponse bias.

‡ Combined school and student participation rate is below .70; interpret results with extreme caution because of possible nonresponse bias.

Educational and Cultural Characteristics and Average Percents Correct

COUNTRY CHARACTERISTICS

	Population (in Thousands)[1]	Ethnic Homogeneity (90 Percent or More from One Group)[1]	Percent Urban[1]	Per Capita Gross National Product (U.S. $)[2]	Percent of Gross National Product Spent on Education[2]	Percent Literate[1]	Age Start Sch
COMPREHENSIVE POPULATIONS							
Korea	42,793	Yes	70	3,883	4.5	93	6
Taiwan	20,221	No	74	4,355	3.6	92	6
Switzerland 15 Cantons	6,756	No	60	27,693	4.8	100	6 or 7
Soviet Union Russian-speaking Schools in 14 Republics	290,122	No	66	8,728	7.0	99	6 or 7
Hungary	10,437	Yes	62	2,490	5.7	99	6
France	56,647	Yes	73	16,419	6.1	99	6
Emilia-Romagna, Italy†	57,512	Yes	65	13,814	4.0	97	6
Israel Hebrew-speaking Schools	4,666	No	89	8,882	10.2	92	6
Canada	26,620	No	76	17,309	7.4	96	6
Scotland†	5,094	Yes[3]	92[3]	10,917[3]	5.2[3]	100[3]	5
Ireland	3,509	Yes	57	7,603	6.7	100	6
Slovenia	1,948	Yes[4]	74[4]	7,233[4]	3.4[4]	99[4]	7
Spain Spanish-speaking Schools except in Cataluña	39,618	No	76	8,078	3.2	93	6
United States†	251,394	No	77	19,789	7.5	96	6
Jordan	3,169	Yes	70	1,527	7.1	77	6
POPULATIONS WITH EXCLUSIONS OR LOW PARTICIPATION							
China In-school Population, Restricted Grades, 20 Provinces & Cities	1,133,683	Yes	26[5]	356	2.7	73	6.5
England Low Participation‡	47,536	Yes[3]	92[3]	10,917[3]	5.2[3]	100[3]	5
Portugal In-school Population, Restricted Grades†	10,388	Yes	30	3,740	4.4	84	6
São Paulo, Brazil Restricted Grades	150,368	No	75	2,245	3.3	81	7
Fortaleza, Brazil In-school Population, Restricted Grades	150,368	No	75	2,245	3.3	81	7
Maputo and Beira, Mozambique In-school Population, Low Participation‡	15,696	No	13	113	—	17	7

† Combined school and student participation rate is below .80 but at least .70; interpret results with caution because of possible nonresponse bias.

‡ Combined school and student participation rate is below .70; interpret results with extreme caution because of possible nonresponse bias.

[1] *1991 Britannica Book of the Year.* Chicago: Encyclopedia Britannica, Inc., 1991. Data reflect entire country.

[2] *P.C. Globe.* Tempe, AZ: P.C. Globe, Inc., 1990. Data reflect entire country.

[3] Data are for United Kingdom.

[4] *Annual Statistical Report of Slovenia,* Central Statistics Office, Ljubljana, Slovenia, 1990.

[5] National Population Census Office, *Major Figures of the Fourth Population Census of China.* Beijing: China Statistical Publishing House, 1991.

— Information is not available.

[6] IAEP Co

[7] IAEP Sc

EDUCATIONAL SYSTEMS

Age-Start School[6]	Average Days of Instruction in Year[7]	Average Minutes of Instruction in School Each Day[7]	Average Class Size for Modal Grade[7]	National Curriculum[6]	Percent of Schools with One or More Serious Problems[7]
6	222	264	49	Yes	24
6	222	318	44	Yes	10
6 or 7	207§	305§	18§	No	11§
6 or 7	198	243	22	Yes	72
6	177	223	27	Yes	32
6	174	370	25	Yes	29
6	204	289	21	Yes	18
6	215	278	32	Yes	46
6	188	304	25	No	13
5	191	324	24	Yes	23
6	173	323	27	Yes	39
7	190	248	25	Yes	50
6	188	285	29	Yes	33
6	179	338	23	No	5
6	191	260	27	Yes	63
6.5 or 7	251	305	48	Yes	43
5	192	300	22	Yes	24
6	172	334	25	Yes	56
7	181	271	38	No	60
7	183	223	32	No	62
7	193	272	51	Yes	92

COMPREHENSIVE POPULATIONS

Korea

Taiwan

Switzerland
15 Cantons

Soviet Union
Russian-speaking Schools in 14 Republics

Hungary

France

Emilia-Romagna, Italy†

Israel
Hebrew-speaking Schools

Canada

Scotland†

Ireland

Slovenia

Spain
Spanish-speaking Schools except in Cataluña

United States†

Jordan

POPULATIONS WITH EXCLUSIONS OR LOW PARTICIPATION

China
In-school Population, Restricted Grades, 20 Provinces & Cities†

England
Low Participation‡

Portugal
In-school Population, Restricted Grades‡

São Paulo, Brazil
Restricted Grades

Fortaleza, Brazil
In-school Population, Restricted Grades

Maputo and Beira, Mozambique
In-school Population, Low Participation‡

[6] IAEP Country Questionnaire. Data reflect entire country.
[7] IAEP School Questionnaire, Age 13. Jackknife standard errors range between 0.0 to 9.9 unless otherwise noted and are presented in the full report.

UNITED STATES DEPARTMENT OF EDUCATION

WASHINGTON, D.C. 20202-_____

FAX COVER SHEET

TO: Gary Gershowitz

White House

FROM: Eleanor / Tom Corwin - ~~Director of ELSE, SVE Analysis Division~~

Budget Service

Name and telephone number of sender Eleanor

telephone number 401-1700

No. of pages 5 including cover sheet

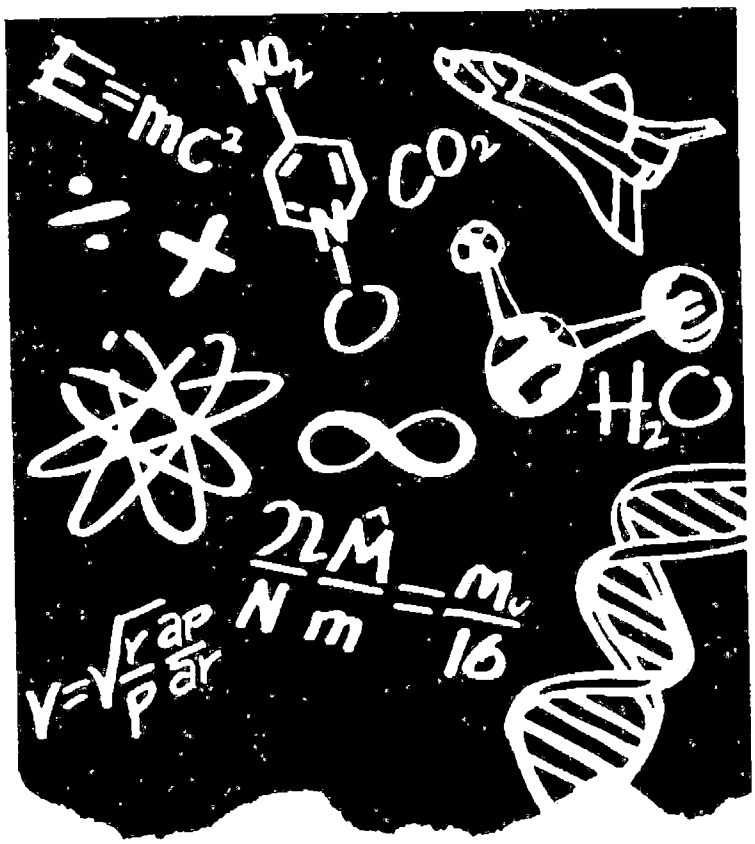
Our fax number is (202) 401-2837

Your fax number is 456-6218

Tom Corwin is Director of Elementary, Secondary & Vocational Education, Analysis division, DOE - 401-0318

BY THE YEAR 2000:
FIRST IN THE WORLD

REPORT OF
THE FCCSET COMMITTEE ON
EDUCATION AND HUMAN RESOURCES



FY 1993
BUDGET SUMMARY

January 1992

CEHR FY 1993 BUDGET SUMMARY

FY 1993 BUDGET REQUEST

The President's FY 1993 budget proposes the investment of $2.1 billion in mathematics, science, engineering, technology, and science literacy education programs, along priority lines indicated in Figure 3. This represents an increase of $138 million or 7% over the FY 1992 enacted levels for these programs (Figure 4: FY 1992-93 Growth by Education Level), and a $626 million, or 43% increase over their FY 1990 enacted levels (Figure 10).

The FY 1993 request is distributed by education level as shown in Figure 5: $768 million for precollege (37% of the total request), $481 million for undergraduate (23%), $750 million for graduate (36%), and $93 million for science literacy (4%).

For FY 1992-93, in accordance with the policy guidance provided by the National Education Goals and AMERICA 2000, the single largest requested increase is in the precollege area

Figure 3:
FY 1993 Federal Math/Science Education Priority Framework

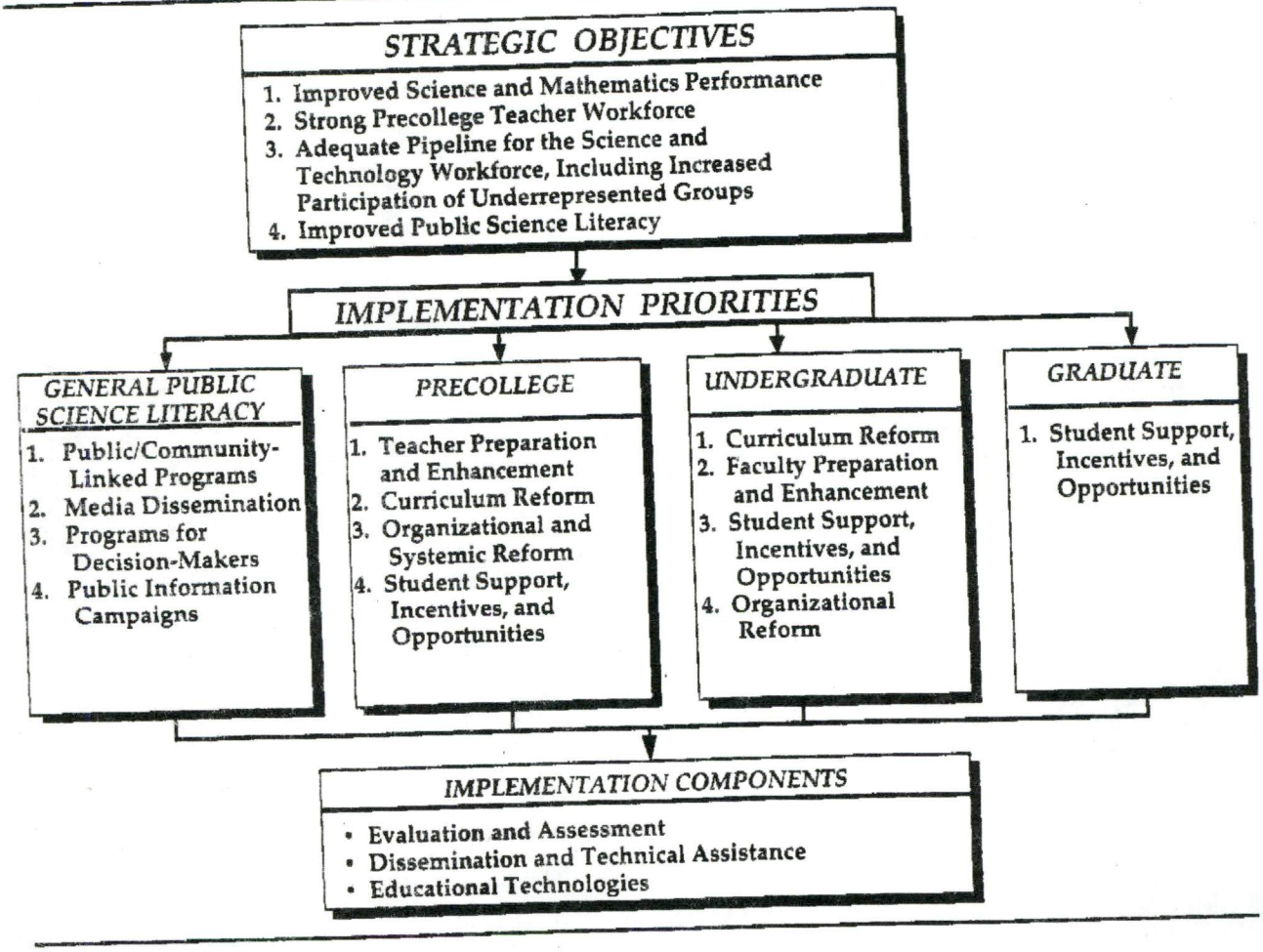


Figure 4:
FY 1992-1993 Growth by Education Level (dollars in millions)

	FY 1992	FY 1993	Increase FY 92-93	% Increase FY 92-93
Grand Totals	**$ 1954.74**	**$ 2092.23**	**$ 137.50**	**7%**
Precollege	650.71	767.95	117.23	18%
Undergraduate	444.25	480.77	36.52	8%
Graduate	768.88	750.20	-18.68	-2%
Science Literacy	90.89	93.32	2.43	3%

(+18%), followed by undergraduate (+8%) and science literacy (+3%), followed by a decrease in graduate (-2%) education, due to add-ons in the FY 1992 budget that are not requested again in FY 1993.

Figure 6: FY 1993 Budget Request by Agency and Major Program Area and Figures 7 and 8: FY 1992-1993 Growth, show the President's FY 1993 request for CEHR programs in detail by agency, educational level and major program area. Complete budget matrices for FY 1993 (Figure 24) and FY 1992 (Figure 25) can be found in the Appendix.

Figure 5:
FY 1993 Request by Education Level

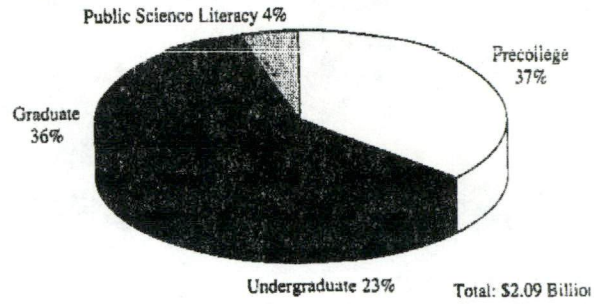


Figure 7:
FY 1992-1993 Growth by Agency (dollars in millions)

	FY 1992	FY 1993	Increase	% Increas
TOTAL	**$1954.74**	**$2,092.23**	**$137.50**	**7.03%**
USDA	20.36	22.65	2.29	11.26%
DOC	3.51	3.68	.18	4.99%
DOD	415.97	415.97	0.00	0.00%
ED	293.83	392.53	98.70	33.59%
DOE	108.56	113.21	4.65	4.28%
DHHS	411.94	416.45	4.51	1.09%
DOI	82.73	88.43	5.70	6.89%
SI	9.96	10.04	.08	0.84%
NSF	521.80	537.20	15.40	2.95%
NASA	77.79	82.27	4.48	5.76%
EPA	8.30	9.80	1.50	18.07%

CEHR FY 1993 Budget Request by Agency and Major Program Area

MAJOR CATEGORIES	Total Request	USDA	DOC	DOD	ED	DOE	HHS	DOI	SI	NSF	NASA	EPA
GRAND TOTAL	2092.23	22.65	3.68	415.97	392.53	113.21	416.45	88.43	10.04	537.20	82.27	9.80
Precollege Total	767.95	0.72		4.97	371.20	32.39	21.84	25.30	0.63	286.20	16.70	8.00
Teacher Preparation/Enhancement	436.51			0.63	286.50	16.84	5.19	2.00	0.33	114.80	7.92	2.30
Curriculum Development	91.58				2.70	4.51	2.54	6.90	0.22	67.70	5.00	2.01
Comprehensive/Organizational Reform	104.05				20.00	3.58	4.14			74.00	0.29	2.04
Student Incentives	68.08	0.72		4.34	20.00	6.55	9.97	14.71		11.00	0.58	0.21
Program Evaluation and Studies, and Dissemination	58.74				42.00	0.57		0.15	0.08	13.80	0.70	1.44
Other	8.99					0.34		1.54		4.90	2.22	
Undergraduate Total	480.77	13.50		176.20	21.00	56.87	25.00	8.72		146.30	32.38	0.80
Faculty Preparation/Enhancement	49.22					11.52	0.08	1.82		30.80	5.00	
Curriculum Development	97.71			38.90		3.22	0.16	1.03		52.90	1.50	
Comprehensive/Organizational Reform	90.44	13.50		6.80	6.00		22.52	0.43		28.80	12.39	
Student Incentives	190.05			100.50	15.00	25.05	2.24	5.33		28.80	12.33	0.80
Other, includes education technologies, program evaluation and dissemination	53.35			30.00		17.08		0.11		5.00	1.16	
Graduate Total	750.20	8.43	3.68	234.80		19.62	364.01	11.07	0.50	73.90	33.19	1.00
Predoctoral Fellowships	99.54		0.30	16.70		8.21	5.64	0.10	0.09	52.40	15.30	0.80
Predoctoral Traineeships	160.81	4.00		3.90		0.55	128.99	10.42		8.40	4.35	0.20
Postdoctoral Fellowships	98.70		3.38	10.50		6.43	51.23	0.55	0.41	13.10	13.10	
Postdoctoral Traineeships	155.62	4.43				0.50	150.69					
Other	235.53			203.70		3.93	27.46				0.44	
Public Science Literacy Total	93.32				0.33	4.34	5.60	43.34	8.91	30.80		
Education Programs for Decision Makers	5.10					0.35		3.35		1.40		
Media Dissemination	22.09					1.13	1.21	3.25		16.50		
Public/Community-Linked Dissemination	59.50					1.34	3.23	33.12	8.91	12.90		
Public Information Campaigns	6.33				0.33	1.42	0.96	3.62				
Public Science Literacy Evaluation	0.30					0.10	0.20					

Figure 6: FY 1993 Budget Request by Agency and Major Program Area

The President's FY 1993 Budget for:

RESEARCH AND DEVELOPMENT

A key to enhancing long-term economic growth in America is improving productivity, thus making possible improvements in America's standard of living. Investments in R&D are the key to innovation and productivity improvement.

The 1993 budget proposes to invest over $76 billion for research and development, including R&D facilities, an increase of nearly $2 billion or 3 percent. Within a budget which freezes domestic discretionary spending, **Federal civilian R&D would increase by 7 percent**. The total increase for R&D is affected by the fact that defense-related R&D would increase by only 1 percent. The budget proposes over $14 billion for basic research, an increase of over $1 billion or 8 percent. The budget also proposes over $17 billion for civilian applied research and development, an increase of over $1 billion or 6 percent.

Applied Research and Development:

- **High Performance Computing and Communications**. The budget proposes $803 million, an increase of $148 million or 23 percent for the second year of a successful program to move to a new generation of computers and computer networks. The President's sweeping high performance computing Initiative will help develop computing capability with roughly 1,000 times improvement over current systems by 1996 and communications systems 100 times faster than those currently in use.

- **Advanced Materials and Processing**. The budget proposes $1,821 million, an increase of 10 percent, for a new Presidential program intended to improve the manufacture and performance of materials. Advances in materials will enable improvements in a wide range of other technologies -- from aircraft, to computers, to automobiles.

- **Biotechnology Research**. The budget proposes $4,030 million, an increase of $271 million or 7 percent, for a new cross-cutting program involving 12 Federal agencies. Biotechnology will play a key role in enhancing the Nation's technological strength, economic growth, and health and quality of life of its people.

- **Advanced Manufacturing R&D**. The budget proposes a total of over $1 billion. This includes $321 million, an increase of 27 percent, for nondefense-related manufacturing R&D, including $105 million for an initiative at the National Science Foundation and $27 million for the National Institute of Standards and Technology.

- o The National Institute of Standards and Technology and the Advanced Technology Program. The budget proposes $311 million, a 26 percent increase, for NIST. In addition, the budget proposes $68 million for the Advanced Technology Program, an increase of 36 percent over 1992.

- o Energy Technology R&D. The budget proposes $914 million, an increase of $140 million or 18 percent for targeted high-payroll energy technologies. These investments, guided by the National Energy Strategy, will increase energy efficiency, and will lead to cost-effective alternatives to petroleum and to advances in new electricity technologies, including battery technology.

- o Fusion R&D. The budget proposes $360 million, an increase of $23 million or nearly 7 percent for the development of energy from nuclear fusion. This initiative maintains the U.S. commitment to the International Thermonuclear Experimental Reactor (ITER) engineering design.

- o Transportation R&D. The budget proposes $1,433 million, an increase of 17 percent, for transportation R&D. The Department of Transportation (DOT) will provide $498 million for R&D on aviation and high-speed rail projects, and the National Aeronautics and Space Administration (NASA) will provide $855 million for aeronautics R&D. In addition, NASA and DOD will together provide $260 million for technology development for the National Aerospace Plane (NASP) program.

- o Protecting the Public Health. The budget proposes $4.8 billion for applied research and development at the Department of Health and Human Services, an increase of $92 million, or 2 percent. The budget proposes a total of $10.6 billion for basic and applied research and development at the Department of Health and Human Services, including over $1.2 billion for research on Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome, and an 80 percent increase for the Women's Health Initiative.

- o Space Research and Technology. The budget proposes $305 million, an increase of 12 percent, for NASA space technology development. This increase will help create the new technology for future U.S. space missions.

Initiatives in Basic Research:

- o Doubling the National Science Foundation (NSF) Budget by 1994. The budget proposes an increase of 18 percent overall for NSF, including a 21 percent increase for basic research.

- o Increasing Support for Individual Investigators. The budget proposes nearly $8 billion, an increase of 9 percent, for individual investigators funded by the Departments of Health and Human Services and Energy, and the National Science

Foundation. Individual investigators are the backbone of the U.S. scientific and engineering enterprise -- and have been the source of many of America's most pioneering inventions and discoveries.

- o Human Genome Project. The budget proposes $175 million, an increase of $11 million, or 7 percent, in the Departments of Energy and Health and Human Services. The goal of the project is to analyze within 15 years the entire complement of human genetic material at the molecular level.

- o Superconducting Super Collider (SSC). The budget proposes $650 million, an increase of $166 million, for the SSC. This will support the continued prototype superconducting magnet development, and construction of support facilities and a test tunnel segment. The budget maintains the 10-year schedule approved last year. The total cost of slightly over $8 billion assumes one-third non-Federal contributions, including $233 million in 1993.

- o U.S. Global Change Research Program (USGCRP). The budget proposes $1,372 million, an overall increase of $262 million, or 24 percent. This Initiative is the most advanced program on global change research issues in the world. Understanding more fully the Earth's climate system will facilitate development of sound policies concerning issues such as ozone depletion and global warming.

- o Astronomy and Astrophysics. The budget proposes a total of $890 million, an increase of 6 percent for these programs, funded primarily by the National Science Foundation and the National Aeronautics and Space Administration. The budget proposals are consistent with the recommendations of a recent report of the National Research Council.

- o Agricultural National Research Initiative (NRI). The budget proposes $150 million, an increase of 53 percent. Six areas of research will be funded: natural resources and the environment; nutrition, food quality and health; plant systems (including mapping of plant genomes); animal systems; markets, trade, and policy; and processes antecedent to adding value and developing new products.

Maintaining National Security: Defense R&D. The budget proposes a total of $43 billion for R&D for national security activities, an increase of $438 million, or 1 percent over 1992. This amount includes $40 billion for R&D supported by the Department of Defense, and almost $3 billion for defense-related R&D supported by the Department of Energy.

Accelerating Technology Transfer. The budget projects a significant increase in the level of technology transfer activities, including almost 1,700 Cooperative Research and Development Agreements, an increase of 40 percent over the two

years since 1991; about 3,300 new invention disclosures; 1,500 patent applications; and almost 500 technology licenses awarded.

- **Expanding the Role of the National Laboratories**. The budget proposes that the National Laboratories play an increasing role in high priority areas of civilian applied research and development, and in helping to form R&D consortia and other collaborative R&D arrangements led by industry and universities.

Stimulating Private Sector R&D Investments. R&E Tax Credit: The budget proposes to make the Research and Experimentation tax credit permanent. Encouraging R&D by Multinational Companies: The budget proposes a 18-month extension in the rules for allocation of foreign and domestic expenditures for companies with foreign operations.

Expanding the Geographical Frontier: Space. The budget proposes about $15 billion for the National Aeronautics and Space Administration, an increase of 5 percent over 1992.

- **Space Station Freedom**. The budget proposes $2,250 million, an increase of 11 percent, for continued development. This will allow fabrication and testing of critical components in preparation for first element launch in 1996.

- **Improving Access to Space**. The budget proposes $5.4 billion, an increase of 2 percent, for civil space transportation, including the Space Shuttle, commercial expendable launch vehicle services, and other initiatives such as the SpaceHab module for microgravity research.

  -- New Launch System. NASA and the Department of Defense will propose $250 million for joint development of a new launch system to reduce the cost of access to space, improve reliability, increase operability and flexibility, and extend U.S. launch capability to heavier payloads.

- **Space Exploration**. The budget proposes a total of $586 million for programs leading to exploration of the Moon and the planets. Plans for 1993 include supporting ongoing planetary missions including the planned mission to Saturn, initiating two new robotic missions to explore the Moon, and advancing key technologies needed for future missions to the Moon and Mars.

Election Predictions

Q. Do you think Buchanan will be finished after Super Tuesday?

The President. I'm not making any predictions. That's the kinder side; I'm going to stay out of that. I'm going to just focus on what I think is best for this country and proclaiming, hey, 58/40, a lot different than I heard some of you guys talking about earlier last evening when, I admit, I was a little tense. Little tense, John [John Cochran, NBC News], with a couple of reports I heard there. But now, when the results are in, people are saying, across the country are saying, "You mean somebody is going to say that 58/40 is not a good victory? And you've got a lot of talking heads out there that don't agree with that, but let's see how they try that one on in Tennessee. I think they're going to say that's pretty good.

Q. Are the gloves off, Mr. Bush?

The President. No, no, the gloves are still on. Gloves are still on. Gloves are still on.

Q. ——running against an incumbent President?

The President. Do you remember the Reagan-Ford race?

Q. And what did Ford do in November?

The President. No, don't worry about November.

Note: The exchange began at 9:50 a.m. at McGhee-Tyson Airfield.

Remarks at a Signing Ceremony for a National Technology Initiative Agreement in Oak Ridge, Tennessee

February 19, 1992

Thank you for that welcome. Well, thank you so much. What a beautiful day in Tennessee. Thank you all. Let me just first start off by recognizing two who have been introduced, two members of my Cabinet, both should be familiar to you all. First, the Secretary of Energy Jim Watkins, who's doing an outstanding job not just in the field of energy but in education and so many other things, standing here next to me. And I heard that nice reception for the hometown kid—[*laughter*]—but we refer to him as the Secretary of Education, the distinguished former Governor Lamar Alexander. And you talk about a man who's doing a great job for his country.

I know that this is the district of a very distinguished Congresswoman, Marilyn Lloyd, who couldn't be with us. But I want to re-present three with whom I work very closely in the Congress, Congressmen Jimmy Quillen and Don Sundquist and Jimmy Duncan, who are also right down here on the end. And my thanks to Al Trivelpiece, the director of Oak Ridge, and to Joe Coors, who's been introduced, of Coors structural ceramics. He just handed me a ceramic putter. [*Laughter*] And he said if this fails, and it will, I'll use it as a hammer. [*Laughter*] You know what that's all about.

But this agreement today is one that I hope to see repeated across the Nation. This agreement, that I'm going to witness, combines in one place the resources of Government with the energy and inventiveness of private enterprise. And you're pointing our country toward the next American century.

In the old era, now ending, many of America's best scientists were engaged in winning the cold war. Well, the new era will free up those priceless talents to concentrate on the technologies of tomorrow, improving productivity and guaranteeing our long-term prosperity. We will transform the arsenal of democracy into the engine of economic growth. It's going to take the right kind of investments; the kind we've been making for 3 years. And our future economic competitiveness demands that we invest in an area in which we've always led the world, and I'm talking about something you all know a lot about, research and development.

Our challenge now is to put more of these incredible technologies to work for the America of this decade and beyond. And we've been busy sweeping away the obstacles that inhibit the transfer of technology from the Government over to the private enterprise sector. And 2 years ago, I signed a bill that allows private industry to take advantage of Government research. And there are 675 public-private agreements that are active today, 675.

And today, we witness another one. Coors ceramics company and the Oak Ridge National Lab are going to attack one of the obstacles to wider use of durable, efficient, and lightweight ceramic parts: machining ceramics without destroying their desirable qualities. Oak Ridge's high temperature materials lab, a world-class advanced materials testing facility, will be working with American industry to take the world lead in making precision ceramic parts. Ceramic parts will be vital to the longer lasting and more efficient engines of the future. And we're in a race with other nations for this multibillion dollar market, and we will get there first with the best products, thanks to the hard work of people right here, the imagination of these scientists.

And let me make this clear to the rest of the country, something that you all know, getting there first, in this regard, means jobs, American jobs. Now, Coors moved here 2 years ago precisely to take advantage of the expertise and high-tech facilities here at Oak Ridge. And that means 85 new jobs here because of this partnership. And this is just one of the 25 cooperative agreements at this lab alone.

One of the reasons I'm here is to help get the message out. Our national technology initiative, which Admiral Watkins is spearheading and helping us spearhead, is bringing Government officials together with private businesses to let them know what Government can offer in technology. We must move these developments out of the laboratory and into the marketplace, and create more American jobs. And that's what this is about.

I'm very, very pleased to be here with you all today. So, without further ado, I'll be pleased to witness the signing of the agreement. I believe that's going to take place. Here it is. Thank you all very much.

Note: The President spoke at 10:52 a.m. at the Oak Ridge National Laboratory. Alvin Trivelpiece, Director of the Laboratory, and Joe Coors, Jr., president and chairman of Coors Ceramics Co., signed the cooperative research and development agreement. .

Remarks to Community and Business Leaders in Knoxville, Tennessee

February 19, 1992

Thank you very, very much for that welcome. Please—thank you for such a warm welcome back. And thank you, Senator Baker, my esteemed friend, for that overly generous introduction.

May I extend my greetings to another longtime friend, Mayor Victor Ashe, who is doing a great job here in this community, and to thank all of the other Knoxville community leaders here today. And I'm not sure that that description includes the marvelous music we've had, but my thanks to those from the Vols over here who provided some upbeat sounds. And I also want to single out with great pride two Cabinet members who are with me here today: First, our Secretary of Energy, Jim Watkins, doing a superb job, with us over here, Jim; and then, of course, one that you all know so well, Lamar Alexander, our Secretary of Education.

You may know that Lamar, as part of his mission to promote lifetime learning, in keeping with one of our education goals, one is never too old to learn, convinced me to learn how to use a computer. It really paid off. I can now make typographical errors twice as fast as I used to on the typewriter.

And may I also single out three Members of the Tennessee congressional delegation, Jimmy Duncan, Jimmy Quillen, and Don Sundquist, all three doing a fantastic job for us in Washington. And a very heartfelt thanks, quick thanks, to the people at the Knoxville Chamber of Commerce who helped pull this magnificent event together, Larry Martin and Jack Hammontree and Susan Shay. And I'm pleased that John Waters of the TVA could join us here today.

I feel very much at home, and I'm delighted to be here. And Tennessee is a State with a special significance for me. After all, it's the Volunteer State. And during Operation Desert Storm you proved it all over again. So let me take this opportunity, thinking back a year just almost from this minute,

THE WHITE HOUSE

Office of the Press Secretary

EMBARGOED FOR RELEASE
AND WIRE TRANSMISSIONS
UNTIL 9:00 PM (EST)
TUESDAY, JANUARY 28, 1992

THE PRESIDENT'S STATE OF THE UNION ADDRESS

FACT SHEET

The President in his State of the Union Address spoke about America's unique place in the world and about his plans for restoring growth in America's economy. He challenged the Congress to pass his economic growth package by March 20.

Previously, the President had identified five tests for evaluating proposals for restoring economic growth:

- Does the proposal stimulate the investment necessary to create jobs?
- Does it bolster real estate values and increase home sales?
- Does it give Americans confidence they will be able to afford the cost of raising a family, including meeting their education and health care expenses?
- Does it increase America's capacity to compete in the global economy?
- Does it control wasteful government spending and work to reduce the Federal deficit?

The President's agenda meets these tests. In his State of the Union address, the President outlined three broad themes:

- Securing a New World Order;
- Getting the Economy Moving: The Short-Term Agenda; and
- Securing America's Future: The Longer-Term Agenda.

The following is a summary of the initiatives announced by the President.

In his 1993 budget, the President is proposing the largest increase for any Federal discretionary program for the Department of Education -- bringing it to a level 42 percent above FY 1989 discretionary spending.

C. Investing in Research, Development and Technological Innovation.

The President declared that "we must make common sense investments that will help us compete, long term, in the marketplace."

1. Encouraging Private Research and Development.

The President proposes to make permanent the current 20 percent research and experimentation credit and extend the current research and experimentation sourcing rules through December 31, 1993.

2. Increasing Federal Support for Emerging Technologies.

Investments in research and development form the foundation for the exploration of all of the new frontiers of today and tomorrow. The President's budget proposes $76.5 billion in research and development expenditures for 1993. This funding will support investments to expand the frontier of knowledge in such areas as biotechnology, materials science, and high performance computing.

D. Combatting Violent Crime.

The President's plan for building strong neighborhoods supports his serious, all-out assault on crime and drug abuse. He noted that violent crime "saps our strength and hurts our faith in our society, and in our future together."

The President called upon Congress to pass his comprehensive crime bill which, he said, is "tough on criminals and supportive of police." The proposed Comprehensive Violent Crime Control Act's key elements include:

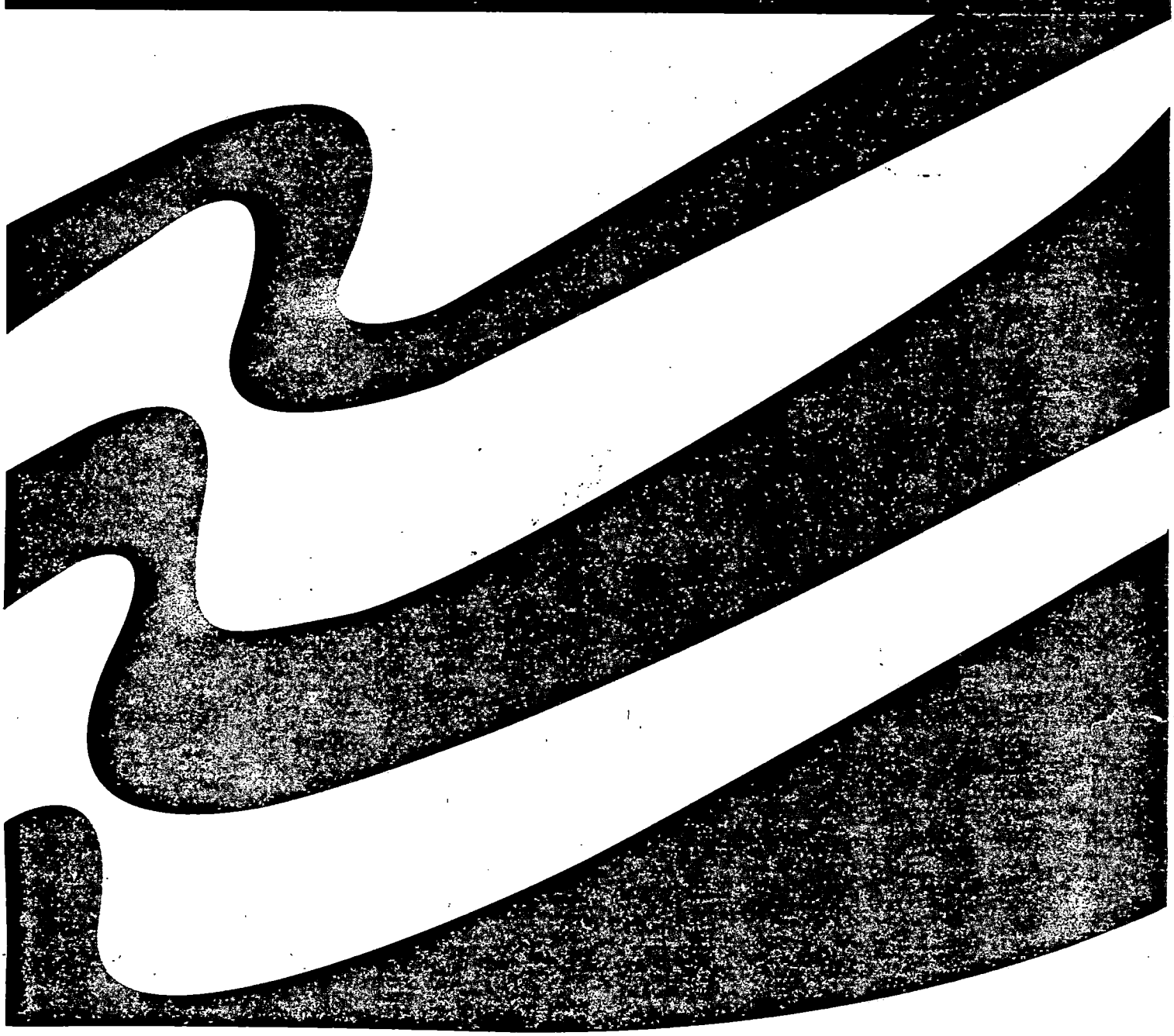
- An enforceable Federal death penalty;
- Reform of habeas corpus procedures;
- Reform of the exclusionary rule; and

BUDGET

OF THE

UNITED STATES GOVERNMENT

FISCAL YEAR 1993



resents the product of a multi-billion dollar investment made in the original research.

Access to the STI knowledge base maintained by Federal agencies has been considerable. Nearly 8 million items were disseminated in 1991 alone. Of those items, almost 6 million went to non-Federal users in the U.S. In addition, access through electronic databases continues to increase dramatically. Researchers gained access to references of over 81 million STI items during searches of on-line data bases provided by Federal agencies in 1991—over 10 million more than just three years earlier. Each item referenced in a search is a potential source of information which the researcher can either order directly from the Federal Government or, as is often done, simply obtain a copy from his or her company, university, or public library.

Advances in information system technology are rapidly changing the way in which STI is created, stored and disseminated. A world once firmly linked to paper and microfiche has been rapidly shifting to electronic formats. For example, two years ago the Federal Government had never disseminated any STI on CD ROMs, while in 1991 over 1,100 were disseminated. The infrastructure for electronic storage and dissemination of Federal STI will be critical to continuing and enhanced access by Federal and non-Federal users alike. The National Research and Education Network being funded through the High Performance Computing and Communications Initiative will be an essential part of the future STI infrastructure. With such a vast knowledge base being generated and managed by numerous Federal agencies, and with the rapid changes in technology, interagency coordination in STI is critically important. For this reason, the Administration has recently moved to reinvigorate interagency coordination of STI.

STIMULATING INCREASED PRIVATE SECTOR R&D INVESTMENTS

The budget proposes making permanent the research and experimentation tax credit and an 18-month extension of the tax rules governing the allocation of foreign and domestic R&D expenditures.

Industry is the largest supporter of R&D, providing slightly over 50 percent of the total national R&D investment. It also performs much of the R&D funded by the Federal Government. In total, over 70 percent of all R&D is performed by industry.

From the early 1960s through the mid-1980s, total real industrial R&D expenditures increased significantly, mostly in development. Since the mid-1980s, however, the rate of growth in industrial R&D spending has leveled off, dropping from a rate of more than 7 percent average annual percent real growth between 1980–1985 to less than 2 percent between 1985–1991. For 1992, the Industrial Research Institute forecasts that industrial investment in R&D is likely to experience no growth, and will decline as a percentage of revenues for the first time since the mid-1980s. However, this slowdown may be due to factors other than a simple reduction in funding for R&D. These factors could include greater efficiency in the private R&D process (embodied in a much greater use of concurrent design and engineering), and the shifting of private investment in R&D from products to process technologies.

The Federal Government can stimulate R&D in the private sector directly with increased government R&D spending. The Federal Government can also stimulate R&D in the private sector indirectly through tax incentives. The use of tax credits for R&D has been a net near-term revenue loser to the Treasury. It is anticipated, however, that in the longer-term these losses will be more than offset by the revenues from new products and processes resulting from the private investment stimulated by the credit. However, since only the short-term losses can be estimated (the long-term benefits are simply too diffuse), these incentives are essentially a form of increased Federal R&D spending in areas of greatest potential benefit to

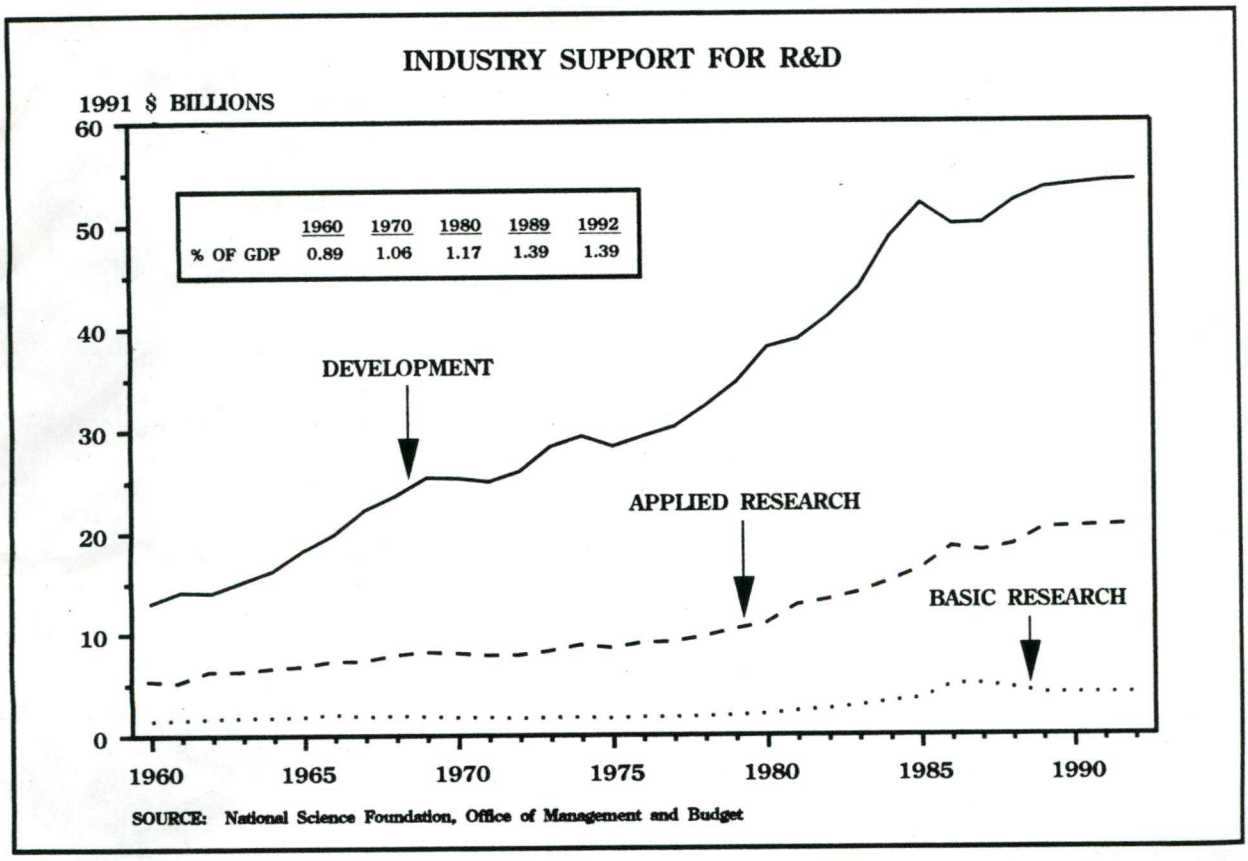
the economy as identified by the private sector.

Tax Credit and Allocation Rules

The Research and Experimentation (R&E) tax credit was originally adopted in 1981 to encourage increased private R&D spending. The credit was never made permanent, but was renewed in 1986, 1988, 1989, 1990, and 1991 (only until Spring, 1992) at a lower rate than originally granted.

Tax credits prior to 1989 reduced the cost of increments to R&D for most qualifying firms by about 6 to 9 percent. In 1989 the incentives provided by the credit were improved. The version of the credit enacted in 1989, and extended in the 1990 Omnibus Budget Reconciliation Act, reduces, for most qualifying firms, the cost of increments to R&D by 20 percent. Bailey and Lawrence have estimated that this version of the tax credit should increase corporate R&D spending in the 1990s by about 4 percent. Making the credit permanent would help reverse the recent trend toward leveling off of corporate R&D spending.

The budget proposes two changes in the tax code designed to provide additional incentives for industry to increase its investment in R&D. The budget proposes to make the 20 percent tax credit permanent. In addition, the budget proposes to extend for 18 months the rules, as extended in the Tax Extension Act of 1991, for the allocation of foreign and domestic R&D expenditures for companies with foreign operations. This proposal would apply to all tax years beginning after the current rules expire on June 30, 1992.



AAS

General Explanations
of the
President's Budget Proposals Affecting Receipts

Department of the Treasury
January 1992

EXTEND RESEARCH AND EXPERIMENTATION (R&E) TAX CREDIT

Current Law

Current law allows a 20 percent tax credit for a certain portion of a taxpayer's "qualified research expenses." The portion of qualified research expenses that is eligible for the credit is the increase in the current year's qualified research expenses over its base amount for that year. The base amount for the current year is computed by multiplying the taxpayer's "fixed-base percentage" by the average amount of the taxpayer's gross receipts for the 4 preceding years. A taxpayer's fixed-base percentage generally is the ratio of its total qualified research expenses for the 1984-88 period to its total gross receipts for this period. Special rules for start-up companies provide a fixed-base percentage of 3 percent. In no event will a taxpayer's fixed-base percentage exceed 16 percent. A taxpayer's base amount may not be less than 50 percent of its qualified research expenditures for the current year.

In general, qualified expenditures consist of (1) "in-house" expenditures for wages and supplies used in research; (2) 65 percent of amounts paid by the taxpayer for contract research conducted on the taxpayer's behalf; and (3) certain time-sharing costs for computers used in research. Restrictions further limit the credit to expenditures for research that is technological in nature and that will be useful in developing a new or improved business component. In addition, certain research is specifically excluded from the credit, including research performed outside the United States, research relating to style, taste, cosmetic, or seasonal design factors, research conducted after the beginning of commercial production, research in the social sciences, arts, or humanities, and research funded by persons other than the taxpayer.

The credit is available only for research expenditures paid or incurred in carrying on a trade or business of the taxpayer. A taxpayer is treated as meeting the trade or business requirement with respect to in-house research expenses if, at the time such in-house research expenses are incurred, the principal purpose of the taxpayer in making such expenditures is to use the results of the research in the active conduct of a future trade or business of the taxpayer or certain related taxpayers.

Current law also provides a separate 20 percent tax credit ("the university basic research credit") for corporate funding of basic research through grants to universities and other qualified organizations performing basic research. The university basic research credit is measured by the increase in spending from certain prior years. This basic research credit applies to the excess of (1) 100 percent of corporate cash expenditures (including grants or contributions) paid for university basic research over (2) the sum of a fixed research floor plus an amount reflecting any decrease in nonresearch giving to universities by the corporation as compared to such giving during a fixed based period (adjusted for inflation). A grant is tested first to see if it constitutes a basic research payment; if not, it may be tested as a qualified research expenditure under the general R&E credit.

The R&E credit is aggregated with certain other business credits and made subject to a limitation based on tax liability. The sum of these credits may reduce the first $25,000 of regular tax liability without limitation, but may offset only 75 percent of any additional tax liability. Taxpayers may carry credits not usable in the current year back 3 years and forward 15 years.

The amount of any deduction for research expenses is reduced by the amount of the tax credit taken for that year.

The R&E credit in the form described above is in effect for taxable years beginning after December 31, 1989. However, the credit will not apply to amounts paid or incurred after June 30, 1992.

Reasons for Change

The current law tax credit for research provides an incentive for technological innovation. Although the benefit to the country from such innovation is unquestioned, the market rewards to those who take the risk of research and experimentation may not be sufficient to support the level of research activity that is socially desirable. The credit is intended to reward those engaged in research and experimentation of unproven technologies.

The credit cannot induce additional R&E expenditures unless its future availability is known at the time businesses are planning R&E projects and projecting costs. R&E activity, by its nature, is long-term, and taxpayers should be able to plan their research activity knowing that the credit will be available when the research is actually undertaken. Thus, if the R&E credit is to have the intended incentive effect, it should be made permanent.

Proposal

The R&E credit would be made permanent.

Effects of Proposal

Stable tax laws that encourage research allow taxpayers to undertake research with greater assurance of the future tax consequences. A permanent R&E credit (including the university basic research credit) permits taxpayers to establish and expand research activities without fear that the tax incentive would not be available when the research is carried out.

Revenue Estimate

	Fiscal Years						
	1992	1993	1994	1995	1996	1997	1992-97
	(Billions of Dollars)						
Extend R&E credit:	-0.2	-0.8	-1.4	-1.6	-1.8	-2.1	-7.8

EXTEND RESEARCH AND EXPERIMENTAL (R&E) ALLOCATION RULES

Current Law

The tax credit allowed for payments of foreign tax is limited to the amount of U.S. tax otherwise payable on the taxpayer's income from foreign sources. The purpose of this limitation is to prevent the foreign tax credit from offsetting U.S. tax imposed on income from U.S. sources. Accordingly, a taxpayer claiming a foreign tax credit is required to determine whether income arises from U.S. or foreign sources and to allocate expenses between such U.S. and foreign source income.

Under the above limitation rules, an increase in the portion of a taxpayer's income determined to be from foreign sources will increase the allowable foreign tax credit. Therefore, taxpayers generally receive greater foreign tax credit benefits to the extent that their expenses are applied against U.S. source income rather than foreign source income.

Treasury regulations issued in 1977 described methods for allocating expenses between U.S. and foreign source income. Those regulations contained specific rules for the allocation of research and experimental (R&E) expenditures, which generally required a certain portion of R&E expense to be allocated to foreign source income. Absent such rules, a full allocation of R&E expense to U.S. source income would overstate foreign source income, thus allowing the foreign tax credit to apply against U.S. tax imposed on U.S. source income and thwarting the limitation on the foreign tax credit.

Since 1981 these R&E allocation regulations have been subject to seven different suspensions and temporary modifications by Congress. The Technical and Miscellaneous Revenue Act of 1988 (TAMRA) adopted allocation rules which were in effect for only 4 months. For 20 months following the period when the TAMRA rules were in effect, R&E allocation was controlled by the 1977 Treasury regulations. The Budget Reconciliation Act of 1989 subsequently reintroduced the TAMRA rules, once again on a temporary basis. These rules were extended to taxable years beginning on or before August 1, 1991 by the Omnibus Budget Reconciliation Act of 1990, and were further extended to the first 6 months of the first taxable year beginning on or after August 1, 1991 by the Tax Extension Act of 1991.

Under the R&E allocation rules enacted by TAMRA (and temporarily extended in 1989, 1990 and 1991), a taxpayer must allocate 64 percent of R&E expenses for research conducted in the United States to U.S. source income and 64 percent of foreign-performed R&E expenses to foreign source income. The remaining portion can be allocated on the basis of the taxpayer's gross sales or gross income. However, the amount allocated to foreign source income on the basis of gross income must be at least 30 percent of the amount allocated to foreign source income on the basis of gross sales.

Reasons for Change

The Administration believes providing tax incentives to increase the performance of U.S.-based research activities. The allocation rules in this proposal provide such an incentive. Although the proposal benefits only multinational corporations that are subject to the foreign tax credit limitation, it will provide an incentive with respect to such entities. By enhancing the return on R&E expenditures, the proposal encourages the growth of overall R&E activity as well as the location of such research within the United States.

Proposal

The proposal would provide an 18-month extension of the R&E allocation rules.

Effects of Proposal

The automatic allocation of 64 percent of U.S.-performed R&E to U.S. source income under the proposal generally permits a greater amount of income to be classified as foreign source than under the 1977 regulations. As discussed above, this will increase the benefits of the foreign tax credit for certain taxpayers.

The operation of these rules is best illustrated through an example. Assume that an unaffiliated U.S. taxpayer has $100 of expense from research performed in the United States, that 50 percent of relevant gross sales produces foreign source income, and that 30 percent of the taxpayer's gross income is from foreign sources. Subject to certain limitations not applicable to these facts, the 1977 regulations would have required the taxpayer to allocate at least $30 of R&E expense to foreign source income ($100 x 30% gross income from foreign sources).

Under the proposal $64 is automatically allocated to U.S. source income based on the place of performance ($100 x 64%). The remaining $36 may be allocated either on the basis of gross sales or on the basis of gross income (subject to the limitation described below). A gross sales apportionment of the remainder would result in $18 ($36 x 50%) being allocated to foreign source income, while a gross income apportionment would result in $10.80 ($36 x 30%) being allocated to foreign source income.

The amount allocated to foreign source income using the gross income method must be at least 30 percent of the amount so allocated using the gross sales method. That limitation will not affect the result here since the $10.80 apportioned to foreign source income under the gross income method is greater than $5.40 ($18 apportioned under gross sales x 30% limitation).

As a result of the allocation rules in the proposal, the taxpayer in this example would allocate $10.80 of U.S.-performed R&E expense to foreign source income, compared to the $30 required to be so allocated under the 1977 regulations.

Revenue Estimate

	Fiscal Years						
	1992	1993	1994	1995	1996	1997	1992-97
	(Billions of Dollars)						
Extend R&E allocations rules:	-0.2	-0.5	-0.3	0.0	0.0	0.0	-0.9

n describe our education goals. As a
any.

governors adopted six ambitious
2000 is a strategy to achieve them.

America's Education Goals

By the year 2000:

1. All children in America will start school ready to learn.

2. The high school graduation rate will increase to at least 90 percent.

3. American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.

4. U.S. students will be first in the world in science and mathematics achievement.

5. Every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

6. Every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning.

The four-part AMERICA 2000 Education Strategy will enable us to achieve these goals.

Appointment of Five Members of the Arctic Research Commission, and Designation of the Chairperson

February 26, 1985

The President today announced his intention to appoint the following individuals to be members of the Arctic Research Commission. These are new positions.

Oliver Leavitt, for a term of 4 years. Mr. Leavitt is currently first vice president of Arctic Slope Regional Corp. He is a graduate of the RCA Institute (1965). He is married, has two children, and resides in Barrow, AK. He was born October 11, 1943, in Barrow.

Elmer Edwin Rasmuson, for a term of 3 years. Mr. Rasmuson is currently director of the National Bank of Alaska. He graduated from Harvard University (S.B., 1930; M.A., 1935). He is married, has three children, and resides in Anchorage, AK. He was born February 15, 1909, in Yakutat, AK.

Juan Gualterio Roederer, for a term of 2 years. Mr. Roederer is currently director of the Geophysical Institute at the University of Alaska. He graduated from the University of Buenos Aires (Ph.D., 1952). He is married, has four children, and resides in Fairbanks, AK. He was born September 2, 1929, in Priest, Italy.

Albert Lincoln Washburn, for a term of 3 years. Mr. Washburn is currently professor emeritus of geology at the University of Washington, Quaternary Research Center, in Seattle, WA. He graduated from Dartmouth College (B.A., 1935) and Yale University (Ph.D., 1942). He is married, has three children, and resides in Mercer Island, WA. He was born June 15, 1911, in New York, NY.

James Herbert Zumberge, for a term of 4 years. Upon his appointment the President intends to designate him as the Chairperson. Mr. Zumberge is currently president of the University of Southern California. He graduated from the University of Minnesota (Ph.D., 1959). He is married, has four children, and resides in San Marino, CA. He was born December 27, 1923, in Minneapolis, MN.

Remarks at the Presentation Ceremony for the National Medal of Science

February 27, 1985

I'm delighted to welcome all of you here today. In a few minutes, it'll be my privilege to present the National Medal of Science to 19 Americans who have made outstanding contributions to our way of life and to our future.

Recently, I was told that all those scientists don't want it generally known, most enjoy their work so much that they almost feel guilty getting paid for it. [*Laughter*] I was told this either by Jay Keyworth, reminiscing about his previous job—[*laughter*]—or by Dave Stockman, reminiscing about his present one. [*Laughter*]

Well, we're not here to take up a collection. [*Laughter*] In fact, despite the constraints in Federal spending, our budget for the next fiscal year calls for a 6.7-percent increase for basic research in the physical sciences. I should add that we're also planning for increased funding for science and technology and basic research through the end of the decade, and that's because what you do is that important. The ultimate source of innovation, of new technology, of human progress itself, is knowledge; and that's the business of science.

Now, there's no nation on Earth that can match our scientific capability, but, of course, no nation depends as much as we do on the science base. Our enviable standard of living, our national security, our ability to create millions of new jobs—more than 7 million over the last 2 years, in what the Europeans are calling an American miracle—all depend on new talent, knowledge, and our talent for making use of it.

And there's no doubt that the measure of America's future safety, progress, and greatness depends on how well scientists keep pushing back new frontiers. That's why I'm so pleased that today's ceremony is the third White House event this month honoring the people whose work will determine that future.

Last week we presented the first National Technology Awards for exceptional achievements in developing and using technology for industrial advances. Technology last week; science this week. Isn't that just like the Government? Getting the cart before the horse. [*Laughter*]

Jay Keyworth tells me that there have been times, not too long ago, when scientists and technologists barely spoke to each other. Well, I believe that one of today's real strengths is the enthusiasm with which scientists and technologists explore each other's interests. In fact, it occurs to me that if we could have brought together last week's doers with today's thinkers in a single ceremony, we might have seen the formation of several new companies before—[*laughter*]—the medals were even presented. Maybe we should keep that in mind for next year and invite a few venture capitalists. [*Laughter*]

But at least this year, today is the day for the National Medal of Science. And I know Einstein once remarked that, "The whole of science is nothing more than a refinement of everyday thinking." Well, that was easy for him to say. [*Laughter*] As for me, I'm still trying to decide—or decode energy equals mass times the speed of light squared. And I must tell you that when I looked over the briefing materials for this event and saw phrases like "discovery of the free neutrino" and the "central role of neuropeptides" and "spectroscopic investigations," I thought they were mentioning some of the questions left over from [Attorney General] Ed Meese's confirmation hearings. [*Laughter*]

But today's awards honor a remarkable group of American scientists. The National Medals of Science are a tribute from your fellow—well, from a group of—why should I pause right here when it's right in front of me and all I have to do is look at it?—from your fellow scientists. I started to say just from your fellow Americans, but I think that would have been proper, too, because I'm sure they share our gratitude and appreciation for all you do.

Each of you has devoted your energies not to truth as understood, but to the search for truth not yet understood. You had faith that you'd come to understand the unknown, and you did. You had faith that your discoveries would bring progress, and they did. And because of your achievements and those of your colleagues, we stand on the verge of greater advances than mankind has ever known.

Your work is proof that there are no limits to discovery and human progress when men and women are free to follow their dreams. You've proven time and again that freedom plus science equals opportunity and progress and that America's future can be determined by our dreams and our visions.

On behalf of the American people in whose names these medals are presented, I extend my congratulations to all of you, to your families, and your coworkers. We deeply appreciate what you've done, and we thank you. And God bless you all.

And now I'm going to ask Jay Keyworth to help me present the medals.

Note: The President spoke at 11:29 a.m. in the East Room at the White House. In his remarks, the President referred to George A. Keyworth II, Science Adviser to the President and Director of the Office of Science and Technology Policy, and David A. Stockman, Director of the Office of Management and Budget.

Recipients of the medal were Howard L. Bachrach, Paul Berg, E. Margaret Burbidge, Maurice Goldhaber, Herman H. Goldstine, William R. Hewlett, Roald Hoffmann, Helmut E. Landsberg, George M. Low, Walter H. Munk, George C. Pimentel, Frederick Reines, Wendell L. Roelofs, Bruno B. Rossi, Berta Scharrer, J. Robert Schrieffer, Isadore M. Singer, John G. Trump, and Richard N. Zare.

Letter to the Speaker of the House of Representatives and the President Pro Tempore of the Senate on United States Military Action in the Persian Gulf
July 14, 1988

Dear Mr. Speaker: (Dear Mr. President:)

At approximately 11:30 a.m. (EDT), July 12, 1988, a Panamanian tanker (Japanese owned) sent out a distress call reporting it was under attack by two small boats and in need of assistance. Units of the U.S. Middle East Joint Task Force, responding to the ship's distress call, dispatched five U.S. helicopters to an area approximately 23 nautical miles west north west of Farsi Island in the Northern Persian Gulf. Two of the helicopters, while on their way to provide assitance, observed two small boats heading towards Farsi Island. As they closed to identify visually the boats, the boats fired at the U.S. helicopters. This hostile action posed an immediate and direct threat to the safety of the helicopters. Accordingly, acting in self-defense, the helicopters returned fire, firing rockets and machine gun rounds at the small boats, which then left the scene. At this time it is believed that one of the boats may have been hit with a rocket. The extent of damage to the boat is unknown. There were no casualties or damage to U.S. forces; the tanker caught fire as a result of the attack.

The actions of U.S. forces in response to being attacked by the Iranian small boats were taken in accordance with our inherent right of self-defense, as recognized in Article 51 of the United Nations Charter, and pursuant to my constitutional authority with respect to the conduct of foreign relations and as Commander in Chief. There has been no further hostile action by Iranian forces, and, although U.S. forces remain prepared to take additional defensive action to protect our units and military personnel, we regard this incident as closed.

Since March 1987, I and members of my Administration have provided to Congress letters, reports, briefings, and testimony in connection with developments in the Persian Gulf and the activities of the U.S. Armed Forces in the region. In accordance with my desire that Congress continue to be fully informed in this matter, I am providing this report consistent with the War Powers Resolution. I look forward to cooperating with Congress in the pursuit of our mutual, overriding aim of peace and stability in the Persian Gulf region.

Sincerely,

RONALD REAGAN

Note: Identical letters were sent to Jim Wright, Speaker of the House of Representatives, and John C. Stennis, President pro tempore of the Senate.

Remarks at the Presentation Ceremony for the National Medals of Science and Technology
July 15, 1988

Thank you very much, and Secretary Verity and Dr. Graham. And thank you all, and welcome to the White House. Please be seated. The awards we'll be presenting in just a few moments stand for our nation's scientific and technological progress.

And well, would you be surprised if I said that reminded me of a story? [*Laughter*] When you get to my age, you discover that quite a few things remind you of stories. My only fear is that I've told this so often that maybe I've told it to you already. Don't let me know if I have. [*Laughter*] It happens to be about one of my old bosses, Harry Warner, back in the days of silent pictures. A technician came up to Harry, very excit-

ed, and told him that there was a new breakthrough that had taken place that would make it possible to give soundtracks to motion pictures, and we'd have talking pictures. Harry Warner stood there for a moment and then said, "Who the heck wants to hear actors talk?" [*Laughter*]

But it's true that I have a special belief in American science and technology, because I've lived long enough to have witnessed breakthrough after breakthrough. I've seen the rise of the automobile. Indeed, I can remember my first ride in an automobile—before that it was horse and buggy. And the development of the modern media—radio, movies, and television—the advent of space travel—and now the computer and the microchip.

Indeed, I often reflect that it was not too long ago when sand was just the stuff beaches were made of. In fact, one of the lines in my old speeches said if we put the government in charge of sand, there'd be a shortage. [*Laughter*] And now the mind of man has given the silicon in sand virtually limitless value in the form of the microchip, a tiny invention that's transforming the world economy more dramatically than any event since the Industrial Revolution. And I haven't even mentioned the newest breakthrough: high-temperature superconductivity.

It's important to remember, too, that it's not just economic productivity that science and technology have improved, but the whole quality of human life. New fertilizers have been coupled with new types of grains, providing greater crop yields here at home and around the world. Medical science has produced advance after advance, combating disease, improving our overall health and extending the lifespan. Technology is adding a new dimension to education. Consider, for example, that it's now possible to put an entire encyclopedia on a disk that can be used on a home computer. Technology is even having a profound effect on my former field of entertainment, making available music and movies of all kinds in home entertainment centers. You are the men and women who are leading us into this new era of information and technology. You are the builders, the dreamers, the heroes.

Our administration has supported basic scientific research from the start. We're going forward with the funding of a superconducting supercollider. We're moving ahead on a permanently manned space station and a commercially developed space facility. We're funding crucial new research as part of our Strategic Defense Initiative, research that holds out the hope of putting peace on a firmer footing throughout the world. And our budget requests to Congress have contained billions of dollars each year for research and development—although I'm sorry to say that too often Congress has trimmed back those requests.

But I'm convinced that perhaps the most important action we've taken has involved knocking down the barriers to progress that government itself had erected. Our tax cuts, for example, have revitalized the entrepreneurial economy. Indeed, in recent years we've seen tens of billions of dollars devoted to venture capital, and tens of billions more in new public stock offerings. And during this economic expansion, hundreds of thousands of new businesses have been formed, many of them linked to specific new technologies. All of this represents the application of knowledge to human needs on a massive scale—not by government, but by committed individuals, acting in freedom.

You see, America's greatest resource is not the land, vast and beautiful though it is. It's not our climate, nor even our abundant natural resources. America's greatest resource is the genius of her people. And so to express our gratitude to you, but also to set an example for all the world and an example of what free men and women can accomplish, we honor you.

I can't help but tell you another little item out of my past. More than 20 years ago when I was Governor of California, and you will remember those, the rioting days on the campuses and all of that trouble, and one day I received a very arrogant demand from the student body presidents of the nine State universities of California demanding a meeting with me.

Well, I was delighted because if I tried to go to the campus to see them they'd start a riot. Well, they came in, barefooted, tee

shirts, most of the tee shirts torn—slouched into their seats in our Cabinet Room there at the State, and then the spokesman started in and he said, "Governor, it's impossible for you to understand your own children." He said, "Your generation didn't live at a time of instant electronics, of communication, of space travel, of journeys to the Moon and jets." And he went on listing all of these things. Usually you think of the answer after you're home and the meeting's over. But he talked just long enough that when he paused for breath I said, "You're absolutely right, we didn't have those things when we were growing up. We invented them." [*Laughter*]

Well, thank you all, God bless you. And now, we'll be presenting the awards.

Note: The President spoke at 11:34 a.m. in Room 450 of the Old Executive Office Building. In his opening remarks, he referred to William R. Graham, Science Advisor to the President and Secretary of Commerce C. William Verity, Jr.

Appointment of Tyrus W. Cobb as a Special Assistant to the President for National Security Affairs

July 15, 1988

The President today announced the appointment of Tyrus W. Cobb as Special Assistant to the President for National Security Affairs and Senior Director of International Programs and Technology Affairs for the National Security Council.

Mr. Cobb has served since 1983 as Director of Soviet, West European, and Canadian Affairs at the National Security Council. Prior to that Mr. Cobb was a permanent professor of international politics at the United States Military Academy at West Point. He currently holds the position of adjunct professor of international security affairs at Georgetown University. A Vietnam veteran, Mr. Cobb served initially with a combat unit and later was named as a member of the American delegation implementing the 1973 Paris peace accords.

Mr. Cobb received a Ph.D. from Georgetown University, an M.A. from Indiana University, and a B.A. from the University of Nevada. He is married to the former Suellen Small of Reno, NV. They have three children and reside in McLean, VA.

Appointment of Howard H. Baker, Jr., as a Member of the President's Foreign Intelligence Advisory Board

July 15, 1988

The President today announced his intention to appoint Howard H. Baker, Jr., to be a member of the President's Foreign Intelligence Advisory Board for a term of 2 years. He would succeed Albert D. Wheelon.

Senator Baker is currently associated with Baker, Worthington, Crossley, Stansberry, and Woolf in Huntsville, TN. Prior to this he was Chief of Staff to the President at the White House, 1987–1988. He was a United States Senator from Tennessee, 1966–1985, serving as minority leader, 1977–1981; and majority leader, 1981–1985.

Senator Baker graduated from the University of Tennessee (LL.B., 1949). He was born November 15, 1925, in Huntsville, TN. He served in the United States Navy from 1943 to 1946. He is married, has two children, and resides in Huntsville, TN.

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release September 16, 1991

REMARKS BY THE PRESIDENT
DURING PRESENTATION OF NATIONAL MEDAL OF SCIENCE
AND NATIONAL MEDAL OF TECHNOLOGY

The Rose Garden

10:30 A.M. EDT

THE PRESIDENT: Thank you. Please be seated, and let me welcome the dignitaries -- that's almost everybody. I don't know who is excluded, but -- (laughter) -- first, Secretary Mosbacher and Secretary Lujan here -- Bob over my shoulder -- Allan Bromley, my Science Advisor; Henson Moore, I believe is to be here, of Energy; and, of course, Rock Schnabel of Commerce; Walter Massey, the Director of the National Science Foundation. And then finally and perhaps most important today, our honorees and their friends and families. It's my pleasure to welcome all of you to this steamy Rose Garden. (Laughter.)

And with us today are five Nobel Laureates, leading engineers of the Informaton Age, authors of some of this century's world-changing discoveries and inventions. Men and women whose quantum leaps of learning compress generations of knowledge within a single lifetime of achievement. From the first moments of creation to the frontiers of the solar system and now, with Voyager, beyond: your knowledge spans the broad canvas of human endeavor.

Some of you are not only experts in your field, you invented your field. Your quests and questions produced new disciplines, new knowledge, new ways of looking at our world.

And today, your nation recognizes your monumental accomplishments, honors the differences you have made: advancing human understanding, improving the human condition, helping mankind conquer ignorance and illness, helping this nation compete and prosper.

Today's award winners range in age from the Pegasus Team -- a group of precocious 40-something scientists and one 37-year-old -- who designed and built the world's first private space rocket to Admiral Grace Hopper, born in 1906, who pioneered the revolution that put personal computers on the desks of millions of Americans -- and dragged even this President into the computer age. (Laughter.)

I was asked for a report. It's been almost six months since my first computer lesson, and I'm making progress. I make the same mistakes, but I do it five times faster. It's marvelous. (Laughter.)

The men and women we honor exemplify not simply the life of the mind, but the spirit of adventure and risk that accompanies the quest for advancement.

Take Stephen Bechtel, whose vision helped a city spring from the Saudi desert, helped turn the Arctic waters of James Bay into a source of energy for millions of North Americans, and who's now helping Kuwait rise up from the ashes of war.

Consider Colonel Stapp, John Paul Stapp, expert on the human impact of G-forces stress. When his experiments became too

dangerous to impose on others, Colonel Stapp became his own subject. And as a former Naval aviator, I can hardly believe he's withstood 40 Gs: That's the same as going from 632 miles per hour to a dead stop in 1.4 seconds. Colonel Stapp put himself on the line and made flying safer for everyone from passengers on commuter shuttles to the astronauts now orbiting the Earth on Discovery.

From the work of a single individual come benefits that can banish suffering and prolong life for many millions of people. Consider the career of Gertrude Elion, Nobel Prize-winning biochemist. Her life's work spans the quest to defeat Leukemia and Malaria to today's battle against AIDs and other immune system disorders.

Together, your efforts transformed our world. And yet, as a nation, our honor for all you've done falls short if we fail to sustain your forward march. This administration has proposed what progress demands: record funding levels for research and development, with funds channeled to the individual investigator and small research teams that so often redefine state-of-the-art. To advance technology, we've focused funds on the areas of energy and aeronautics, biotechnology and advanced materials, high performance computing and communications.

To advance science and engineering research, we've urged Congress to approve an 18-percent increase in funding for the National Science Foundation, keeping us on track with our commitment to double spending on that vital research arm by the year 1994. Our commitment to science and technology proves beyond doubt we will not shortchange the future.

In the words of Astronomer Edwin Powell Hubble: "Equipped with his five senses, man explores the universe around him, and calls the adventure science." Well, science and technology hold open the hope of infinite possibility -- of answers that eluded Einstein, of a new world free from fear and want. And that same shining future -- the new world of possibility -- exists within every child.

In the end, progress of enlightenment comes down to education, and what are we doing to cultivate the children sitting today in classrooms around the country -- the generation we'll ask to provide solutions to the challenges of a new century, answers to questions that haven't even yet been asked.

Unless we act immediately, the next generation may not be equipped to follow in your footsteps. All of you know our national education goals and the strategy that we call America 2000 -- our challenge to everyone with a stake in our schools to literally reinvent American education. Well, right now, in some studies of math and science aptitude, U.S. students rank dead last amongst the industrialized nations. And that one statistic alone should shake us out of our complacency and show us the scope of the challenge that we face.

If we're going to be first in the world in math and science by 2000, there's not a moment to waste. Because we're serious, next year's budget targets $661 million for precollege math and science education -- a one-year increase of 28 percent.

And today, I salute every one of you who has taken the time to share your wisdom in the classroom. I mentioned earlier that we have five Nobel laureates with us today. Let me recognize another medal-winner for a singular distinction: Elvin Kabat, who's had the satisfaction of seeing one of his students go on to win a Nobel.

We must preserve the vital connection between teaching and research. That's the idea behind the Commerce Department's

THE WHITE HOUSE

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Some of you are not only experts in your field, you invented your field. Your quests and questions produced new disciplines, new knowledge, new ways of looking at our world.

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Take Stephen Bechtel, whose vision helped a city spring from the Saudi desert, helped turn the Arctic waters of James Bay into a source of energy for millions of North Americans, and who's now helping Kuwait rise up from the ashes of war.

Consider Colonel Stapp, John Paul Stapp, expert on the human impact of G-forces stress. When his experiments became too

Technology Heroes Program -- to turn Medal of Technology winners into role models for our kids. And that's why, today, I am pleased to announce the establishment of the Presidential Faculty Fellows Program -- to provide 5-year grants totaling $500,000 to as many as each of 30 young faculty members each year. These grants will support young scholars in their path-breaking work in science and technology and their teaching in the classroom. Perhaps years from now, some of those Presidential Faculty Fellows will have their own day here in the Rose Garden.

In honoring each of you, this nation honors the boundless horizons of the human mind, the soaring spirit of inquiry, the special genius of the architects who fashion today's fantastic idea into tomorrow's usable tool. Your work stands as its own reward; so let me simply add your nation's thanks.

Once again, welcome to the White House. Congratulations on your well-deserved honors. Now, with the help of Dr. Massey and Secretary Mosbacher and Dr. Allan Bromley, we will present the awards.

Thank you all very much. (Applause.)

(The awards are presented.)

THE PRESIDENT: Well done to the presenter. I guess that concludes it, doesn't it?

Thank you all and, again, my congratulations. I think that concludes the ceremony. And the person that's in charge of the weather, please meet me inside. (Laughter.) Thank you all very much. (Applause.)

END 10:40 A.M. EDT

Other Independent Agencies—Continued

(In millions of dollars)

Account			1991 actual	1992 estimate	1993 estimate
Trust funds					
Gifts and donations (arts):					
Appropriation, permanent	503	BA	*	*	*
Outlays		O	*	*	*

National Endowment for the Humanities

Federal funds

Account			1991 actual	1992 estimate	1993 estimate
General and Special Funds:					
National endowment for the humanities: Grants and administration:					
Appropriation, current	503	BA	**170**	**176**	**187**
Spending authority from offsetting collections		BA	**1**	**1**	**1**
Outlays (gross)		O	153	178	180
National endowment for the humanities (gross)		BA	**171**	**177**	**188**
		O	153	178	180
Offsetting collections			−1	−1	−1
Total National endowment for the humanities (net)		BA	**170**	**176**	**187**
		O	152	177	179
Trust funds					
Gifts and donations (humanities):					
Appropriation, permanent	503	BA	*	*	*
Outlays		O	1	*	*

National Labor Relations Board

Federal funds

Account			1991 actual	1992 estimate	1993 estimate
General and Special Funds:					
Salaries and expenses:					
Appropriation, current	505	BA	**147**	**162**	**173**
Spending authority from offsetting collections		BA	*	*	
Outlays (gross)		O	143	163	173
Salaries and expenses (gross)		BA	**148**	**162**	**173**
		O	143	163	173
Offsetting collections			−*	−*	
Total Salaries and expenses (net)		BA	**147**	**162**	**173**
		O	143	162	173

National Mediation Board

Federal funds

Account			1991 actual	1992 estimate	1993 estimate
General and Special Funds:					
Salaries and expenses:					
Appropriation, current	505	BA	**7**	**7**	**8**
Outlays		O	6	6	7

National Science Foundation

Federal funds

Account			1991 actual	1992 estimate	1993 estimate
General and Special Funds:					
Research and related activities:					
Appropriation, current	251	BA	**1,694**	**1,874**	**2,212**
Spending authority from offsetting collections		BA	**77**	**100**	**100**
Outlays (gross)		O	1,657	1,802	2,099
Research and related activities (gross)		BA	**1,771**	**1,974**	**2,312**
		O	1,657	1,802	2,099
Offsetting collections			−77	−100	−100
Total Research and related activities (net)		BA	**1,694**	**1,874**	**2,212**
		O	1,580	1,702	1,999
Academic research facilities:					
Appropriation, current	251	BA	**20**		
Outlays		O	1	19	8
Academic research facilities and instrumentation:					
Appropriation, current	251	BA		**33**	**33**
Outlays		O		10	23
Salaries and expenses:					
Appropriation, current	251	BA	**101**	**109**	**135**
Spending authority from offsetting collections		BA	**1**		
Outlays (gross)		O	91	97	130
Salaries and expenses (gross)		BA	**102**	**109**	**135**
		O	91	97	130
Offsetting collections			−1		
Total Salaries and expenses (net)		BA	**101**	**109**	**135**
		O	91	97	130
Office of the Inspector General:					
Appropriation, current	251	BA	**3**	**4**	**4**
Outlays		O	2	4	4
U.S. Antarctic research activities:					
Appropriation, current	251	BA	**100**	**78**	**163**
Outlays		O	69	160	133
U.S. Antarctic logistical support activities:					
Appropriation, current	251	BA	**75**	**10**	
Outlays		O	127	11	10
Scientific activities overseas (special foreign currency program):					
Outlays	251	O	*		
Education and human resources:					
Appropriation, current	251	BA	**322**	**465**	**480**
Spending authority from offsetting collections		BA	**4**		
Outlays (gross)		O	196	310	408
Education and human resources (gross)		BA	**327**	**465**	**480**
		O	196	310	408
Offsetting collections			−4		
Total Education and human resources (net)		BA	**322**	**465**	**480**
		O	192	310	408
Critical technologies institute:					
Appropriation, current	251	BA		**2**	**1**
Spending authority from offsetting collections		BA		**5**	
Outlays (gross)		O		7	1
Critical technologies institute (gross)		BA		**7**	**1**
		O		7	1
Offsetting collections				−5	
Total Critical technologies institute (net)		BA		**2**	**1**
		O		2	1
Trust funds					
Donations:					
Appropriation, permanent	251	BA	**17**	**21**	**21**

Other Independent Agencies—Continued

(In millions of dollars)

Account		1991 actual	1992 estimate	1993 estimate
Outlays	O	19	20	21
Total Federal funds National Science Foundation	BA	2,316	2,574	3,027
	O	2,063	2,315	2,716
Total Trust funds National Science Foundation	BA	17	21	21
	O	19	20	21

National Transportation Safety Board

Federal funds

General and Special Funds:

Salaries and expenses:

Appropriation, current	407 BA	31	35	36
Outlays	O	29	36	36

Neighborhood Reinvestment Corporation

Federal funds

General and Special Funds:

Payment to the Neighborhood Reinvestment Corporation:

Appropriation, current	451 BA	26	32	28
Outlays	O	26	28	30
Outlays for grants to State and local governments	O	(26)	(28)	(30)

Nuclear Regulatory Commission

Federal funds

General and Special Funds:

Salaries and expenses:

Appropriation, current	276 BA	461	509	545
Spending authority from offsetting collections	BA	3	2	2
Outlays (gross)	O	436	497	536
Salaries and expenses (gross)	BA	464	511	547
	O	436	497	536
Offsetting collections		−3	−2	−2
Total Salaries and expenses (net)	BA	461	509	545
	O	433	495	534

Office of the Inspector General:

Appropriation, current	276 BA	4	4	5
Outlays	O	4	3	4

Summary

Federal funds:				
(As shown in detail above)	BA	465	512	550
	O	437	498	539
Deductions for offsetting receipts:				
Offsetting governmental receipts	276 BA/O	−439	−493	−529
Total Nuclear Regulatory Commission	BA	26	20	21
	O	−1	6	10

Nuclear Waste Technical Review Board

Federal funds

General and Special Funds:

Salaries and expenses:

Appropriation, current	271 BA	.....	3	2
Outlays	O	2	3	3

Occupational Safety and Health Review Commission

Federal funds

General and Special Funds:

Salaries and expenses:

Appropriation, current	554 BA	6	7	7
Outlays	O	6	7	7

Office of Government Ethics

Federal funds

General and Special Funds:

Salaries and expenses:

Appropriation, current	805 BA	4	6	6
Spending authority from offsetting collections	BA	*	*	*
Outlays (gross)	O	4	7	7
Salaries and expenses (gross)	BA	4	6	6
	O	4	6	7
Offsetting collections		−*	−*	−*
Total Salaries and expenses (net)	BA	4	6	6
	O	4	6	7

Office of Navajo and Hopi Indian Relocation

Federal funds

General and Special Funds:

Salaries and expenses:

Appropriation, current	808 BA	34	26	31
Outlays	O	27	30	28

Office of Special Counsel

Federal funds

General and Special Funds:

Salaries and expenses:

Appropriation, current	808 BA	7	8	8
Outlays	O	3	8	8

Office of the Nuclear Waste Negotiator

Federal funds

General and Special Funds:

Salaries and expenses:

Outlays	271 O	1	2	1

Panama Canal Commission

Federal funds

Public Enterprise Funds:

Panama Canal revolving fund:

Authority to borrow, permanent	403 BA	.....	14	.....
Spending authority from offsetting collections	BA	514	550	556
Outlays (gross)	O	502	519	544
Limitation on administrative expenses		(49)	(50)	(51)
Limitation on program level (obligations)		(456)	(471)	.....
Panama Canal revolving fund (gross)	BA	514	550	556
	O	502	519	544

U.S. FIRST Representatives

June 23, 1992

Dean Kamen DOB: 4/5/51	Founder, U.S. FIRST President, DEKA Research & Development
Raymond K. Price DOB: 5/6/23	Board Member, U.S. FIRST President, Economic Club of NY
Dr. Woodie Flowers DOB: 11/18/43	Advisory Board, U.S. FIRST Professor of Teaching Innovation MIT
Kent Hughes DOB: 2/23/41	Advisory Board, U.S. FIRST President, Council on Competitiveness
David Hartman DOB: 5/19/35	Advisory Board, U.S. FIRST President, Rodman-Downs
Miriam A. Dumaine DOB: 7/19/59	Director of Development, U.S. FIRST

(4)

CLINTON HIGH SCHOOL

80 Church Street
Clinton, Massachusetts
EDWARD J. PHILBIN, *Principal*

Telephone
(508) 365-4205
(508) 365-4208

TO: Mr. Peter Marshall, NYPRO

FROM: Mr. Leo R. Bachant, Clinton High School

DATE: May 19, 1992

RE: Information Requested for "SMILEE" Trip to Washington, D.C.

Attached is the personal data requested at the meeting of May 18th for the Clinton School personnel that will be making the trip to Washington. D.C. to meet with President Bush on Monday, June 22, 1992.

As other information becomes available to you with regard to departure time from NYPRO and Logan, itinerary for Washington, and estimated time of return to Clinton on the 22nd, I would appreciate receiving it so that I can distribute it to the personel within the School Department and to the parents of the students involved.

Thanks again.

Regards,

Leo R. Bachant, Assistant Principal
"SMILEE" Project High School Coordinator

LRB/sd

Withdrawal/Redaction Sheet
(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
02. Fax	Re: Clinton High School "Maize Craze" Contest Winners; contains personal information. (4 pp.)	06/12/92	P-6, (b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Speechwriting, White House Office of
Series: Speech File, Backup
Subseries:
WHORM Cat.:
File Location: Medals of Science and Technology 6/23/92

Date Closed: 12/1/2004	**OA/ID Number:** 07575
FOIA/SYS Case #:	
Re-review Case #: 2004-2265-S	
P-2/P-5 Review Case #:	
MR Case #:	**Appeal Case #:**
MR Disposition:	**Appeal Disposition:**
Disposition Date:	**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 advise 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.

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.
03. Fax	Re: List of Xerox Personnel / Wilson High School; contains personal information. (6 pp.)	06/12/92	P-6, (b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Speechwriting, White House Office of
Series: Speech File, Backup
Subseries:
WHORM Cat.:
File Location: Medals of Science and Technology 6/23/92

Date Closed: 12/1/2004	**OA/ID Number:** 07575
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U.S. FIRST

- Not 25 pieces.
- 13 pieces already have lost

220 * 13 207

Facsimile Message

Date of Transmission: 6/11/92

Message to: Bart Berry

Company: White House - Office of Public Liaison

Telecopier Number: 202-456 1647

Message from: Miriam Domaine

Number of Pages (including cover): 15

Comments:

Please call if anything is unclear!

BART <—

Sorry about the delay

Tom Gradia

74

Withdrawal/Redaction Sheet
(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01. List	Re: U.S. First Representatives; contains personal information. (1 pp.)	06/23/92	P-6, (b)(6)	

Collection:

Record Group: Bush Presidential Records
Office: Speechwriting, White House Office of
Series: Speech File, Backup
Subseries:
WHORM Cat.:
File Location: Medals of Science and Technology 6/23/92

Date Closed: 12/1/2004	**OA/ID Number:** 07575
FOIA/SYS Case #:	
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P-2/P-5 Review Case #:	
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MR Disposition:	**Appeal Disposition:**
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(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

(1)

U.S. FIRST

MEMO TO: Office of Public Liaison

ATTN: Jane Leonard
Bart Berry

FROM: Miriam Dumaine
U.S. FIRST

RE: List of attendees for June 23 ceremony

DATE: June 11, 1992

We are getting very excited about our visit on June 23! I have notified all who plan to attend of the date change and that we are to arrive no later than 1:00 p.m. at the east appointment gate. As I understand from Bart, the ceremony is to start at 1:30 p.m. and will last about one-half hour.

Just as a reminder, there will be two teams represented plus a few people from U.S. FIRST. Total in attendance for our group is 75, plus another 5 from Xerox public relations through the media office. Here's the breakdown:

U.S. FIRST	7
NYPRO, Inc./ Clinton High School	5 Students 3 School Administrators 2 Teachers 8 NYPRO engineers 4 NYPRO executives
XEROX/ Wilson High School	20 Students 2 Teachers 1 Principal 18 Engineers 4 Xerox Education/Science Consultants Program 1 Executive

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(2)

The NYPRO/ Clinton High School team from Clinton, Massachusetts was the overall national champion of FIRST Encounters "Maize Craze." NYPRO is an international plastic industrial component manufacturer.

The XEROX/ Wilson Magnet High School team from Rochester, New York received the U.S. FIRST Chairman's Award for a quality school partnership effort during the six weeks of the program. This was judged on a variety of criteria including videotapes of their teamwork in progress.

The attached lists from these two teams are pretty well detailed. The list below is of those attending from U.S. FIRST. Please let me know if there is any other information you need. We truly appreciate your kindness and consideration.

FAct sheet on US First Maize-craze

Memo to: White House visit participants

From: Miriam Dumaine

Re: Details and schedule

Date: May 12, 1992

Today, the Office of Public Liaison told us that our visit to the White House will take place in the Oval Office. I had told many of you earlier that according to the White House, this was a Rose Garden visit. Please be advised that until you walk in the door, I cannot be sure where the meeting will take place.

Schedule--May 18, 1992

Be at the East Appointment entrance no later than 10:45 a.m. This entrance is between the White House and the Treasury building. The visit itself is scheduled for 11:20 a.m. It will probably last 5 minutes.

Who else is going?

Attached is a list of attendees from the competition. Dr. Allan Bromley, whom many of you met, will attend from the Office of Science and Technology Policy.

What about media opportunities?

U.S. FIRST is coordinating with Christine Cummings at Xerox, and John Doherty, on behalf of NYPRO to send out a request for coverage and press release. Xerox Corporation has offered to send a two-person video crew to capture the event. I am working with the White House Media Office to get them the OK to attend.

U.S. FIRST

Mission Statement

What we want is to see the child in pursuit of knowledge, and not knowledge in pursuit of the child.
George Bernard Shaw

U.S. FIRST is an national alliance of business, education, and government intent on reversing the declining levels of student interest and performance in science and math. Right now, it is obvious that too many students are not buying the "products" the teachers are trying to sell. U.S. FIRST approaches the quest from a market driven, customer focused, perspective - instilling in students the desire to want to learn. The ultimate goal is to stimulate broad demand by leading young people to see science and math as fun, exciting, and rewarding.

The founders of U.S. FIRST have spent two years developing a series of marketing promotions, programs, and events to popularize science, math, and technology inside and outside of the classroom. This will be done through the use of games, contests, celebrities, contemporary mass media vehicles, hands on science tools, and imaginative teaching materials.

Marketing has become a sophisticated art form used to build awareness and create demand. The mass media has evolved into a powerful shaper of values and attitudes. Combined, the two forces create mass demand for new products seemingly overnight. They create instant celebrities, heroes, villains, and millionaires. They can not create scientists and engineers overnight, but they can help reverse the negative trends in a relatively short time span.

The programs U.S. FIRST has designed will link directly into the marketing and advertising efforts of major corporations and local businesses seeking to reach the same audience. The reach of our programs spans classrooms, shopping malls, fast food restaurants, radio, and television. To fill a void in contemporary role models and "heroes" that kids can emulate, U.S. FIRST will create a national Hall of Fame of Science and Technology comparable to baseball's Cooperstown. We will also create a professional and collegiate sport to showcase creative engineering talents in a fashion that America's culture can readily embrace.

U.S. FIRST is designed to serve a role analogous to the U.S. Olympic Committee. U.S. FIRST is an independent organization whose singular objective is to promote science and math literacy. Our goal is to put technical proficiency on equal footing to athletic prowess. Founding corporate members of U.S. FIRST include NYNEX, Raytheon, Digital Equipment, Merck, The Henley Group, Baxter, Chiat/Day/Mojo, The Hadley Group, and M&M/Mars. Individual supporters of U.S. FIRST extend from senior officials in the White House; to governors; congressmen; the executive board and membership of the National Science Teachers Association; board members of the national Council on Competitiveness; education leaders from such respected institutions as RPI, MIT, Cal Tech, and Duquesne University; to senior executives from companies like New England Telephone, Xerox, Occidental Petroleum, and Nutrasweet. The list grows daily, despite the fact we have not yet pursued a national roll-out of our message.

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The New York Times

NEW YORK, SATURDAY, FEBRUARY 15, 1992

Business Day

Contest Aims at Future Engineers

By GLENN RIFKIN

Special to The New York Times

MANCHESTER, N.H., Feb. 14 — The high school gymnasium is packed with screaming fans, but instead of a basketball game, the students are watching strange-looking robots with names like "Da Cat" and "the Devastater" maneuver through a big box filled with feed corn, trying to scoop up tennis balls.

At each robot's remote controls are high school students being coached by professional engineers and scientists from Motorola, Xerox, I.B.M. and 25 other companies and universities. For the last two months, the students and engineers have worked together designing and making the robots.

Effort to Break Barriers

Companies like A.T.& T., Boeing Delco Electronics, General Electric, Raytheon and Nynex and schools like M.I.T., Harvard and Dartmouth have provided teams of volunteer engineers and scientists to "adopt" a local high school class and design and build a remote-controlled mechanical vehicle to compete.

"The interaction between the corporations and the high schools is critical," Dr. Allan D. Bromley, President Bush's science adviser, said amid the din emanating from the gym. "Far too few kids ever get a chance to see what an engineer or scientist really does. This kind of event can break down those barriers."

The event, part of a national competition in creative engineering called the Maize Craze, is the first of four regional contests that will culminate in a national championship later this year. Though it is hardly the first national science competition, it is

Continued on Page 38

Michael Quan for The New York Times

At Memorial High School in Manchester, N.H., Nicole Weiner, right, and Scot Trudeau showed their satisfaction on Thursday when the robot they designed and built turned in a commendable performance. The initials on the robot's side stand for Worcester Polytechnic Institute, whose engineers guided and advised the two contestants.

A Contest That Aims at Future Engineers

Continued From First Business Page

unique in teaming high schoolers with high-powered engineering teams from big companies or universities.

"If big companies want our country to be successful and to have a source of educated workers for the future, they'll have to do this," said James J. Wynne, a physicist and program manager for local education outreach at the International Business Machines Corporation's Yorktown Heights Research Laboratory. "In Japan, engineers are heroes. Here, athletes are heroes. By creating a hands-on sports atmosphere around engineering, you have a chance of drawing youngsters to it."

For the Maize Craze, contest officials got in touch with the 28 sponsoring organizations in mid-December and gave them barely two months to find schools to sponsor, develop and design the robots and get to Manchester for the competition.

"I had no interest in engineering before this," said Nicole Weiner, a junior at Doherty Memorial High School in Worcester, Mass., whose team worked with engineers from Worcester Polytechnic Institute. "But now I'll definitely be considering that as a career."

The idea came about because of the efforts of Dean Kamen, a frenetic 40-year-old physicist, inventor and self-made millionaire who is obsessed with the relentless decline in America's science and math skills.

He approached Dr. Woodie Flowers, a professor of teaching innovation and mechanical engineering at the Massachusetts Institute of Technology, who designed the contest. He patterned it after M.I.T.'s 2.70 contest, a similar design competition where students are given bags of equipment that are to be used to accomplish a certain task.

Part of an effort to reverse the decline in U.S. science and math skills.

"We've designed the contest so that there is no right way to do it," Dr. Flowers said. "We wanted to have an ambivalence factor. The teams must ask themselves: 'Should I try to block the other machines? Should I just concentrate on offense or defense?' "

Aiming for Cultural Change

Mr. Kamen is convinced that a cultural change in attitude can be accomplished only by using the marketing prowess and muscle of America's top corporations.

"Every kid in this country knows who Ronald McDonald is, but not one of them could name the Nobel Prize winner in physics," Mr. Kamen said. "Clearly the hamburger stands know something we need to learn."

Mr. Kamen, who made millions by inventing an insulin infusion pump when he was in college, has spent the last four years putting his money where his mouth is.

He created USFirst, the United States Foundation for the Inspiration of Science and Technology, a Manchester-based nonprofit coalition of corporate executives, government officials and academicians. He calls it "the Olympic Committee of Smarts" and says its focus is "making kids go to bed thinking about superconductors, not the Super Bowl."

Ronald Campbell, senior vice president of strategy and architecture at the Xerox Corporation, sent out an electronic mail message one morning seeking volunteers and had a team by 4 P.M.

For the students, the commitment meant long bus rides to Xerox after school and early on Saturday mornings. "That was a sign of success for us," Mr. Campbell said. "We saw the excitement and enthusiasm they brought to the project."

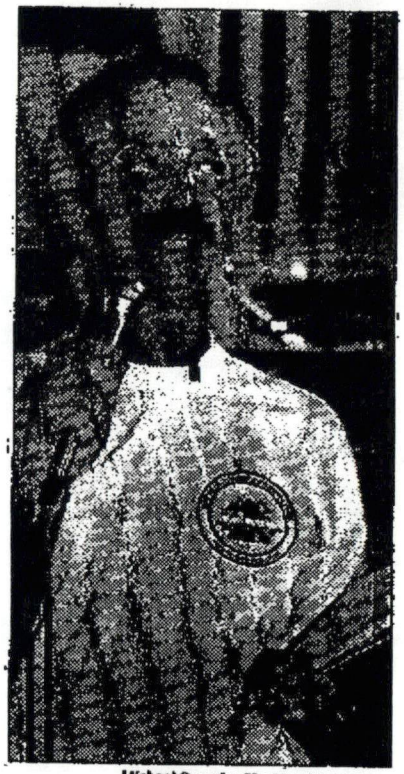
The rules were simple: each team built its robotic device from a kit consisting of $200 worth of electromechanical parts. The sponsoring companies were allowed to use any equipment or personnel to design and build the machines.

Interest From the White House

The concept is gaining credibility in the technology community. Preceding the final round today, a Maize Craze awards dinner here on Thursday night drew 1,200 contestants, teachers, engineers and corporate sponsors and was addressed by Dr. Bromley, the White House adviser. It was also attended by John H. Sununu, the former White House chief of staff; Roland W. Schmitt, the president of Rensselaer Polytechnic Institute, and Ray Price, the president of the Economic Club of New York.

President Bush stopped in on Wednesday night to endorse USFirst and invite the regional Maize Craze winner to the White House.

The winning team, chosen today, is from Clinton High School of Clinton, Mass., a small town west of Boston, which worked with Nypro Inc., a medical equipment maker in Clinton.



Michael Quan for The New York Times

Dr. Woodie Flowers, who designed the Maize Craze contest, acted as host for the competition round at Memorial High School this week in Manchester, N.H.

DESIGN NEWS
ENGINEERING NEWS

Engineering pros woo America's youth

Manchester, NH—The clock winds down on the final four and the crowd goes wild. Fans stamp their feet and roar as the winners trade high-fives and bear hugs.

It's not the NCAA. It's called the "Maize Craze," a design competition that brings teams of engineers together with teen-agers.

The object was trivial: Have small robots collect as many tennis balls as possible in 2 minutes. But the real goal of the event was to spur more interest among youngsters in technology.

Sponsored by U.S. FIRST (For Inspiration and Recognition of Science and Technology), the Maize Craze drew 28 universities and companies, along with their high-school design partners, to a Manchester gymnasium.

The contest was modeled on an MIT course that stresses the brainstorming, design tradeoffs, prototyping, and testing that make up the bulk of engineering work. Participants were given a large picnic cooler of miscellaneous parts and materials. From those parts, they had roughly six weeks to design and construct their tethered, ball-fetching robot.

While the companies could use any or all of their engineering staffs on the project, they had to include high-schoolers in the design process. A teenager might just contribute a winning design idea, since "young people don't know what can't be done," MIT Professor Woodie Flowers told the teams.

The two-day competition involved more than 100 participants and some two dozen referees, judges, and FIRST officials. A thousand or so spectators added to the excitement.

Twin 256-sq-ft arenas were set up to keep the action flowing. Each arena was covered in 2-inch-thick layers of feed corn (hence, the Maize Craze), and each sprouted 2-inch-dia PVC tubes from its center and corners. Competitors brought their creations to the arenas, connected them to power umbilicals trailing from the gym's ceiling, and the two-minute battles began.

Contestant machines could choose to capture high-point-value balls from atop the PVC tubes or scramble to collect one-point balls from the floor. Interfering with opposing machines was perfectly legal, and tugs of war and open-field tackles delighted the crowd.

Robots varied greatly in appearance and talents. Some were grabbers, others scoopers. Most combined the two. Since all captured balls had to be present in a team's home base at the end of a round in order to count, each round featured mad dashes home through the slippery corn.

The problems with traction were often the most discouraging. Caterpillar treads, narrow wheels, spiked wheels, even paddle wheels—every possibility was present.

Arranged around the gym's periphery, pit areas were noisy, crowded, and very friendly. One of the most impressive parts of the competition was the camaraderie of the teams as they shared tools, techniques, and opinions on each other's designs.

In the end, the Nypro, Inc./Clinton High School machine from Massachusetts won the contest. Its 12 high, narrow wheels feature tennis-ball-sized cutouts. The machine doesn't have to bother scooping up balls, it just rolls over them and traps them between the wheels in the cutouts. The balls seem to aid traction and the drivers don't have to coordinate as much as other designs to pick up ball after ball.

Apart from the competition, the engineers and young people attended a banquet where awards were given out for creativity, craftsmanship, best offensive and defensive plays team spirit, sportsmanship, and photogenicity.

At the banquet, engineer Dean Kamen explained why he started FIRST: "When I was a kid I just knew that America had the best scientists and engineers. When I retire, I want to be sure of the same thing."

Dr. Allan Bromley, the White House Science and Technology Adviser, also acknowledged the problems this country faces in attracting talented young people into the technical professions. In 1989, the nation's engineering colleges graduated 67,000, while such schools in far smaller Japan graduated 77,000. ⇒

Beautifully made *Delco/Kokomo High ball-scooping machine won the award for best craftsmanship and made the final four in the 'Maize Craze' competition.*

Companies supporting the FIRST contest showed what it takes to get young people involved in technology. Baxter Healthcare Corp. had partnered with Whitney Young High, an inner-city Chicago school. The company bused the students out to their facilities for design sessions and factory tours, on evenings and weekends, for weeks while working on their entry.

Dallas Christian High School, Mesquite, TX, working with E-Systems, Inc., got some 250 design suggestions from their students.

Delco Electronics Corp. seemingly brought the entire city of Kokomo, IN, into their design process. A videotape showed the mayor reading a proclamation, student-brainstorming sessions, pep rallies, and prototype machines going through their paces in school hallways. A project log book showed the progression of their design through student ideas, engineering studies, and prototypes.

A panel of judges, including former *Design News* Engineer of the Year Burt Rutan, Ray Price Jr., president of The Economic Club of New York, and Bill Aldridge, President of the National Science Teachers Association, considered all of the teams. After debating until two in the morning, they chose Xerox Corp. and the Joseph C. Wilson Magnet School of Rochester, NY, as the winner of the Chairman's Award for Best in Class. This award was given to the team that met the true spirit of the competition: turning kids on to engineering.

Xerox constructed a design and engineering studio out of an abandoned house for the students' use. Science classes were involved, of course, but English classes wrote fight songs and art classes designed the team's logo. A videotape showed students working with a Xerox CAD operator and watching a master machinist turn their ideas into reality.

The judges liked those images. Rutan, president of Scaled Composites, Inc., Mojave, CA, said: "The best collaborations showed kids how far their imaginations and self-discipline could take them."

How did the students feel about the experience? One Manchester teen-ager whose machine didn't do so well, didn't know if engineering was for him, but added: "I really loved doing this. I'll think about it." That's what the FIRST competition is all about. □

—Terrence Lynch,
Northeast Technical Editor

(*Lynch also served as a judge in the competition.*)

The Union Leader

MANCHESTER, N.H. — SATURDAY, FEBRUARY 15, 1992

Clinton (High) Will Be Going to White House

By JOHN CLAYTON
Union Leader Staff

Regardless of the outcome of Tuesday's Presidential primary, it looks as if Clinton's going to the White House.

Not Bill Clinton. Clinton High School.

Students from the central Massachusetts community were booking passage to Washington for an audience with the President after capturing first place in the "Maize Craze," an innovative, national engineering competition held yesterday at Memorial High School.

The contest, sponsored by U.S. FIRST, matched top design engineers from the nation's leading businesses and universities with high school students from around the country, and the result was a rip-roaring, two-day foray into gladiator-style scientific competition.

In the elimination-style format, each of the 28 teams was given a kit filled with a bizarre array of pre-selected materials and given six weeks to assemble a remote-controlled robotic creature that could venture about a 16-foot-by-16-foot playing surface for the express purpose of retrieving tennis balls.

To complicate matters, however, the playing field was covered with two inches of loose, coarse seed corn (hence the name "Maize Craze"); four machines took part simultaneously; and high school students had to control the machines in two-minute heats.

Sounds bland in theory, but in reality, the atmosphere was as electrified as the competing machines, like the "NY-alator," the winning unit assembled by the Clinton kids and engineers from NYPRO Inc., a Massachusetts-based manufacturer of plastic industrial components.

With a gymnasium full of students cheering their every move, the teams that survived Thursday's preliminary rounds started the march yesterday to The Final Four, an athletic metaphor that was not out of place in this academic contest.

"If we don't change the way we think about science in this country, we'll still be a very competitive nation, but only in football and basketball," said U.S. FIRST founder Dean Kamen. "We need to show our kids that creative engineering can be as fun, as exciting and as rewarding as sports."

Fun? Like when Central High physics teacher Sue Krolikowski leaped in the air at the success of "The Little Green Machine," a joint creation of her students, GE Aircraft and New Hampshire Technical College in Manchester?

Exciting? Like the look of exhilaration on the face of Memorial High's Jay Comire as the Crusader-Raytheon entry — dubbed "Terminator III" — moved into the last elimination frame?

Rewarding? Like the pride reflected by the West High-Manchester Kiwanis team at receiving the "Best Defensive Maneuver" at Thursday's awards banquet?

All of those elements came into play shortly before noon yesterday, as The Final Four took the field. The entries included Delco Electronics-Kokomo (Indiana) High; Motorola Inc.-Wheeling (Illinois) High; Worcester Polytechnic Institute-Doherty (Mass.) High and the NYPRO-Clinton High team.

The first team to capture two of the two-minute heats would claim the championship, and it didn't take long for the "NY-alator" to live up to its name. With Clinton students Jon Payne and Hugo Medeiros manning the controls, their machine was cleaning house, and when a last-ditch blocking effort by Delco and Motorola fell short, the title went to Clinton.

There were no losers, however, as Kamen was quick to point out.

"This didn't just meet our expectations, it exceeded them by the widest margin imaginable," said Kamen, "and the attention it has generated can only help us in our goal to be analogous to the U.S. Olympic Committee, only we want to promote science and math literacy.

"In the future, we think companies will be competing to sponsor teams here just like they compete to sponsor athletic teams, and based on our success here today, we think it will grow exponentially."

While the NYPRO-Clinton team captured the overall title, the team of Xerox and the Joseph C. Wilson Magnet School from Rochester, N.Y., won the Chairman's Award for the best involvement between school and sponsor.

Other awards were presented in the following categories: Most Creative Design: NYPRO-Clinton; Best Offensive Round: WPI-Doherty; Best Defensive Maneuver: Kiwanis-Manchester West; Most Photogenic: Advanced Animation-Rochester (Vermont) High; Best Sportsmanship: Motorola-Wheeling; Best Team Spirit: Xerox-Wilson; Play of the Day: NH Technical College-Central; and The Ultimate Keeper: Delco-Kokomo.

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WEDNESDAY, JANUARY 22, 1992 ■ WORCESTER, MASSACHUSETTS

This doubles team will serve robots

By George Snell
Staff Reporter

CLINTON — Tennis balls.

The most important goal in the project, which involves scientists and engineers from Nypro Inc. and students and faculty from Clinton High School, is the ability to gather tennis balls.

After all, that's how you win.

"We're going to put Clinton on the map," vowed Paul C. Jensen, corporate director of training and development at Nypro.

Today's Focus

Jensen will have his chance Feb. 13 and 14 when 40 businesses and universities from across the country will compete in Manchester, N.H., in U.S. First's "Maize Craze."

The contest teams each organization with an adopted high school science class. Together the scien-

Turn to CLINTON /Page A5

Clinton students join robot project

Continued From Page One

tists and students will design, build and test a robotic vehicle using a standard kit of materials supplied by U.S. First. The teams will then compete against one another, four at a time on a specially designed arena. The vehicle that collects the most tennis balls in two minutes is the winner. The contest is called "Maize Craze" because the surface of the arena is covered with an inch of corn.

"This is technology in action," Jensen said yesterday. "This is not a science fair. We have to develop a robot that can collect tennis balls, defend itself against other robots and move along a surface of corn. We want scientists and students to interact with each other. We want the students to look at the scientists and engineers as role models."

That is the goal of U.S. First. Eric C. Yantz, Northeast account manager for Nypro, said the New Hampshire-based organization is a national alliance of business, education and government, focused on reversing a high school trend of declining interest in science and math.

"The ultimate goal is to let kids see firsthand that science and technology is fun and exciting," Yantz said.

He said a team of eight Nypro scientists and engineers has been meeting twice a week since the beginning of January with a group of high school students and faculty.

"It's amazing to watch these people all sitting at the same table, discussing how to build and operate a robot. I don't know who's more into it — the scientists or the kids," he said.

Peter Marshall, a Nypro vice president, said the competition uses the marketing and excitement of a sporting event to attract students.

"Our society eulogizes pro athletes," Marshall said. "Joe Montana can throw a football and Michael Jordan can shoot hoops. We should play up the lives of Nobel prize winners just like we do pro athletes."

Leo R. Bachant, assistant principal at Clinton High School, said Nypro approached the school about the project between Christmas and New Year's.

"I said yes and got itchy about the possibilities right away," Bachant said. "We tried to open it up to as many students as we could."

He said a physics class headed by teacher Thomas O'Connell was chosen to work with Nypro, but an art class and a graphic-arts class are designing a logo for the robot.

"Super Bowl Sunday is coming up and a lot of people are interested. I know I am. To get an ad on TV during the game costs millions of dollars," Bachant said. "If these companies can do that, why not spend some money on a contest like this promoting science and technology?"

He said the contest, which will be held four days before the New Hampshire presidential primary, may attract some of the Democratic and Republican candidates.

"The more we can do to promote science the better," he said.

Other area teams include the Bose Corp. in Framingham, Digital Equipment Corp. in Maynard, Raytheon Co. in Lexington and Worcester Polytechnic Institute in Worcester.

The Union Leader

"THERE IS NOTHING SO POWERFUL AS TRUTH" — DANIEL WEBSTER

MANCHESTER, N.H. — SATURDAY, JANUARY 11, 1992

John Clayton/Union Leader

MANCHESTER Industrialist Dean Kamen shows some of the top engineers in the country an example of a solution to the challenge in the creative engineering championship to be held Feb. 13 and 14.

Queen City Is Site For 'Engineer's Super Bowl'

By JOHN CLAYTON
Union Leader Staff

It may have escaped your notice, but Manchester's collective IQ probably doubled last week.

More than two dozen of the nation's finest engineering minds — the Superstars of Technology — were in town to prepare for a competition that has been likened to the Super Bowl of engineering.

It's called "First Encounters," and organizers have billed it as a creative engineering championship to showcase science and technology for America's youth in a format they can best understand — competitive sport.

And in this competition, only the strong survive.

The contestants include engineers from 24 companies such as Digital, Chrysler, General Electric, Raytheon, Boeing, AT&T, Xerox and Hewlett-Packard, and universities such as Harvard, Yale, MIT and Rensselaer Polytechnic Institute.

Those engineers will work in concert with high school students and return to Manchester Feb. 13 for a two-day contest to deter-

FIRST CONTEST, Page 14

FIRST CONTEST

(Continued From Page One)

mine who will prevail in this diabolical engineering challenge.

While an eventual winner will emerge from the round-robin tournament, the FIRST emphasis is on student involvement. Thus, special award categories will recognize the most original design and the most attractive unit, but the most important award will go to the company that demonstrates the most novel form of generating student interest.

But first, a word about FIRST.

FIRST is an acronym — For Inspiration and Recognition of Science and Technology — and although the mission of this non-profit alliance of business, government and education can be simply stated, it will be difficult to achieve.

"We are dedicated to promoting science, math and technology as if our future depended on it," said Dr. Woodie Flowers, whose very name could inspire a student to take up the study of botany.

"More specifically, the purpose of this contest is to inspire student interest in, and draw mass media attention to, the wonderful world of science and technology," added Flowers, who is a professor of teaching innovation at the MIT School of Engineering.

It was Flowers who put the visiting engineers through an orientation program at the Granite Street Bar & Grill last week, and you could almost hear the wheels turning in their heads as they tried to grasp the complexities and the subleties of the challenge — just take a kit filled with preselected materials and assemble a remote-controlled machine that will retrieve tennis balls from a 16-by-16-foot playing field.

Only the field will be covered with two inches of seed corn.

And there will be three other machines on the field.

And high school students have to run the machine.

And there's a two-minute time limit.

That's simple enough, isn't it?

"I think it's safe to say this is not the soap box derby," said Flowers, "and we're not asking the engineers to look over the students' shoulders and teach them things. This is a full-bore professional design activity with students taking part, and the goal is not to teach, but to motivate."

Manchester industrialist Dean Kamen nodded in agreement.

"You represent high tech, and you have to wow the kids and bring them to where they understand and appreciate the challenges of engineering," he said. "They're supposed to come away thinking engineers have as much fun as ball players. We want them to know this is neat stuff."

It is neat stuff, and both Kamen and Flowers hope to reinforce that point when the completed machines are put to the test in the gymnasium at Memorial High School on Feb. 13 and 14, before a panel of judges that will include the President's science adviser, Dr. Allan Bromley.

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release May 15, 1992

The President has named fifteen scientists and fifteen engineers as the first recipients of the Presidential Faculty Fellow Awards. The Presidential Faculty Fellows (PFF) Program annually provides recognition and support for young faculty members who demonstrate excellence and promise both in scientific or engineering research and in teaching future generations of students to extend and apply human knowledge. Each award carries a grant from the National Science Foundation of $100,000 per year for five years.

The following individuals have been named as Presidential Faculty Fellows:

Chiye Aoki, of New York University, for work in neuroscience.

Morton A. Barlaz, of North Carolina State University, for work in mammalian cell engineering.

Wolfgang Wilhelm Bauer, of Michigan State University, for work in nuclear physics.

Gary Hirshon Bernstein, of the University of Notre Dame, Indiana, for work in ultrasmall electronic devices.

Shira Lynn Broschat, of Washington State University, for work in electrical engineering.

Carlos Castillo-Chavez, of Cornell University, New York, for work in ecology and applied mathematics.

David Ethan Culler, of the University of California, Berkeley, for work in computer engineering.

Aaron Maxwell Ellison, of Mount Holyoke College, Massachusetts, for work in marine environmental ecology.

Erich Carr Everbach, of Swarthmore College, Pennsylvania, for work in mechanical engineering.

Jose Fernando Escobar, of Indiana University, Bloomington, for work in mathematics.

Lance Jeremy Fortnow, of the University of Chicago, for work in computer science.

Susan Adlai Foster, of the University of Arkansas, for work in animal behavior.

Peyman Givi, of the State University of New York, Buffalo, for work in mechanical engineering.

Louis Joseph Guido, of Yale University, Connecticut, for work in compound semiconductors.

Robert John Hamers, of the University of Wisconsin, Madison, for work in chemistry.

Lars Eric Hernquist, of the University of California, Santa Cruz, for work in astronomy and astrophysics.

Chris Johnson Jacobsen, of the State University of New York, Stony Brook, for work in x-ray optics and bioengineering.

James Takuro Kadonaga, of the University of California, San Diego, for work in genetics and biochemistry.

Louise Helen Kellogg, of the University of California, Davis, for work in geophysics.

Mark Edward Law, of the University of Florida, for work in computer engineering.

Mary Lorette Lowe, of Loyola College in Maryland, for work in condensed matter physics.

Emir Jose Macari-Pasqualino, of the University of Puerto Rico, for work in civil engineering and geomechanics.

John Cary Mitani, of the University of Michigan, for work in anthropology.

Gerard Francis Ralph Parkin, of Columbia University, New York, for work in inorganic chemistry and biochemistry.

Theodore S. Rappaport, of Virginia Polytechnic Institute and State University, for work in computer engineering.

Rebecca Rae Richards-Kortum, of the University of Texas, Austin, for work in bioengineering.

Athan James Shaka, of the University of California, Irvine, for work in physical chemistry.

David Tuckchow Yue, of Johns Hopkins University, Maryland, for work in biomedical engineering.

Lucy Marie Ziurys, of Arizona State University, for work in chemistry and astronomy.

David Zumbrunnen, of Clemson University, South Carolina, for work in mechanical engineering.

# # #

THE WHITE HOUSE

WASHINGTON

EXECUTIVE OFFICE OF THE PRESIDENT

18-Jun-1992 10:03am

TO: Gary J. Gershowitz

FROM: Elizabeth M. Hinchliffe
Office of Communications

SUBJECT: medals

Hi. Some new information we could use for the Medals speech:

1. Administration requests for funding for r&d;
2. What are we doing to keep on track with our commitment to double spending on National Science Foudnation research by 1994? (e.g. ask Congress to approve x% increase in funding, etc.)
3. Do U.S. students still rank dead last in industrialized nations in some math and science testing?
4. How much did we request in the budget for precollege math and science education -- and how much of an increase is this over last year, and since GB has been President?

Thanks.

Withdrawal/Redaction Sheet
(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
04. Memo	D. Allan Bromley to Kathy Super, re: The U.S. First Competition. (2 pp.)	05/07/92	P-5	

Collection:

Record Group: Bush Presidential Records
Office: Speechwriting, White House Office of
Series: Speech File, Backup
Subseries:
WHORM Cat.:
File Location: Medals of Science and Technology 6/23/92

Open on Expiration of PRA
(Document Follows)
By AN (NLGB) on 4/5/2005

Date Closed: 12/1/2004	**OA/ID Number:** 07575
FOIA/SYS Case #:	
Re-review Case #: 2004-2265-S	
P-2/P-5 Review Case #:	
MR Case #:	**Appeal Case #:**
MR Disposition:	**Appeal Disposition:**
Disposition Date:	**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 advise 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.

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

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

THE WHITE HOUSE

WASHINGTON

May 7, 1992

MEMORANDUM FOR KATHY SUPER

FROM: **D. ALLAN BROMLEY** Allan

SUBJECT: **THE US FIRST COMPETITION**

Earlier this year the President appeared in New Hampshire at the opening of a competition, the so-called "maize craze" which was organized by an old friend of John Sununu's, Mr. Dean Kamen. Tom Ratchford and I from OSTP also attended, and I must say were enormously impressed by the level of cooperation that had been obtained between major corporations and high school groups in using standard electronic and mechanical parts provided in kit form to each group to come up with a mechanism that would pick up tennis balls from an area covered with shelled corn (hence "maize craze"). This may sound a little strange but it generated an enormous amount of school spirit, of good clean competition and, most importantly, gave a lot of high school kids from all over the country the opportunity to interact on a very close personal basis with some of the outstanding engineers in some of the major corporations in the area.

In his remarks to the group in its opening session, President Bush invited the winners to come to the White House and this was captured on TV and shown frequently throughout the event, so the President is very definitely on public record as having invited the winning team to the White House.

Kamen is continuing his work and for next year has lined up companies all across the United States and will be running regional competitions. Quite frankly he is the only person that I have encountered in this whole education field who has actually made things like this happen, who has liberated private sector support, and who has created an enormous amount of enthusiasm that will unquestionably bring young people into science and technology when they finish high school, something that the Nation badly needs.

Recently, Kamen called someone at the White House to arrange for the visit of the winners of the US FIRST "maize craze" competition to the White House. From subsequent telephone conversations with him I gather that he got off on the wrong foot as henot infrequently does, reflecting tremendous enthusiasm, fast talking, and the like. I would emphasize that he is vastly saner than he appears at first exposure and really is of near genius status.

In any event, the winning school is the Clinton High School, not a particularly fortunate name at the present moment, but that is what emerged, and so they clearly should be invited to come to the White House. There are roughly six members in the team, I believe, and it would be, in my opinion, appropriate to invite Dean Kamen, the organizer of this whole venture as well as the faculty sponsor of the entire activity, a professor at MIT.

Beyond that, what Dean Kamen suggested to whomever he talked was that the corporate group that had far exceeded all others in terms of the amount of effort that they put into working with the high school kids was the Xerox Corporation. Xerox worked with the Wilson Magnet High School in Rochester, New York and, because of this, Xerox won the so-called Chairman's Award which is the most prestigious in this particular competition. They are now arguing that representatives from the Xerox engineering group that worked with the Wilson School kids and the Wilson School team itself, should also be invited to the White House.

I hate to bother you with this sort of nonsense but the publicity associated with this event was very large and will continue to grow in the years ahead. This is something that clearly is important to the President in his role as the Education President.

I am enclosing herewith the letter from Ronald B. Campbell of Xerox making his case and I would recommend that, if at all possible, we arrange to invite the Wilson team, the Clinton team, together with two or three of the sponsoring engineers in each case, as well as Den Kamen and the MIT professor whom I believe is called Woodley, for a total somewhere around 20. All that would be required would be a photo op of this group with the President to 2take care of the commitment that he made when he was in New Hampshire.

Enclosure

Joseph C. Wilson Center for Technology
Bldg. 105-61C
800 Phillips Road
Webster, New York 14580
(716) 422-6917

April 30, 1992

Dr. D. Allan Bromley
Science Advisor to the President
The White House
356 Old Executive Building
Office of Science and Technology Policy
Washington, DC 20500

Dear Allan,

Xerox has a problem with the invitation of a subset of our team to the White House award ceremony, and I would like to ask your help.

At Xerox, in our quest for quality, we have emphasized building empowered teams. For the "Maize Craze" competition, we decided at the beginning to build a true partnership with the Wilson High School students so that they could learn about engineering by participating actively, instead of merely observing. Receiving the Chairman's Award for superior partnership demonstrates our success. Moreover, we have had a partnership with the Rochester School system for some twenty-four years now, the Science Consultants Program. This partnership was the basis for our successful participation in the competition.

To send only a portion of the team to Washington concerns the Xerox-Wilson team and all of its sponsors because it indicates a possible lack of understanding of how empowered teams work and what their benefits are. Personally, I believe that this kind of understanding is essential to the competitive success of our country because of the demonstrable productivity accomplishments of empowered teams. In our partnership with Wilson High School, the team was a self-managing and self-guided team. An extraordinarily strong sense of teamwork resulted, and the team was far more productive than ordinary groups. We were iterating electro-mechanical designs in one week.

The Xerox-Wilson team would like to be recognized, not just as having won a major award at the competition, but as a model of how industry and schools can work together to improve education in technical areas. If it could be possible for the whole team to come to the White House, I believe we all could communicate effectively a very powerful and successful way to improve education in our country. I have attached a possible statement to this effect.

I will plan to call to discuss with you. Thank you for your attention.

Ronald B. Campbell, Jr., Vice President
Technology Management

Attachment
c: Mr. Dean Kamen
Mr. David Kearns

National Quality Award 1989 Winner

Proposed Statement on

Xerox / Joseph C. Wilson Magnet High School Partnership

"Twenty-four years ago, Xerox initiated in a partnership with the Rochester City School District that has evolved into a significant model for others to emulate. Every week, Xerox scientists and engineers bring to the classroom the excitement and challenge of science and engineering. The Xerox Science Consultant program which engages elementary and middle school students with employees, teachers and parents, has become a benchmark in educational initiatives.

Building on this infrastructure, a team of 20 Xerox engineers and 20 Joseph C. Wilson Magnet High School students from Rochester, NY, won the U.S. FIRST "Chairman's Award" for superior partnership. I am delighted to recognize the accomplishments of this team for demonstrating the productivity of teamwork and in setting new standards for leading high school students to appreciate engineering as fun, exciting and rewarding."

THE ECONOMIC CLUB OF NEW YORK

EMPIRE STATE BUILDING · SUITE 4910 · NEW YORK, NY 10118 · (212) 947-7738/FAX (212) 947-7118 FOUNDED 1907

Raymond K. Price, Jr./President

May 14, 1992

Memo for: Jane Leonard
From: Ray Price

Subj: U.S. FIRST event

I'm sorry I missed your call last night and didn't get back to you this morning. I was at home most of the morning, and through a mix-up didn't get the message until I arrived at the office shortly before noon, when you were unavailable. But Dean did call me immediately after hearing from you, and I'm delighted at the way you worked things out. Many thanks.

Dean did indicate that you wanted some ideas, suggested remarks or something like that from me. I'll be glad to try to supply whatever you'd like -- or, as I did in the case of the Manchester event, just to plug in directly with whoever on the writing staff is going to get the assignment. Since I used to run that staff, I do speak the writer's language and have a reasonably good understanding of his or her needs. Just let me know what you'd like me to do.

I was a little hard to reach yesterday because that was when I had 2,600 people (including Dean) coming to lunch with Mikhail Gorbachev.

All best,

Ray

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 1

To JANE LEONARD	From RAY PRICE
Co.	Co.
Dept.	Phone #
Fax #	Fax #

6/16 4pm

TO: GARY
FROM: JANE

X

VISIT OF THE PRESIDENT AND MRS. BUSH

TO

NEW HAMPSHIRE

FEBRUARY 12, 1992

EVENT: Remarks to "U.S. FIRST" Sponsors

DATE: Wednesday, February 12, 1992

TIME: 5:35 pm - 5:52 pm

LOCATION: Science Demonstration Room, Technology Center, Manchester, New Hampshire

ATTENDEES: 75

PRESS: Open

SCENARIO: THE PRESIDENT arrives Gateway Technology Center and met by: Mr. Dean Kamen, President of DEKA Research and Development Corporation; Dr. Roland Schmidtt, President, Rensselaer Polytechnic Institute; Mr. Jerry Fisher, Vice President, Baxter Health Care, Inc.; and Mr. Ray Price, President, Economic Club of New York. Following the Greetings, THE PRESIDENT proceeds to U.S. Science Demonstration Room. THE PRESIDENT arrives US FIRST Science Demonstration Room and is met by: Mr. Richard Osborne, President, U.S. FIRST; Dr. Richard Propper, Advanced Medical, Inc.; and Mr. Herbert Stebbins, Chairman, Greater Manchester Development Corporation. Following the Greetings, THE PRESIDENT begins viewing Static Display. THE PRESIDENT concludes viewing of Static Display and proceeds to Toast Lectern. THE PRESIDENT gives Brief Remarks. THE PRESIDENT concludes Brief Remarks and begins participation in Science Demonstration (NOTE: THE PRESIDENT will view a high school student operating a small remote-controlled vehicle from the US FIRST competition.) THE PRESIDENT concludes participation in Science Demonstration and begins participation in Gift Presentation.

(Note: THE PRESIDENT is presented with a U.S. FIRST medallion and T-shirt by Mr. Donald Reed, Chairman, U.S. FIRST.) THE PRESIDENT concludes participation in Gift Presentation, departs Science Demonstration Room and proceeds to Holding Room. After a brief hold, THE PRESIDENT departs Holding Room, boards Motorcade and departs Gateweay Technology Center en route Airport.

The Backdrop is a rough brick wall with a 36" diameter black and white U.S. First seal. The press platform is straight on at a 50 ft. throw.

U.S. FIRST SCIENCE DEMONSTRATION

DATE: Wednesday, February 12, 1992
LOCATION: Technology Center
340 Commercial Drive
Manchester, New Hampshire
TIME: 5:35 - 5:52 pm

FROM: Ronald C. Kaufman

I. PURPOSE

To highlight your efforts as the Education President and to recognize the educational achievements of the students participating in the U.S. First competition.

II. BACKGROUND

U.S. First (Foundation for Inspiration and Recognition of Science and Technology) was founded to encourage students - through a cooperative effort of students, teachers and corporate engineers - that the study of engineering is enjoyable and rewarding. Dr. Allen Bromley, your Advisor for Science and Technology is a member of the board of U.S. First.

III. PARTICIPANTS

The President
Governor Judd Gregg
Mr. Dean Kamen, President of DEKA Research and Development Corporation and Founder of U.S. First
Mr. Richard Osborne, President of U.S. First
Dr. Roland Schmidtt, President of Rensselaer Polytechnic Institute
Mr. Ray Price, President, Economic Club of New York

Mr. Jerry Fisher, Vice President of Baxter Health Care
Dr. Richard Propper, President, Advanced Medical, Inc.
Mr. Herbert Stebbins, Chairman, Greater Manchester Development Corporation
200 U.S. First participants, sponsors and supporters

IV. PRESS PLAN

Open press

WORCESTER TELEGRAM & GAZETTE 1/22/92

This doubles team will serve robots

By George Snell
Staff Reporter

CLINTON — Tennis balls.

The most important goal in the project, which involves scientists and engineers from Nypro Inc. and students and faculty from Clinton High School, is the ability to gather tennis balls.

After all, that's how you win.

"We're going to put Clinton on the map," vowed Paul C. Jensen, corporate director of training and development at Nypro.

Today's Focus

Jensen will have his chance Feb. 13 and 14 when 40 businesses and universities from across the country will compete in Manchester, N.H., in U.S. First's "Maize Craze."

The contest teams each organization with an adopted high school science class. Together the scien-

Turn to CLINTON /Page A5

Clinton students join robot project

Continued From Page One

tists and students will design, build and test a robotic vehicle using a standard kit of materials supplied by U.S. First. The teams will then compete against one another, four at a time on a specially designed arena. The vehicle that collects the most tennis balls in two minutes is the winner. The contest is called "Maize Craze" because the surface of the arena is covered with an inch of corn.

"This is technology in action," Jensen said yesterday. "This is not a science fair. We have to develop a robot that can collect tennis balls, defend itself against other robots and move along a surface of corn. We want scientists and students to interact with each other. We want the students to look at the scientists and engineers as role models."

That is the goal of U.S. First. Eric C. Yantz, Northeast account manager for Nypro, said the New Hampshire-based organization is a national alliance of business, education and government, focused on reversing a high school trend of declining interest in science and math.

"The ultimate goal is to let kids see firsthand that science and technology is fun and exciting," Yantz said.

He said a team of eight Nypro scientists and engineers has been meeting twice a week since the beginning of January with a group of high school students and faculty.

"It's amazing to watch these people all sitting at the same table, discussing how to build and operate a robot. I don't know who's more into it — the scientists or the kids," he said.

Peter Marshall, a Nypro vice president, said the competition uses the marketing and excitement of a sporting event to attract students.

"Our society eulogizes pro athletes," Marshall said. "Joe Montana can throw a football and Michael Jordan can shoot hoops. We should play up the lives of Nobel prize winners just like we do pro athletes."

Leo R. Bachant, assistant principal at Clinton High School, said Nypro approached the school about the project between Christmas and New Year's.

"I said yes and got itchy about the possibilities right away," Bachant said. "We tried to open it up to as many students as we could."

He said a physics class headed by teacher Thomas O'Connell was chosen to work with Nypro, but an art class and a graphic-arts class are designing a logo for the robot.

"Super Bowl Sunday is coming up and a lot of people are interested. I know I am. To get an ad on TV during the game costs millions of dollars," Bachant said. "If these companies can do that, why not spend some money on a contest like this promoting science and technology?"

He said the contest, which will be held four days before the New Hampshire presidential primary, may attract some of the Democratic and Republican candidates.

"The more we can do to promote science the better," he said.

Other area teams include the Bose Corp. in Framingham, Digital Equipment Corp. in Maynard, Raytheon Co. in Lexington, and Worcester Polytechnic Institute in Worcester.

NEW HAMPSHIRE SUNDAY NEWS, Manchester, N.H. — February 9, 1992

Winnacunnet Among 6 NH Schools To Compete in 'Maize Craze' Event

DURHAM — Now let's see, what would MacGyver do? Somebody hands you a slab of electrical and mechanical odds and ends — including a junked computer printer — and challenges you to build a remote-controlled machine that can collect tennis balls strategically located on a 18-foot by 16-foot playing field two inches deep in dried corn while three opposing teams try to do the same. Hmmm.

Word to MacGyver — forget the Swiss Army knife; it's time to call in the cavalry. Or, in this case, the engineers.

True to the spirit of just such a challenge, Hampton's Winnacunnet High School and the University of New Hampshire have joined forces to compete in "Maize Craze." The Feb. 13 and 14 contest, at Memorial High School in Manchester, will pit 28 high school teams from all over the country against each other in a high-visibility contest.

Winnacunnet is one of six New Hampshire schools competing. The other New Hampshire high schools are Memorial, Central and West, all of Manchester, Nashua High School and Keene High School.

Each team has the backing of a major corporation or educational institution, from AT&T to Xerox, from Dartmouth to MIT and Rensselaer to UNH.

Dr. Allan Bromley, science and technology adviser to President Bush, will host an awards banquet during the event, which is based on the design engineering competition made famous by Woodie Flowers, professor of teaching innovation at the Massachusetts Institute of Technology.

Billed as a "national engineering celebration in creative design and school partnering," the contest is sponsored by a Manchester firm called U.S. FIRST (For Inspiration and Recognition of Science and Technology). The not-for-profit corporation was founded by Manchester inventor and entrepreneur Dean Kamen to "excite the next generation about science and technology."

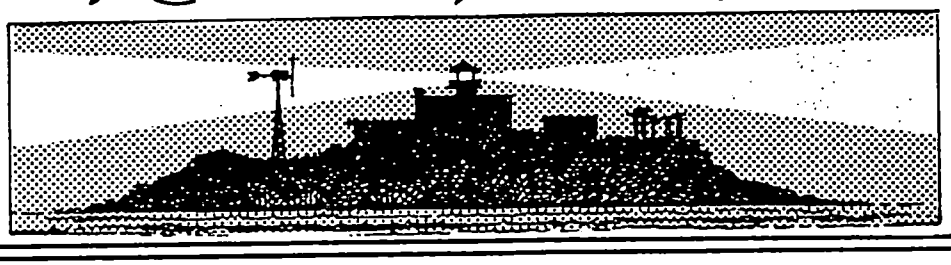
The Winnacunnet team is made up of students in physics teacher Robert Devantery's class. Their UNH backing comes from Gerry Sedor, a retired naval engineer and instructor who, on his way to earning a Ph.D., became "sub-meister" for UNH's two award-winning human-powered submarines. In guiding his young charges through the thinking process that will produce their Maize Craze entry, Sedor is aided by mechanical engineering graduate student Paul Maxted, from Holliston, Mass., mechanical engineering senior Rick Miller, of Dover, and civil engineering senior Chris Duncorf.

The crew is working nights and weekends to come up with a winning competition strategy and a vehicle that works. But while the crew focuses on winning, the payoff for Sedor and Devantery — introducing young minds to science and engineering by offering them a challenge — has already begun.

North Dumpling Times

VOLUME 2, ISSUE 1 | SOMETIME IN DECEMBER, 1990 | 50,000

"All the news that's wit, we print."



WEATHER: Fall followed by probable winter. Chance of spring next year.

Dumpling Issues Foreign Aid Bond to United States

President of Dumpling Reacts to Crisis in America

DPI - On a recent jaunt abroad, President Dumpling delivered to U. S. President George Bush the first of the Foreign Aid Bonds recently issued by the Dumpling Congress. The proceeds of the bond will be given to an American institution whose purpose is to enrich America's appreciation of and interest in science and technology. *(See "1st FIRST Bond" Story, page 3.)*

When questioned by the press about this latest move to improve the tiny nation's relationship with the much larger U.S., President Dumpling replied, "Hey, we are neighbors after all. Anything we Dumplonians can do to help out a friend in trouble, we will." The trouble to which President Dumpling referred to is the faltering state of scientific literacy in the U.S. Dumpling continued, "When we learned those guys were in so much trouble, we (the NDI Congress) came up with the idea of a foreign aid bond. "

U.S. President Bush accepts "Foreign Aid" bond from President of Dumpling

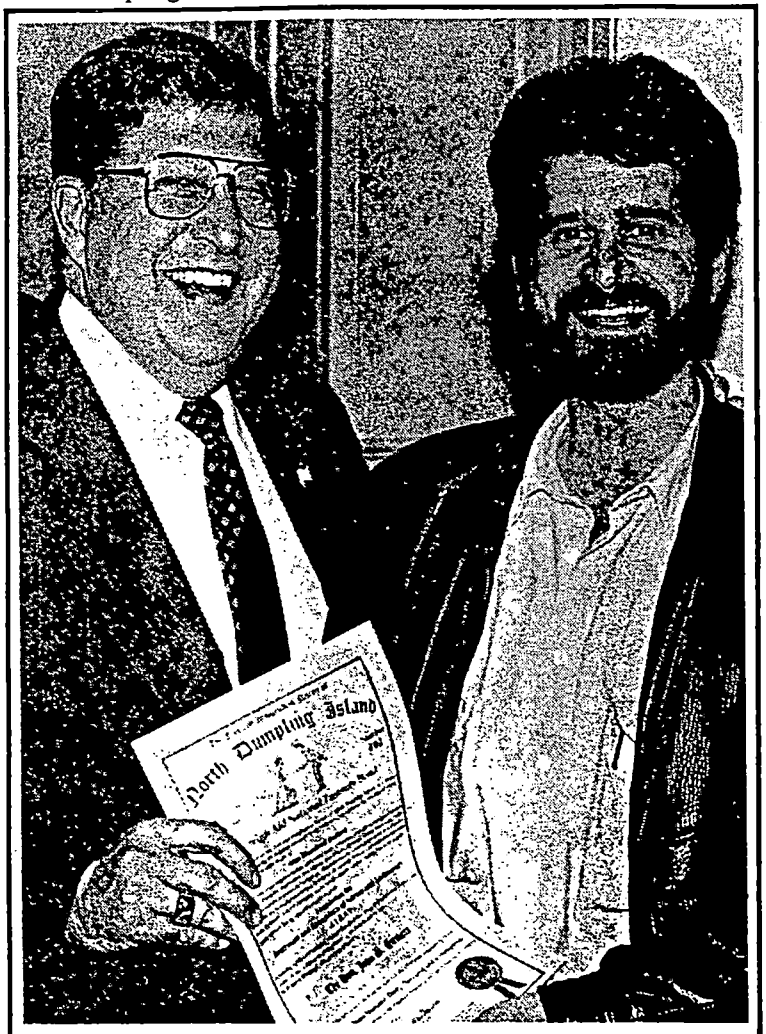
Message in Bottle / A Cry for Help

President Dumpling explained that North Dumpling Island, which is extremely isolated from the foreign press, learned of the crisis in America from a note found in a bottle which washed upon the shores of the island. According to President Dumpling, "I was polishing the hubcaps of the North Dumpling Navy, when I noticed a bottle on the sands. I wasn't sure if it was from the U.S. (it was a German beer bottle), until I read the note inside. It was from a crazed professor at some Massachusetts technical school. He wrote that he had just read a report about U.S. Citizens not knowing whether the earth revolved around the sun, or the other way around. The note went on to say that he (the professor) was giving it all up and moving to Bora Bora."

Although this is the first time in American history that another country has offered the U.S. foreign aid, President Dumpling seems confident that it will be accepted by President Bush, who has stressed education as a top priority. Apparently, the Dumplomat ran into the U.S. President at a function in the States, and just happened to have one of the bonds with him. "As luck would have it, a photographer snapped our picture as we exchanged the usual anecdotes about being world leaders."

When questioned about how he got past the Secret Service to see the U.S. leader, President Dumpling replied, "It was easy. They thought I was there to repair the furnace."

Got those old "what do I get my fabulously rich great aunt for Christmas" blues? See the North Dumpling Times Exclusive 1990 Gift Choice on page 4.



Chief of Staff John Sununu accepts bond from President Dumpling

Dumpling Presents Bond to FIRST Friend John Sununu

The roving Dumplonian President found another top-ranking U.S. Official to present with a Foreign Bond, White House Chief of Staff John Sununu. The "Education President's" right hand man has been a long-time supporter of the Foundation for Inspiration and Recognition of Science and Technology (FIRST), and Science Enrichment Encounters, the organizations which will benefit from the sale of the bonds.

"John Sununu is a great ally of Dumpling. He's one of the few people who doesn't run when I come into the room." President Dumpling went on to state that, "Not only is he a brilliant engineer, he's also a pretty snappy dresser."

"He (Sununu) understands the need for improved appreciation and understanding of science in the United States. I respect and like him for that." When asked whether he believed the feeling was mutual, Dumpling replied, "I think so. After all, I can't believe he let me take this picture just because I was the only one in the room who made him look tall."

Editorial

Foreign Ice Cream: Can't Live With It, Can't Live Without It

The United States and North Dumpling Island have had strained relations in the past due to the Island nation's dependence on U.S. ice cream - insuring a ready supply has been a high priority item for the Dumpling Administration. "It's true," stated an anxious Dumpling. "The citizens of North Dumpling have a voracious hunger for the stuff."

As for the conservation of the precious substance, Light House insiders state that President Dumpling is probably the worst offender. Several sources have confirmed that the leader of the country, rather than presenting a good example, has been seen eating ice cream at every opportunity. President Dumpling was unavailable for comment.

Meanwhile, the situation in Dumpling worsens. Ice cream imports have increased by 23%. Many analysts are predicting an even greater increase in the fourth quarter despite the onset of winter, due to the popularity of the ice cream/hot cocoa combination, a craze started in the Light House itself.

Now is the time for our President to prove he is a real leader (not just some ice cream slurping, Ben & Jerry's junkie) - a leader who has the willpower to halt this situation before it reaches crisis proportions.

Editors note: The opinions expressed in this editorial do not necessarily reflect the opinions and attitudes of the North Dumpling Times Staff. Editorials are submitted by Dumpling citizens who prefer to remain anonymous and alive. The North Dumpling Times is not responsible for the contents of editorials, as we have no legal staff to review this stuff for us (due to the Lawyer Embargo Act of 1988).

NORTH DUMPLING ISLAND VISA APPLICATION DEPARTMENT OF STATE

TYPE OR PRINT IN INK IN WHITE AREAS (SPELLING COUNTS)

1. NAME FIRST NAME _____ MIDDLE NAME _____

LAST NAME _____

2. MAILING ADDRESS _____

STREET _____

CITY, STATE _____

ZIP CODE _____

COUNTRY _____ PLANET _____

3. HOME PHONE (AREA CODE) _____

4. BUSINESS PHONE (AREA CODE) _____

5. OCCUPATION _____

6. IQ (LAWYERS NEED NOT REPLY) _____

7. SEX _____

MALE FEMALE UNKNOWN

8. PLACE OF BIRTH CITY, STATE, COUNTRY _____

9. DATE OF BIRTH _____

MO. DAY YEAR

10. HEIGHT _____

11. COLOR OF HAIR (IF DYED, STATE TRUE COLOR) _____

12. COLOR OF EYES _____

13. SHOE SIZE _____

14. FATHER'S MAIDEN NAME _____

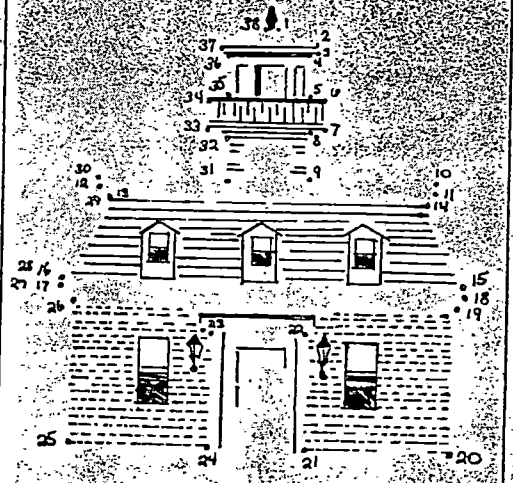
15. MOTHER'S NAME _____

16. HAVE YOU EVER BEEN MARRIED (OR OTHERWISE INSTITUTIONALIZED)?

☐ 1x ☐ 2x ☐ 3x ☐ 4x ☐ 5x ☐ 6x ☐ 7x ☐ 8x ☐ MORE THAN 8X

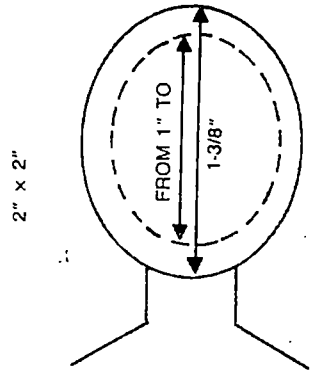
DATE OF MOST RECENT MARRIAGE _____

OFFICIAL USE ONLY

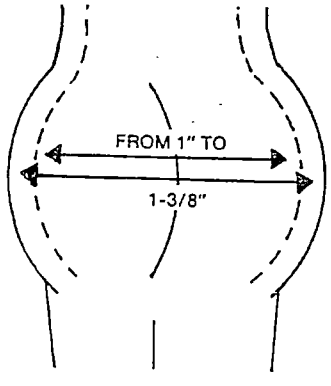


CONNECT THE DOTS

SUBMIT TWO RECENT IDENTICAL PHOTOS



SUBMIT TWO REASONABLY ACCEPTABLE BUNS



17. HAVE YOU EVER BEEN ISSUED A NORTH DUMPLING ISLAND VISA? ☐ YES ☐ NO

18. HAVE YOU EVER BEEN SLAPPED IN THE FACE? ☐ YES ☐ NO

IF UNABLE TO SUBMIT MOST RECENT VISA, GO DIRECTLY TO JAIL, DO NOT PASS GO, DO NOT COLLECT $200.

19. SUBMIT TRAVEL PLANS DEPARTURE DATE _____ LENGTH OF STAY _____

PLAN TO VISIT (CHECK ONE) ☐ NORTH SHORE ☐ SOUTH SHORE ☐ EAST SHORE ☐ WEST SHORE

20. IDENTIFYING DOCUMENTS

☐ DRIVER'S LICENSE ☐ PAROLE REPORT

☐ PILOT'S LICENSE ☐ NOTE FROM MOTHER

24. DO NOT SIGN APPLICATION UNTIL REQUESTED TO DO SO BY PERSON ADMINISTERING OATH

OATH: I pledge allegiance to the flag of the Principality of North Dumpling Island, and to the lifestyle for which it stands, one island, under water, with seclusion and ice cream for all.

Subscribed and sworn to (affirmed) before me

MONTH DAY YEAR

_____

(Signature of person authorized to accept application)

X _____

(Sign in presence of person authorized to accept application)

Authorized person (check one)

☐ Lord Dumpling ☐ Lord Dumpling

☐ Lord Dumpling ☐ Lord Dumpling

(PLACE OFFICIAL SEAL HERE)

VISA ISSUE DATE _____

VISA EXPIRATION DATE _____

VISA APPLICATION

RULES AND REGULATIONS

The light atop the Lighthouse (like the Guantanemo Naval Air Station in Cuba), is a small military installation subject to the laws of the United States, not the sovereign power of Lord Dumpling. Guests are forbidden to trespass. Those who do so will be subject to one or more of the following penalties:

a) Arrest for trespassing on Coast Guard property (really!).
b) Brussels Sprouts up the nose under North Dumpling Island jurisdiction.
c) Revocation of North Dumpling VISA and immediate deportation.
d) Taking to your grave the fact that you, personally, caused a major international diplomatic incident between the governments of North Dumpling Island and the United States potentially resulting in worldwide annihilation.

No pets allowed, except possibly as entrees.

VISA applicants may be required to post bond (ie. security deposit) if applicants are traveling with rug rats or curtain climbers.

No illegal aliens. Anyone caught on North Dumpling Island without an up-to-date VISA, valid for the dates of visit, will be scolded, tortured and deported.

If you elect to confiscate any property of North Dumpling Island for memorabilia or any other purpose:

a) Any or all of your property may be confiscated during outbound customs.
b) Your VISA will be revoked and future VISAs will be denied.
c) A pox will be upon you and your descendants until some future member of Lord Dumpling's family steals something from a member of your family.

Killing of baby harbor seals is strictly forbidden except for its deterrent value.

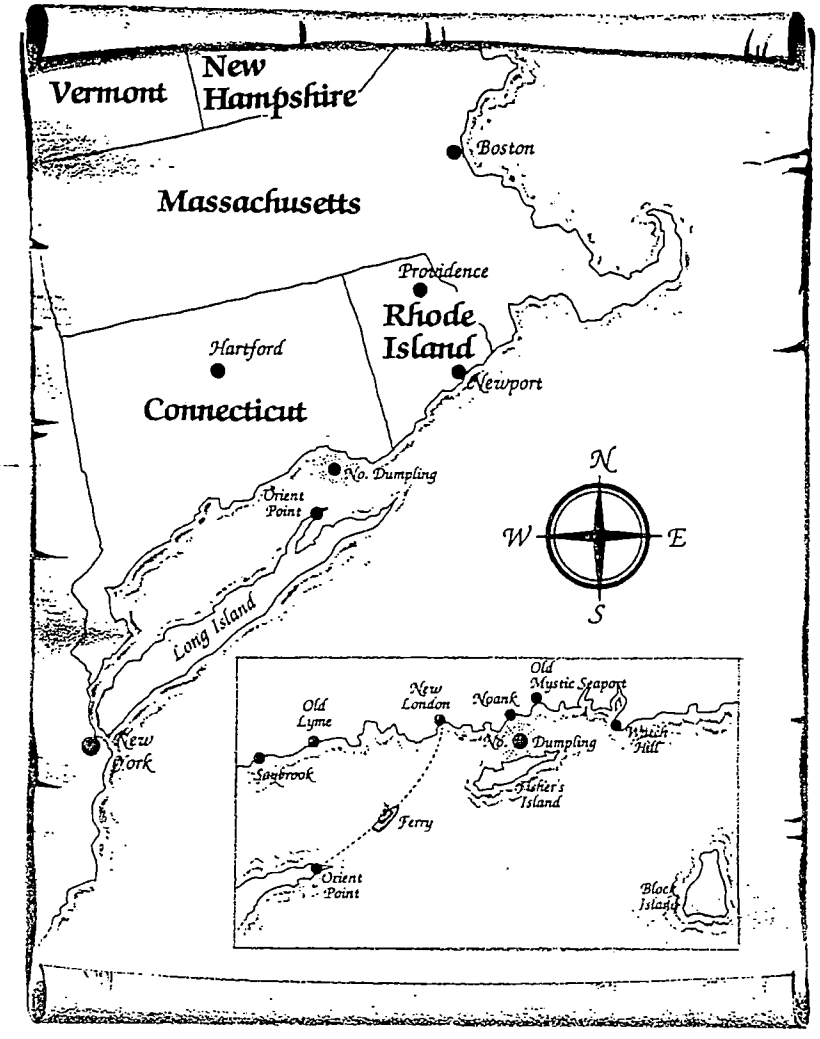
PRIVACY STATEMENT:

The information on this form is confidential. It is made available only on a need to know basis to personnel of the Department of State, other government agencies having statutory or other lawful authority to maintain such information, or to those who hear the information when we shout it from the rooftops.

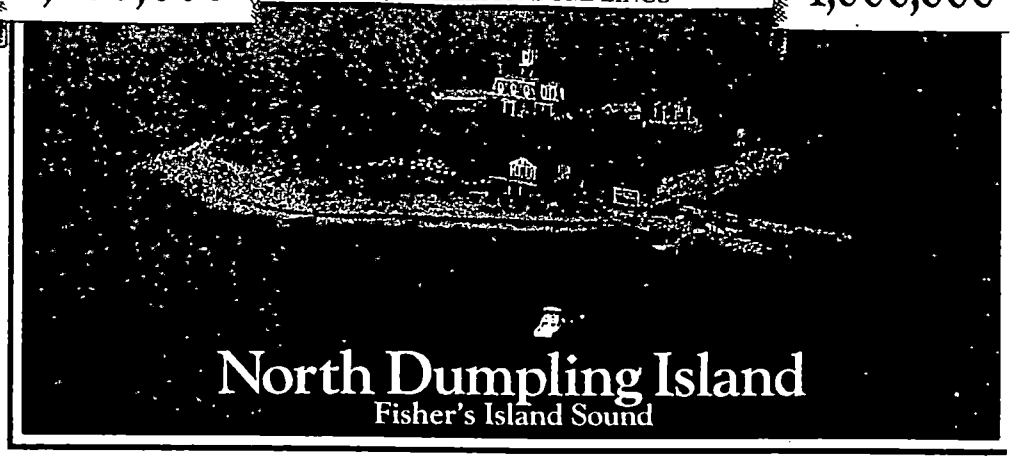
HOW TO APPLY FOR A NORTH DUMPLING ISLAND VISA. NDI VISAs are issued only from the North Dumpling Department of State or North Dumpling Embassies. Each person must obtain his or her own VISA (except the illiterate who may, if necessary, pay someone else in their law firms to complete the forms). VISA applications are available:

c/o 1874 Associates, 340 Commercial Street
Manchester, New Hampshire 03101. (603) 669-9000

FEES. VISA fees vary inversely to Lord Dumpling's happiness rating at the time of issuance. In order to expedite the VISA procurement process, however, the Department of State recommends that all applications be submitted with a deposit (or full payment) for rentals.



1,000,000 ONE MILLION DUMPLINGS 1,000,000



North Dumpling Island
Fisher's Island Sound

50,000 FIFTY THOUSAND DUMPLINGS 50,000

IN NOTES I TRUST*

LORD DUMPLING

WIZARD OF FINANCE

SECRETARY OF MUSIC

*CASH AIN'T BAD EITHER

North Dumpling Island

500,000 FIVE HUNDRED THOUSAND DUMPLINGS 500,000

IN IRREVOCABLE LETTERS OF CREDIT WE TRUST*

LORD DUMPLING

WIZARD OF FINANCE

WIZARD OF FINANCE

*ALL OTHERS PAY CASH

North Dumpling Island

395-3261

***** SUGGESTED PFF TALKING POINTS *****

- While we are honoring the innovation and accomplishments of our National Medalists of Science and Technology, we must recognize that their contributions are special because they are about the future. Our Nation can remain strong only by investing its resources and talents in science, technology, and education.

- For that reason, we are also here today to recognize our first class of Presidential Faculty Fellows. These 30 men and women -- 15 scientists and 15 engineers -- represent the most outstanding young faculty in our colleges and universities.

- Our Presidential Faculty Fellows were selected on the basis of their leadership in both teaching and research. Their skills cover many of the scientific and technical fields that will be most important to our future competitiveness and quality of life -- fields like mechanical and computer engineering; bioengineering; ecology and environmental science; chemistry; to name only a few.

- With support provided by the National Science Foundation -- $500,000 over five years, our Fellows will be able to continue to design innovative research and teaching projects that will keep our colleges and universities world leaders.

- Consider, for example, the work of Carlos Castillo-Chavez, who is making fundamental contributions to applying mathematics to biology and sociology, while taking the time to design new courses and oversee student research projects.

- Consider also Shira Broschat, who is not only recognized internationally for her work in scattering theory and its applications to cancer diagnosis and therapy, but who is also recognized by her students as an enthusiastic and dynamic teacher and role model.

- I would not be surprised if Carlos, Shira, and our other Presidential Faculty Fellows were to rejoin us one day as National Medalists of Science and Technology. They are among the best minds in our country, and the best investment we can make in our future.

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release September 16, 1991

ESTABLISHMENT OF PRESIDENTIAL FACULTY FELLOWS PROGRAM

FACT SHEET

The President today announced a new award program that will recognize, honor, and support outstanding young scientists and engineers in America's colleges and universities. Known as the Presidential Faculty Fellows (PFF) Program, it will provide awardees with $100,000 each year for five years.

By supporting young faculty members in science and engineering, the program will foster innovative and far-reaching developments in science and technology, increase the attractiveness of careers in science and engineering, recognize the interdependence of teaching and research in achieving excellence, and highlight the importance of science and technology to the nation's future.

The program has the following features:

- Nominees will be judged on the basis of their competence and leadership in research, as demonstrated by their research accomplishments, publications, recognition by the community, and other noteworthy achievements, and on the basis of their competence and leadership in teaching, as evidenced by the design of new courses and curricula, published books and articles, service to the community, and other important educational contributions.

- Up to 30 PFF awards are planned each year, to be divided equally between engineering and science disciplines. Nominees may work in any discipline of science or engineering normally supported by the National Science Foundation. Recipients may use the awards for research and teaching purposes as they decide.

- The President or Chief Academic Officer of any U.S. university or college offering a baccalaureate or graduate degree in science or engineering may nominate up to two young faculty members who have received their first faculty position within the last four years.

- The National Science Foundation will manage the program, administer the evaluation process, and fund the awards, with final award decisions being made by the White House. The first awards will be made in Fiscal Year 1992.

#

TAB C

TAB D

TAB E

TAB F

TAB G

TAB H

TAB J

PRESIDENT'S COMMITTEE ON THE NATIONAL MEDAL OF SCIENCE
NATIONAL SCIENCE FOUNDATION
1800 G STREET, N.W.
WASHINGTON, D.C. 20550

MEMORANDUM

TO: Steve Olson, OSTP

FROM: Susan E. Fannoney, Staff Assistant

DATE: June 15, 1992

SUBJECT: Background Information on 1992 Medal of Science Recipients

Following is some background information on this year's recipients for Dr. Bromley's remarks on June 22, 1992 when he introduces the 1992 recipients at the National Building Museum dinner. The recipients citations and summary of achievements is attached. Note: The citations will be read at the White House on Tuesday, June 23.

This is the 30th year of the Award, with a total of 312 medals presented in the 30 years; awards were not presented in 1971-1972; 1977-1978; 1980, and 1984-1985.

GIBSON, Eleanor

Still has graduate students
Still teaches - just came off of a Visiting Professorship at Institute of Child Development, University of Minnesota
Member NAS, NAE
See attached biosketch

NEWELL, Allen - not attending, his son, Paul, is accepting the Award

Member IEEE

QUATE, Calvin F.

Member NAS, NAE, IEEE

SHOEMAKER, Eugene M.

See attached biosketch

SIMMONS, Howard E., Jr.

National Science Board Member
Member NAS

E X E C U T I V E O F F I C E O F T H E P R E S I D E N T

18-Jun-1992 10:03am

TO: Gary J. Gershowitz

FROM: Elizabeth M. Hinchliffe
Office of Communications

SUBJECT: medals

the FY93 is a 3% increase over the FY92 figure

Hi. Some new information we could use for the Medals speech:

1. Administration requests for funding for r&d; 76.6 billion - Chap. 6 (Budget) part 1 - p. 93
2. What are we doing to keep on track with our commitment to double spending on National Science Foudnation research by 1994? (e.g. ask Congress to approve x% increase in funding, etc.) Appendix I p. 113 NSF
3. Do U.S. students still rank dead last in industrialized nations in some math and science testing? - DOE 401-2564
4. How much did we request in the budget for precollege math and science education -- and how much of an increase is this over last year, and since GB has been President?

Thanks.

401-01700-Budget at DOE

DOE-Public Affairs: Eleanor

TOM Skelly, Director, Budget System Division, At DOE 401-0790-24

2. 91 - 1,580,000,000
92

2. 91 - 1,694,000,000
92 - 1,874,000,000
93 2,212,000,000

401-1576

For Question No. 3: National Center on Education Statistics 202-219-1659 (Dr. George Brown)

X3080: Wendy, OMB Public Affairs

Bill Gates - Micro-soft

DAMARA HAWKINS: 6272

The National Medal Of Technology

UNITED STATES DEPARTMENT OF COMMERCE
Technology Administration

Room 4416
Washington, DC
20230

FACT SHEET

What is the National Medal of Technology (NMT)?

The NMT is presented annually by the President to individuals and companies for their outstanding contributions to improving the well-being of the United States, either through the development or commercialization of technology, or for their contributions to the establishment of a technically-trained workforce.

When was the Medal established?

The NMT was signed into law in 1980 as part of the Stevenson-Wydler Technology Innovation Act. The first Medals were awarded in 1985.

Who is eligible to receive the Medal?

Any U.S. citizen or U.S.-owned company is eligible to win the Medal. Persons connected with the Technology Administration or who serve on the Medal's Nomination Evaluation Committee are not eligible during the period of their service and for a period of five years thereafter.

How many Medals have been awarded?

Sixty-eight individuals and two companies have received the National Medal of Technology.

Who administers the Medal?

The NMT is a program administered by the Department of Commerce's Technology Administration. The President gives final approval.

What is the Nomination/Evaluation process?

A steering committee, chaired by the Under Secretary of Commerce for Technology, oversees the solicitation of nominations. Nominations can be made either by individuals or by companies. The nominations are then evaluated by the NMT Nomination Evaluation Committee, which is appointed by the Secretary of Commerce.

What is the deadline for submitting nominations?

Nominations for the 1993 Medal must be submitted by October 31, 1992. Nomination applications can be obtained by writing to: Dr. Paul V. Braden, Manager, National Medal of Technology, Room 4418, U.S. Department of Commerce, 14th Street and Constitution Avenue, N.W., Washington, DC 20230, or by calling: (202) 377-5572.

Awarded by the President of the United States

THE WHITE HOUSE

WASHINGTON

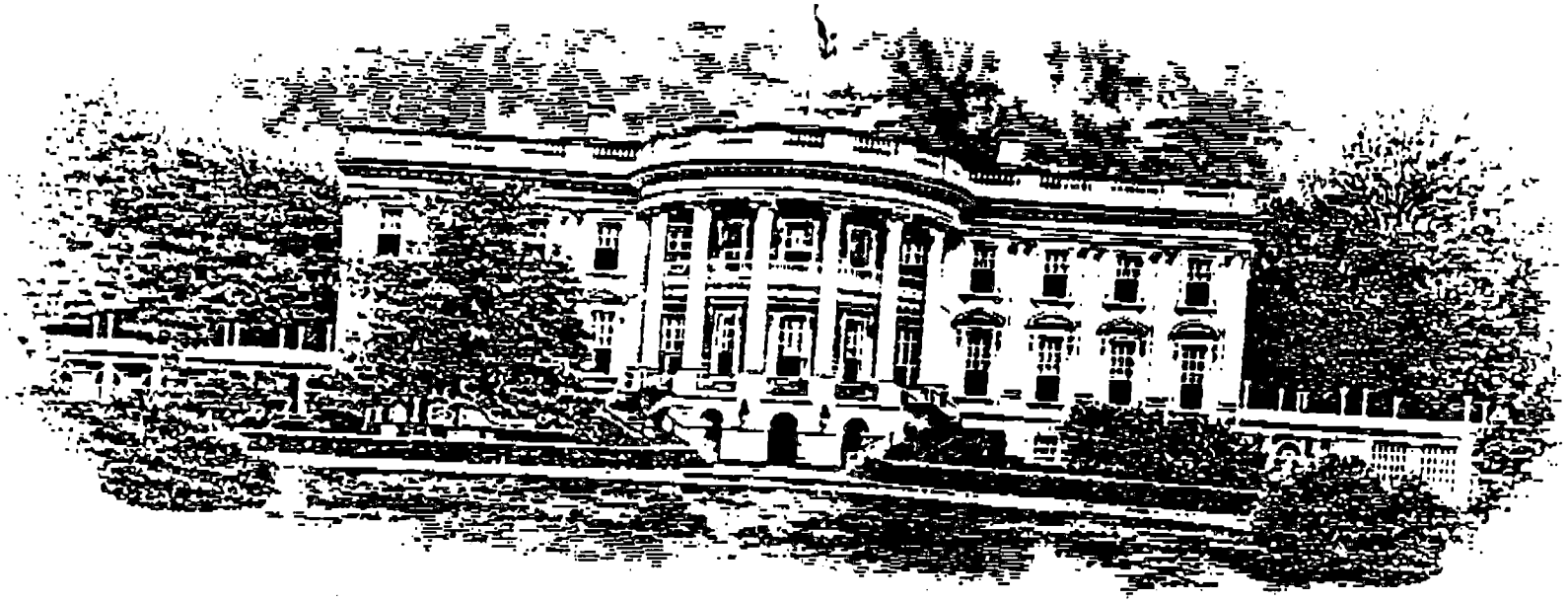
OFFICE OF POLITICAL AFFAIRS

FACSIMILE TRANSMISSION

TO: Jane Leonard
x1647

FROM: Barbara
x2135

Per our conversation.



NUMBER OF PAGES INCLUDING COVER SHEET: 3

2215

THE WHITE HOUSE
WASHINGTON

92 MAY 13 P2:30

May 12, 1992

MEMORANDUM FOR PHIL BRADY

FROM: RON KAUFMAN (RCK)

SUBJECT: U.S. FIRST Competition Winners

The President gave me the attached on Air Force One on Monday's Philadelphia trip.

As is indicated on the President's schedule, he will be seeing this group on Monday, May 18th at 1:45 p.m.

ABOARD AIR FORCE ONE

Please ask
Ron Kaufman
what that stands.
I don't want
to let the guy
down!

ABOARD AIR FORCE ONE

KAMAN

P2

in N. Hampshire
I told an inventor
he could bring
his competitive
wines to the
W. House. He has
a program with
with kids, with
major US Companies
and with MIT

[redacted]

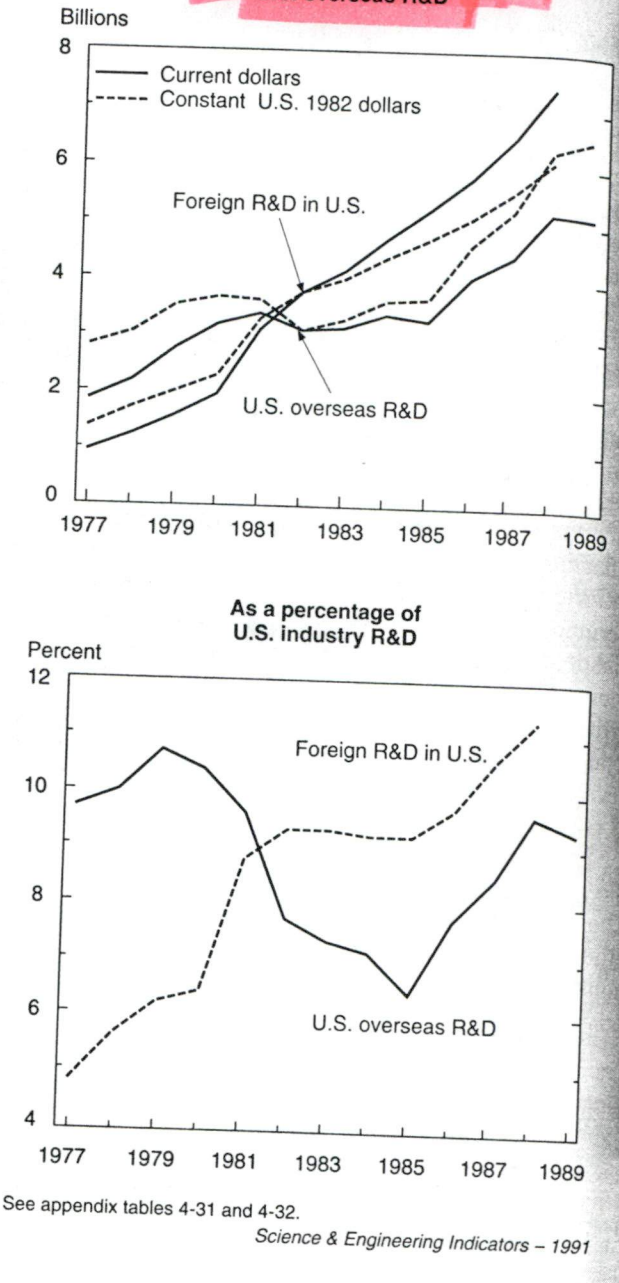
Globalization of R&D

R&D investing has become increasingly global since roughly the mid-seventies. Stiff international competition in research-intensive, or high-technology, products has necessitated many firms' expansion into foreign markets. (See chapter 6, "The Global Market," p. 136.) As a factor in this global market shift, growing development costs and shortening product life cycles have compelled corporate managers to expand overseas research activities so as to tailor products for the specific needs of foreign customers. Thus, much of the R&D undertaken abroad is meant not to displace domestic R&D, but rather to support overseas business growth.[54]

Growth in R&D funds moving both into and out of the United States has been quite strong for the past decade or so. On average, U.S. overseas R&D investments grew by 5.3 percent per year between 1977 and 1989 (in constant dollars). This rate was slightly below that for growth in total U.S. industry R&D funding—5.7 percent annually. And since 1985, the overseas R&D component has grown at six times the rate of industry's domestic funding (11.9 versus 2.1 percent per year): R&D abroad is now equivalent to 9 percent of industry's onshore R&D expenditures. (See figure 4-16.) U.S companies and their foreign subsidiaries in the motor vehicles, machinery (including computers), and drug industries account for the largest shares of this foreign-based R&D activity. Together, they comprised 58 percent of the 1989 overseas performance total. (See appendix table 4-31.) Time series data are not available on which countries receive this U.S. R&D investment.[55]

About $6.3 billion was spent on R&D abroad by U.S. companies in 1988. Foreign companies spent about 17 percent more ($7.4 billion) on R&D in the United States. From 1977 to 1988, growth in this foreign-sourced R&D investment averaged 14 percent per year, or more than twice the rate of growth in domestic R&D activities by U.S. companies. As a result, foreign R&D was equivalent to 11 percent of all industry's R&D funding in the United States in 1988, up from its equivalent 5-percent share in 1977. (See figure 4-16.) Foreign funding came primarily from Canada, West Germany, and the United Kingdom; although the R&D flows from other European countries and Japan also increased steadily over the past decade. Foreign-funded research was concentrated in the industrial chemicals, drugs, and electrical equipment industries.[56] (See appendix table 4-32.)

Figure 4-16.
Foreign and U.S. overseas R&D



See appendix tables 4-31 and 4-32.

Science & Engineering Indicators – 1991

[54]Companies consider a myriad of factors before undertaking R&D overseas: Market access and accommodation of local requirements are but two of them. Tax and regulatory policies, as well as the availability of trained researchers and access to new scientific and technological developments in other countries, also influence R&D location decisions. See NSB (forthcoming) and Howells (1990a and 1990b).

[55]See, however, Bloom and Rubinger (1991) for information on U.S. firms' investment in R&D facilities in Japan.

[56]The foreign R&D data reported here come from an annual survey of Foreign Direct Investment in the United States conducted by the Bureau of Economic Analysis. The Bureau reports that the foreign R&D totals are comparable to the U.S. R&D business data published by NSF. Industry-specific comparisons, however, are limited because of differences between the two surveys in industry classifications. (See Quijano 1990.)

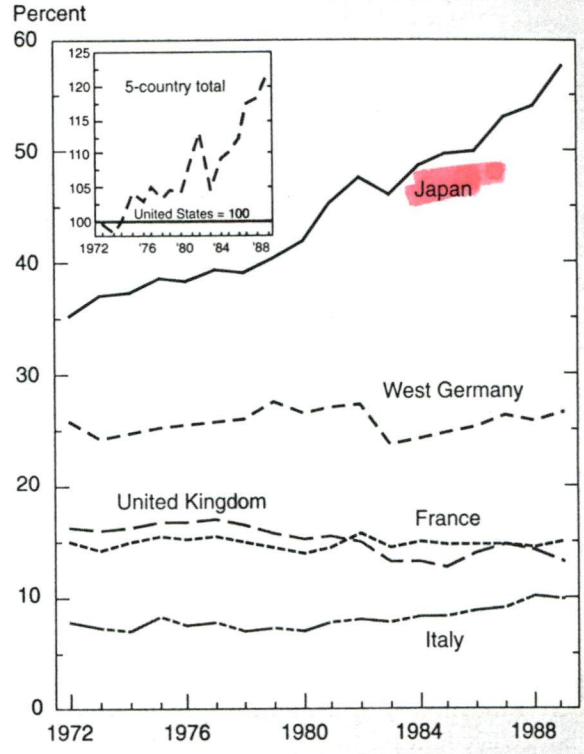
Germany spent an amount equal to about 26 percent of U.S. spending on nondefense R&D in both years ($21 billion in 1989), while France annually spent an amount equivalent to about 15 percent of the U.S. total ($12 billion in 1989). United Kingdom nondefense R&D spending fell by 3 percentage points relative to that of the United States, dropping to 13 percent or $10 billion.

R&D by Socioeconomic Objective[51]

Countries' relative shares of government R&D appropriations (excluding general university funds—GUF) reflect marked differences in national priorities. In the United States, 66 percent of total 1989 Federal investment in R&D was devoted to national defense, compared to 55 percent in the United Kingdom, 42 percent in France, 19 percent in West Germany, and 9 percent in Japan.[52] (See text table 4-7.) The U.S. Government also emphasizes health-related R&D (13 percent of total); this emphasis was especially notable in its R&D support given to academic and similar institutions.[53]

Energy-related activities accounted for 39 percent of Japanese Government R&D appropriations in 1989, reflecting the country's concern with its high dependence on foreign sources of energy. The Government of West Germany invested considerably in R&D related to industrial development and the advancement of research (each about one-fifth of the government total) as did France with 15 and 18 percent, respectively, of its 1989 R&D total. In the United Kingdom, R&D funding for industrial development—at 10 percent of total—trailed only defense in percentage share. Industrial development accounted for 8 percent of the Japanese total, but just 0.2 percent of the government R&D funding total in the United States. The latter figure—which may be understated relative to other countries as a result of compilation differences—nonetheless reflects longstanding U.S. policy to rely on private sector investment decisions in this area.

Figure 4-15.
Nondefense R&D: foreign spending as a percentage of U.S. spending



See appendix table 4-27. *Science & Engineering Indicators – 1991*

Text table 4-7.
Government R&D support, by socioeconomic objective: 1989

	United States	Japan	West Germany	France	United Kingdom
	Percent				
Total	100.0	100.0	100.0	100.0	100.0
Defense	65.5	9.0	19.0	41.9	55.2
Civil space	7.3	11.1	8.5	8.7	3.8
Advancement of research	3.8	13.8	20.7	17.5	5.8
Health	12.9	4.8	5.2	3.7	6.2
Industrial development	0.2	8.1	19.0	15.0	10.3
Energy	3.9	39.2	9.5	4.0	4.0
Agriculture, forestry, and fishing	1.9	6.5	3.1	4.6	5.5
Other	4.5	7.6	14.9	4.5	9.2

NOTE: Data were adjusted to exclude general university funds for Japan (43 percent of the government-funded R&D total), West Germany (33 percent), France (12 percent), and the United Kingdom (18 percent). See text.

See appendix table 4-30. *Science & Engineering Indicators – 1991*

[51]Data on the socioeconomic objectives of R&D funding are rarely obtained by special surveys. They generally are extracted in some way from national budgets which already have their own methodology and terminology, and thus are subject to comparability constraints not placed on other types of international R&D data sets. Notably, although each country adheres to the same criteria for distributing their R&D by objective (as outlined in OECD 1981), the actual classification may differ among countries because of differences in the *primary objective* of the various funding agents. Note also that these data are of government R&D funds only, which account for widely divergent *shares* and *absolute amounts* of each country's R&D total.

[52]The shares presented here and in text table 4-7 are adjusted to *exclude* general university funds which are reported separately for Japan and European countries. For example, GUF accounted for 18 percent of the government-funded R&D total in the United Kingdom: Unadjusted for GUF, its defense share was 46 percent in 1989. The United States does not have an equivalent GUF category: Funds to the university sector are distributed among the objectives of the Federal agencies that provide the R&D funds. (See appendix table 4-30 for further details.)

[53]For detailed comparisons of academic and academically related research, including GUF estimates, in the United States, United Kingdom, The Netherlands, France, West Germany, and Japan, see Irvine, Martin, and Isard (1990) and NSB (1989), pp. 98-99.

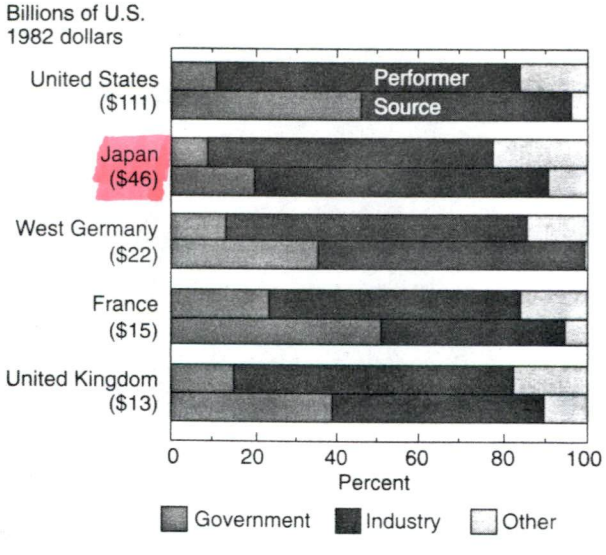
totals. Shares for these sectors, however, differed substantially from one country to the next. Although government was the source of 45 to 50 percent of R&D funds in the United States and France, it provided somewhat less in the United Kingdom (37 percent) and West Germany (33 percent), and considerably less in Japan (19 percent). (See figure 4-14.) Since 1975, government funding shares in all five countries declined, dropping most sharply in the United Kingdom (15 percentage points) and West Germany (14 percentage points). With the exception of France, industry provided more than half of the R&D funds in each of these countries in 1989. It provided 72 percent of Japan's R&D total.

Industry was the largest R&D performer in each of the five countries, with shares ranging from 60 percent in France to 72 percent in both the United States and West Germany. The industry R&D performance share grew most rapidly in Japan—from 57 percent of total in 1975 to 70 percent in 1989.[48] (See appendix table 4-28.) Government as an R&D performer was relatively smallest in Japan and the United States, accounting for 8 and 11 percent, respectively, of each country's R&D total. Government's R&D performance—including that in several nonprivatized industries—accounted for about one-fourth of France's R&D effort.

The United States and Japan devoted about the same proportion of their investments to basic research: 14 percent and 13 percent, respectively, in 1988. (See appendix table 4-29.) In dollar terms, the U.S. basic research investment ($15 billion) was three times that of Japan ($5 billion). West Germany spent 19 percent of its total R&D on basic research ($4 billion), compared to 23 percent for France ($3 billion).[49]

[48]Detailed and more extensive data can be found in SRS (1991c).

Figure 4-14.
International R&D funds, by performer and source: 1989



See appendix table 4-28. *Science & Engineering Indicators – 1991*

R&D Funding as a Percentage of GNP

Total R&D. R&D expenditures as a percentage of GNP have become one of the most widely used indicators of a country's commitment to scientific knowledge growth and technology development. The industrialized nations of France, West Germany, Japan, Sweden, the United Kingdom, and the United States each maintained an R&D/GNP ratio of between 2 and 3 percent throughout the eighties. (In Italy, this ratio rested near 1 percent.) Generally, the R&D/GNP ratio increased annually in these countries, although the rate of change varied somewhat. The approximate 2.7-percent R&D/GNP ratio of the United States in 1989 was about half a percentage point higher than its 1980 ratio. (See figure O-2 in Overview and appendix table 4-26.) Even with this growth, the U.S. R&D/GNP ratio did not keep pace with the same indicator in Japan and West Germany, whose ratios were 2.9 and 3.0 percent, respectively. And, in spite of a recent decline in its R&D/GNP ratio, Sweden also invested a slightly larger GNP share on R&D (2.8 percent in 1989) than did the United States. In dollar terms, however, Sweden's R&D expenditures were only 3 percent of those in the United States.

Nondefense R&D. Differences in R&D emphases among these countries become clearer when the data are disaggregated. Nondefense R&D expenditures as a percentage of GNP in both Japan (3.0 percent) and West Germany (2.8 percent) considerably exceeded those of the United States (1.9 percent); they have done so for more than two decades. (See figure O-2 in Overview and appendix table 4-27.) The nondefense R&D ratios of France (1.8 percent) and the United Kingdom (1.6 percent) were only slightly below that of the United States.

In absolute dollar terms, the U.S. international position was markedly different from that indicated by the nondefense R&D/GNP ratios. Between 1972 and 1989, only Japan and Italy had increased nondefense R&D spending (up 207 and 97 percent, respectively, in constant dollars) at a faster rate than had the United States (up 88 percent).[50] The result is that as a percentage of the U.S. nondefense R&D total, comparable Japanese spending jumped from 35 percent in 1972 to 58 percent in 1989. (See figure 4-15.) Japanese nondefense R&D reached $46 billion in 1989, compared with the $79 billion U.S. nondefense R&D total. Italy's nondefense R&D grew from an amount equivalent to 8 percent of the U.S. nondefense R&D total in 1972 to 10 percent ($8 billion) in 1989. West

[49]Comparable data for the United Kingdom are extremely outdated. The most recent figure (1981) indicates, however, that the basic research share was 13 percent.

[50]See appendix table 4-26 for details on conversion of national currencies to dollars.

success of those policies.[45] For all states combined, industrial sources of support for academic R&D have grown faster than all other sources of support, increasing 179 percent in constant dollars from 1980 to 1989. Support from other sources was up 60 percent. (See appendix table 4-2.) As a percentage of the Nation's total academic R&D effort, industry sources of support increased from 4 to 7 percent. Some states obtain a notably larger than 7-percent share of their academic R&D from industrial sources. This point is startlingly true of states in which university R&D performance is rather small. For example, total R&D activities on the campuses of Maine—$20 million—ranked that state 49th nationwide in 1989; yet industry provided a Nation-leading 20-percent share of total. (See text table 4-6.) Indeed, of the eight states that received the proportionately largest shares (10 percent or more) of their academic R&D funding from industry, six—Maine, Idaho, Nevada, Delaware, West Virginia, and Montana—ranked among the smallest nine states in terms of total academic R&D performance levels.

[45]See Feller (1990) and Berman (1990) for contrasting views on the role of universities in industrial development activities.

Text table 4-6.
States where non-Federal government and industry comprise the largest shares of academic R&D funding: 1989

Rank, total academic R&D	Non-Federal government share (percent)	Rank	Industry share (percent)	Rank, total academic R&D
	Support for academic R&D			
U.S. average	8.2		6.6 U.S. average	
51 South Dakota	39.4	1	20.0 Maine	50
38 Hawaii	35.0	2	12.7 Idaho	46
41 Arkansas	27.9	3	12.1 New Mexico	29
37 Mississippi	27.3	4	12.0 Pennsylvania	6
34 Nebraska	24.5	5	12.0 Nevada	45
46 Idaho	24.4	6	11.0 Delaware	44
47 Montana	24.4	7	10.1 West Virginia	43
26 Louisiana	24.0	8	10.0 Montana	47
33 Kansas	22.4	9	9.9 Missouri	19
17 Virginia	19.0	10	9.7 North Carolina	9
18 Minnesota	16.4	11	9.7 Nebraska	34
13 Wisconsin	16.4	12	9.4 Arkansas	41
15 New Jersey	15.9	13	9.1 North Dakota	48
23 Tennessee	15.1	14	9.1 Massachusetts	5
30 South Carolina	14.5	15	8.9 Kentucky	35
9 North Carolina	14.4	16	8.5 Georgia	10
28 Oregon	12.9	17	8.4 Virginia	17
3 Texas	12.3	18	8.2 Vermont	42
24 Iowa	11.9	19	8.1 Indiana	20
11 Ohio	11.8	20	7.9 Rhode Island	36

See appendix table 4-22. *Science & Engineering Indicators – 1991*

State Agency R&D Expenditures. Although the most recently available NSF data on state agencies' R&D support are for 1988, their inclusion here provides for a more comprehensive overview of state R&D involvement. (See appendix table 4-25.) These data are only for state government expenditures that flow through state agency budgets; they therefore exclude, for example, all other funding for R&D activities by universities and colleges—including direct appropriations from state legislatures.

Like the academic data reported above, total state agency expenditures for R&D from state sources of funds have increased overall, doubling between 1977 and 1988 to about $630 million (in constant dollars). Nevertheless, these expenditures still accounted for only 1 percent of the national R&D funding total. State agency support for R&D facilities rose dramatically, resulting in a more than tenfold inflation-adjusted increase to $160 million. Some states, however, reported declines in real dollars. Care should be taken in using these data, because states differ considerably in their reliance on state agencies to disburse R&D funds. Some states appropriate most funds *directly* to institutions themselves, and this source of support for R&D is not reflected in these data.

International Comparisons

Comparisons of S&T activities between the United States and other major industrialized nations provide an indication of the strength of each countries' overall S&T endeavors. The success of these endeavors depends in part on the adequacy of financial R&D inputs; comparisons of international R&D spending patterns are provided in this section.[46] Performer and source expenditure patterns are contrasted, trend data reviewed, and spending by socioeconomic objective summarized. The section closes by placing the U.S. industry R&D effort in a global context.

R&D Funding by Source and Performer

The United States spent more money on R&D activities in 1989 than did any other country; in fact, it spent more than the next four largest performers—Japan, West Germany, France, and the United Kingdom—combined.[47] (See appendix table 4-26.) By sector, national governments and industry dominated as a percentage of each country's respective R&D funding and performance

[46]R&D data for the major industrialized countries are obtained from reports to the Organisation for Economic Cooperation and Development (OECD). Few R&D data are systematically collected for developing countries; UNESCO reports such estimates where they exist. Although there is a fairly high degree of consistency in the R&D data reported by OECD, data for countries reporting to UNESCO are less comparable—principally because of differences in national statistical collection capabilities and definitions. For a summary of the UNESCO and OECD data, see SRS (1991c).

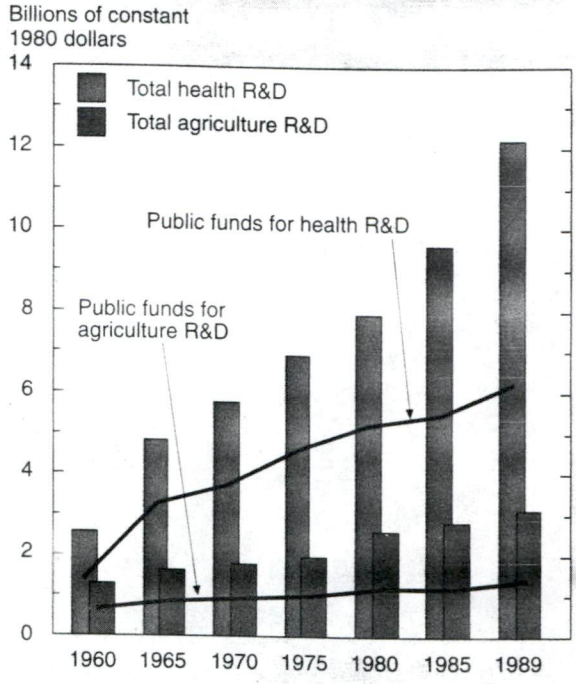
[47]Data for Germany are for West Germany alone. R&D expenditures in the former East Germany are not included.

same 11-year period.[22] Private sector support, led by the R&D investments of drug and biotechnology companies, grew by 125 percent between 1980 and 1989.

Food and Agriculture. As with health R&D, recent estimates show considerable private sector support for agricultural and food research; this support is, however, only one-quarter the level of private health-related R&D spending.[23] Public R&D support for agriculture also is about one-fifth that for health and is provided chiefly by USDA for in-house research by its Agricultural Research Service and Economic Research Service, and for extramural research by its Cooperative State Research Service. This last agency—along with state governments—contributes to the 57 state agricultural experiment stations affiliated, for the most part, with land-grant universities.

Spending on agriculture and food R&D was split rather evenly between the public and private sectors in 1975, with about $0.7 billion each. (See appendix table 4-20.) Since then, public agricultural research has fallen slightly to about 43 percent of the 1989 $5 billion national total; industry research has climbed to 57 percent. Neither source of support expanded very rapidly during the eighties. Increases in public spending averaged only 1.6 percent per year (in constant dollars) with the largest gains slated for the state agricultural experiment stations; industry support rose 2.5 percent annually. Industry's R&D expenditures for 1989 consisted of 40 percent food R&D and 60 percent R&D on agricultural inputs, mostly pesticides and farm machinery. R&D expenditures on biotechnology in food and agriculture grew from almost nothing in 1975 to an estimated $200 million in 1989—12 percent of all agricultural input industries' R&D.

Figure 4-11.
Public and private R&D expenditures for health and agriculture



NOTE: Separate deflators were used for health and agriculture.
See appendix table 4-20. *Science & Engineering Indicators – 1991*

Indirect Federal Encouragement of R&D

Improvement in global competitiveness and national economic welfare are central themes of current U.S. economic policy. To help achieve these goals, several Federal measures were put in place over the past decade, including incentive mechanisms specifically aimed at creating a more favorable environment for R&D investment and cooperative activities. Summary statistics for three such mechanisms—R&D tax credits, R&D consortia, and Federal cooperative research and development agreements—are presented in this section.[24]

R&D Tax Credits. Since 1981, the government has attempted to stimulate corporate spending through tax credits on incremental research and experimentation (R&E) expenditures.[25] The current tax credit is 20 percent for the amount by which a company's qualified R&D exceeds a certain threshold.[26] The Tax Reform Act of 1986 allowed companies to claim a similar credit for basic research grants, contributions, and contracts to universities and other nonprofit institutions. Since 1986 both credits have been annually renewed and were in place at least through the end of 1991.

[22]Constant dollar estimates are based on the Bureau of Economic Analysis/NIH biomedical research and development price index. Using the GNP deflator on these health R&D data results in a 35-percent constant dollar increase in Federal support over the 1980-91 period and in a 230-percent increase in combined industry and nonprofit support. Since the index is designed to reflect price movements in biomedical R&D, it probably measures real changes in health R&D expenditures better than does the GNP deflator (Holloway and Reeb 1987). Pardey, Craig, and Hallaway (1989) similarly found reason to prefer an index specific to the agricultural research system over the GNP deflator. That price index is also used here to deflate these food and agriculture R&D data.

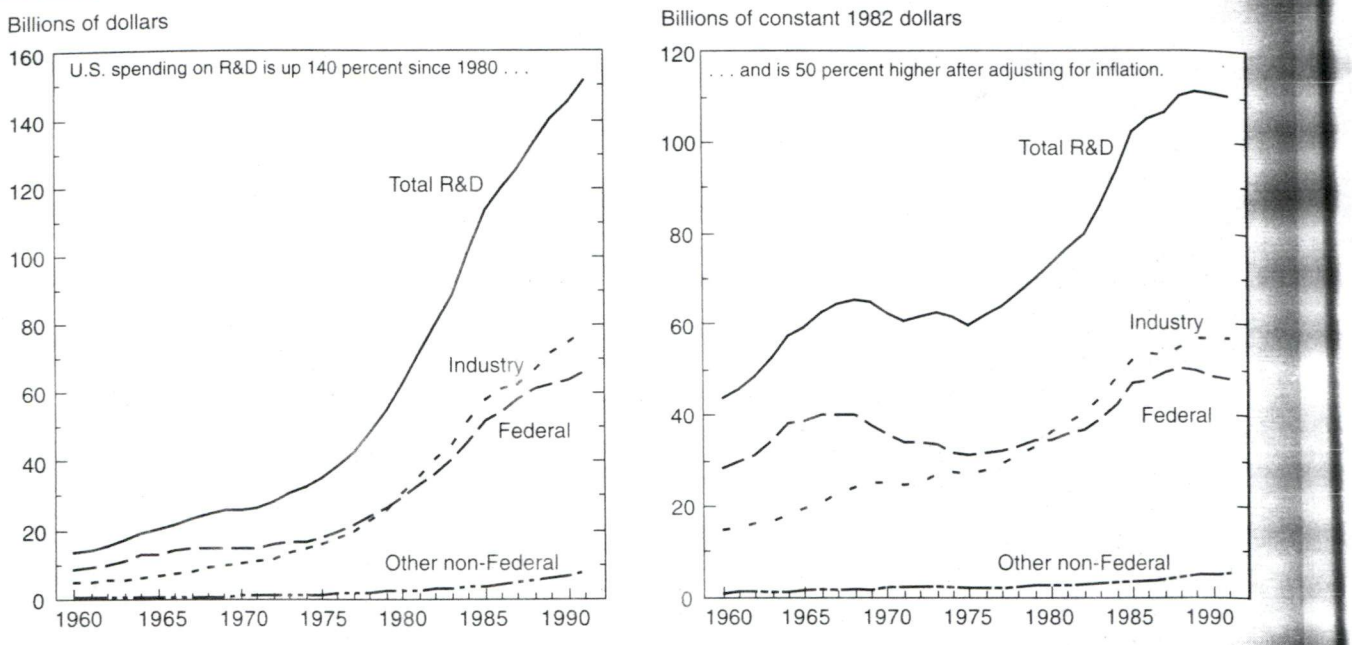
[23]Actually, these figures—recently made available by Dr. Carl Pray at Rutgers University—are for R&D *performance*, rather than *support*. In aggregate terms, however, there is little difference in choice of measures, since industry uses about 95 percent of its food and agriculture R&D funds for in-house activities and contract work to private research firms. Less than 1 percent of industry's in-house research is publicly funded (Pray and Neumeyer 1990).

[24]For a brief overview of recent policy provisions related to high-technology trade, see NSB (1989), pp. 158-60.

[25]Not all R&D is eligible for this credit, which is limited to expenditures on laboratory or experimental R&D.

[26]The current base structure for calculating a company's qualified R&D spending is complex and was put in place by the 1989 Reconciliation Bill, P.L. 101-239. (See Siboni and McCook 1990.) With various exceptions, a company's qualifying threshold is the product of a fixed-base percentage multiplied by the average amount of the company's gross receipts for the 4 preceding years. The fixed-base percentage is the ratio of R&E expenses to gross receipts for the 1984-88 period. See also a related analysis by Baily and Lawrence (1990).

Figure 4-1.
National R&D funding, by source



See appendix table 4-2.

Science & Engineering Indicators – 1991

space technology.[4] Then, for nearly a decade, total R&D growth failed to keep up with either inflation or economic output as both business and government—encountering an economic and political environment that could no longer justify the current rate of R&D expansion—deemphasized funding for research programs. In particular, Federal R&D support for both defense and nondefense activities declined sharply during this period. Overall, real R&D fell 9 percent, dropping from 2.8 percent of GNP in 1967 to 2.2 percent in 1975.

A significant funding reversal occurred following the dual energy and economic crises of the mid-1970s. From 1975 to 1985, U.S. R&D grew on average by 5.5 percent annually, and the R&D/GNP ratio climbed to 2.8 percent. Initially the research growth was directed toward solutions to energy problems; major energy R&D programs were undertaken by both industry and government. In the early eighties, however, the focus of the national R&D effort shifted overwhelmingly toward defense-related activities.[5] In fact, more than 90 percent of the rapid increase in Federal R&D support between 1980 and 1985 was attributable to defense programs.

Sluggishness in the economy (including attendant shortfall in profits, out of which business R&D normally is funded) and budgetary constraints imposed on all government programs have since slowed R&D growth nationwide. Even with the skyrocketing number of cooperative relationships among the various R&D-performing sectors of the economy—relationships generally established in response to regional or international competitiveness concerns—R&D growth has fallen overall to a 1.2-percent average annual rate of increase during the 1985-91 period. Indeed, a slight decline in inflation-adjusted R&D expenditures—fueled particularly by a reduction in defense R&D spending—is indicated from estimates for 1990 and 1991 (SRS 1991e).

Funders, Performers, and Character of Work

R&D Funders. Considerable changes in the patterns of R&D support and performance have accompanied the 30-year expansion of R&D investment chronicled above. The most notable change concerns the relative roles of the Federal Government and private industry in funding, or supporting, R&D. The Federal share of total national R&D expenditures has fallen rather steadily, dropping from 65 percent in 1960 to an estimated post-World War II low of 44 percent in 1991. Indeed, since 1988, not only has the Federal Government's *relative* share of the total fallen, but—after adjusting for inflation—so has its *absolute dollar* contribution. (See appendix table 4-2 for background data.) Also during the 1960-91 period, U.S. firms have increased their relative share of support for total U.S. R&D activities from 33 to 51 percent. This increased support includes both in-house R&D and funding of R&D in other sectors. University and college support for

[4]Growth during this early period is a continuation of the rapid increases in the Nation's military R&D investment that began in the early fifties. From 1953 to 1960, U.S. R&D spending grew on average by 15 percent per year. The earliest year for which the National Science Foundation reports R&D expenditures is 1953.

[5]See SRS (1990b) for relevant statistics on energy and defense spending.