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**OA/ID Number:** 13669  
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**Folder Title:**  
Governor's State Dinner 5/22/89 [OA 6265]

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<b>G</b>	<b>26</b>	<b>19</b>	<b>1</b>	<b>3</b>

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(Smith/Blessey)  
May 22, 1989  
Draft One  
GOV

PRESIDENTIAL TOAST: GOVERNOR'S STATE DINNER  
STATE DINING ROOM  
MONDAY, MAY 22, 1989  
7:45 P.M.

Fellow public servants, politicians, and stem-winding  
orators.

*Transcription of Pres. Quotations*  
*p3412*  
On behalf of every American, it is an honor to welcome you  
to what Franklin Roosevelt called "the house owned by all the . .  
. people" -- and which Harry Truman termed "the finest prison in  
the world."

Moreover, it is a distinct personal pleasure to be with you.  
As a certain former colleague of yours keeps reminding me,  
America's Governors are where the action is.

In that context, I want first to commend Governor Baliles  
for his leadership of the NGA. And let me also pass on my best  
wishes to Governor Branstad, as he becomes your new chairman.

You know, Henry Bellmon will like this one: His fellow  
Oklahoman, Will Rogers, once said, "Politics isn't worrying this  
country one-tenth as much as parking space." What Will meant was  
that often Washington loses perspective. We forget what matters:  
People, and their concerns.

Well, as Governors, you can't afford to lose perspective  
[PAUSE] . . . not if you want to keep on being Governor. There's  
always a budget to balance, a school to be built. Your greatest  
test is a daily test -- to find what works.

I, too, like what works. And I understand your problems

[PAUSE] . . . if I didn't, I have a hunch John Sununu would help me. And we gather here beneath a painting which forms a study in how problems can be met, and overcome. I'm referring, of course, to this portrait of Lincoln painted by George Healy exactly 120 years ago. (1869)

Curators Off.  
Bill Ollman  
2550  
of Usher's  
off.

I've said that Lincoln is one of my favorite Presidents. I

suppose virtually every American feels that way. And I'm reminded daily of our 16th President. For each morning, I pass the room which served as Lincoln's Cabinet Room.

Info Pts Al  
P. 609  
The President  
P. 395  
Little Brown Book  
P. 356

As President, Lincoln abolished slavery. He saved the Union. He preserved for future generations the canons of democracy. In this painting you sense Lincoln's agony, and his greatness. In fact, all around us you feel the sweep of American history. And of the men and women who acted -- boldly, courageously -- to write its pages.

Personally  
Visited St.  
Quincy

My friends, our pages, too, can be extraordinary, fascinating. Look at the change in China. Or the winds of freedom blowing in the Soviet Union. Look at the accord in Angola. Or Panama, where its people -- like so many others around the world -- yearn for freedom and democracy.,

News Summary

Around the globe, leaders are learning what you already know: To survive, government must be responsive and responsible. For if not, the people will find leaders who are. That's why we have that marvelous device called a "free election."

It's not easy, of course -- this governing. Indeed, sometimes you must feel as Lincoln did. One night, a stranger

Little Brown Book  
of Knickerbocker  
P. 357

The Brown Book  
at Lincoln  
p. 35

found him in the street with two of his sons, both of whom were sobbing uncontrollably.

"Whatever is the matter with the boys, Mr. Lincoln?" the stranger asked. Lincoln sighed, then observed, "Just what's the matter with the whole world. I've got three walnuts, and each wants two."

Yes, public officials are often pulled in countless directions. But, always, we treasure these American lessons: Democracy works. Our system works. It works in Dover and Des Moines. It works in Portland, Oregon, and Portland, Maine. It works because when it comes to problem-solving, Washington doesn't know best. The people do.

The Foundational Book  
1978  
?

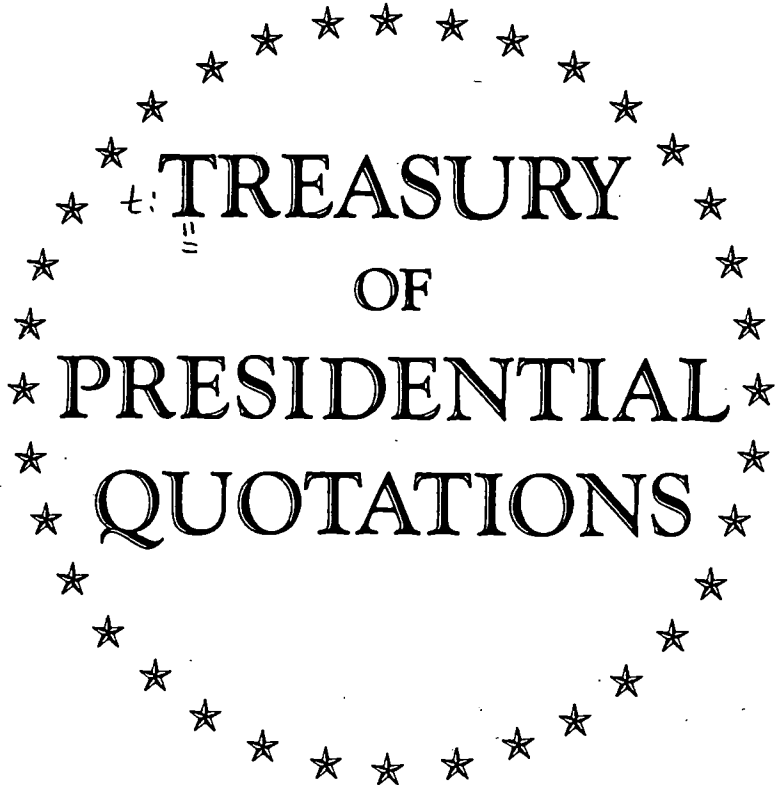
Jefferson wrote, "The God who gave us life, gave us liberty at the same time." My friends, let us use that liberty to find solutions, find what works, and enrich our lives. And in that spirit, I ask all of you to raise your glasses:

- To the American people;
- To you, their trustees;
- And to the American system that remains, after 200

years, the greatest in the history of the world.

# # # #

E176  
.1  
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TREASURY  
OF  
PRESIDENTIAL  
QUOTATIONS

Compiled and edited by  
**CAROLINE THOMAS HARNSBERGER**

FOLLETT PUBLISHING COMPANY  
CHICAGO

1964

ganization (the United Nations) war—and war appeals no longer tional war can no longer lead to onger serve to settle disputes. It eat powers alone. For a nuclear ters and fear, could well engulf nd the poor, the committed and var—or war will put an end to

JOHN F. KENNEDY  
ns General Assembly, Sept. 25,  
pers . . . *Kennedy, 1961, p. 619*  
ed to go unchecked and unchal-

We are also true to our word.  
JOHN F. KENNEDY  
, Oct. 22, 1962; *Vital Speeches,*  
*Nov. 15, 1962, p. 67*

e, Democracy 11, Disarmament  
, God 9, Hope 2, Humanity 1,  
1, League of Nations 3, Navy,  
1, Peace, Preparedness, Presi-  
cure 8, Slavery 13, Union 4,  
6, 7

prevailed over virtue and talent

JOHN ADAMS  
on, July 9, 1813; *Works, X, 52*  
rich, without violating the rights  
me wealth towards a state of  
ence towards a state of comfort.

JAMES MADISON  
*Writings (Hunt), VI, 86*  
oses that the Government shall  
1 will care for the laboring poor.

GROVER CLEVELAND  
ngress, Dec. 3, 1888; *Messages*  
*and Papers, p. 5361*

lity toward honest men who  
ould be crushed.

THEODORE ROOSEVELT  
ature, May 22, 1899; *Works,*  
*XXIII, 143*

5. We are a rich Nation, and undefended wealth invites aggression.

THEODORE ROOSEVELT  
Special Message to Congress, Apr. 14, 1908; *Messages and*  
*Papers, p. 7528*

6. Common welfare is the goal of our national endeavor. Wealth is not inimical to welfare; it ought to be its friendliest agency.

WARREN G. HARDING  
Inaugural Address, Mar. 4, 1921

7. We want wealth, but there are many other things we want very much more. Among them are peace, honor, charity and idealism.

CALVIN COOLIDGE  
Address in Washington, D.C., Jan. 17, 1924; *Autobiography,*  
*p. 358*

8. Wealth comes from industry and from the hard experience of human toil. To dissipate it in waste and extravagance is disloyalty to humanity. This is by no means a doctrine of parsimony. . . . Both men and nations should live in accordance with their means.

CALVIN COOLIDGE  
*Ibid., p. 182*

See also Liberty 36, Mankind 4, Money, Preparedness 8

**Welfare** See Wealth 6

**West, The**

1. Nearly a century ago, one of those rare minds to whom it is given to discern future greatness . . . pronounced . . . "Westward the star of empire takes its way." Let us unite in ardent supplications . . . that what was then prophecy may continue unfolding into history.

JOHN QUINCY ADAMS  
Oration at Plymouth, Mass., Dec. 22, 1802; *Oration, p. 31*

**White House**

1. I pray Heaven to bestow the best of blessings on this House and all that shall hereafter inhabit it. May none but honest and wise men ever rule under this roof.

JOHN ADAMS  
To Abigail Adams, Nov. 2, 1800; *Letters to Wife, II, 267*

2. If you are as happy, my dear sir, on entering this house as I am in leaving it and returning home, you are the happiest man in this country.

JAMES BUCHANAN  
To Abraham Lincoln at the White House, Mar. 4, 1861;  
*Works, XI, 161*

3. You don't live there [in the White House]. You are only Exhibit A to the country.

THEODORE ROOSEVELT  
*Ca. 1908; As I Knew Them, p. 537*

4. I never forget that I live in a house owned by all the American people and that I have been given their trust.

FRANKLIN DELANO ROOSEVELT  
Fireside Chat, April, 1938; *As FDR Said*, p. 224

5. The finest prison in the world.

HARRY S. TRUMAN  
*American Treasury*, p. 332

**Wisdom** 1. There is no such thing as human wisdom; all is the providence of God.

JOHN ADAMS  
Diary, Feb. 13, 1779; *Works*, III, 191

2. The wise know too well their weakness to assume infallibility; and he who knows most, knows best how little he knows.

THOMAS JEFFERSON  
The Batture of New Orleans, 1810; *Writings*, XVIII, 130

3. The wisdom of our fathers, foreseeing even the most dire possibilities, made sure that the government should never be imperiled because of the uncertainty of human life. Men may die, but the fabric of our free institutions remains unshaken.

CHESTER A. ARTHUR  
Inaugural Address, Mar. 4, 1881

4. Nine-tenths of wisdom is being wise in time.

THEODORE ROOSEVELT  
*Kansas City Star*, Nov. 1, 1917; *Works*, XIX, 183

5. Knowledge comes, but wisdom lingers. It may not be difficult to store up in the mind a vast quantity of facts within a comparatively short time, but the ability to form judgments requires the severe discipline of hard work, and the tempering heat of experience and maturity.

CALVIN COOLIDGE

6. We must not be misled by the claim that the source of all wisdom is in the Government. Wisdom is born out of experience, and most of all out of precisely such experience as is brought to us by the darkest moments. It is in the meeting of such moments that are born new insights, new sympathies, new powers, new skills.

HERBERT HOOVER  
Speech at Valley Forge, Pa., May 30, 1931; *Messages and Papers*, p. 566

*See also* Foreign Relations 27, Honesty 4, Popularity 1, Power 10, Security 1, Unity 8

**Women** 1. I never did, nor do I believe I ever shall, give advice to a woman, who is setting out on a matrimonial voyage; first, because I never could advise one to marry without her own consent; and, secondly, because I know it is to no purpose to advise her to re-

**The  
INAUGURAL  
BOOK  
1973**

*“The Spirit of '76”*

Published by  
1973 Inaugural Committee  
First Edition

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*“The God who gave us life,  
gave us liberty at the same time.”*

Thomas Jefferson,  
*Summary View of the Rights  
of British America, 1774*

*“Proc  
throu  
unto  
the i*

*We hold these truths to be  
self-evident, that all men are  
created equal, that they are  
endowed by their Creator with  
certain unalienable rights, that  
among these are life, liberty,  
and the pursuit of happiness.”*



*And for the support of this  
Declaration, with a firm  
reliance on the protection of  
divine Providence, we  
mutually pledge to each other  
our lives, our fortunes, and our  
sacred honor.”*

Declaration of Independence



Old South Meeting House, Boston

*“These  
men’s  
soldier  
patriot  
shrink  
country  
it now  
thanks*

*“There, I guess King George will be able to read that.”*

John Hancock,  
upon signing the Declaration  
of Independence, July 4, 1776



7.17



THE LITTLE, BROWN  
BOOK OF  
❧ ANECDOTES ❧

CLIFTON FADIMAN  
GENERAL EDITOR



LITTLE, BROWN AND COMPANY  
BOSTON TORONTO

to be put off, Lincoln asked for and got \$10 as his legal fee. He gave half of this to the defendant, who thereupon willingly confessed to the debt and paid up the \$2.50, thus settling the matter to the entire satisfaction of the irate plaintiff.

5 (A clerk of the court relates the only occasion on which he was fined for contempt of court.)

"Davis fined me five dollars. Mr. Lincoln had just come in, and leaning over my desk had told me a story so irresistibly funny that I broke out into a loud laugh. The judge called me to order, saying, 'This must be stopped. Mr. Lincoln, you are constantly disturbing this court with your stories.' Then to me: 'You may fine yourself \$5.00.' I apologized, but told the judge the story was worth the money. In a few minutes the judge called me over to him. 'What was that story Lincoln told you?' he asked. I told him, and he laughed aloud in spite of himself. 'Remit your fine,' he ordered."

6 A New York firm wrote to Lincoln, then practicing law, requesting information about the financial circumstances of one of his neighbors. The reply was as follows: "I am well acquainted with Mr.—, and know his circumstances. First of all, he has a wife and baby; together, they ought to be worth \$50,000 to any man. Secondly, he has an office in which there is a table worth \$1.50, and three chairs, worth \$1.00. Last of all, there is in one corner a large rat-hole which will bear looking into. Respectfully yours, A. Lincoln."

7 During his time as a lawyer in Springfield, Lincoln was walking into town one day when he was overtaken by a man driving in the same direction. Lincoln hailed him and asked, "Will you have the goodness to take my overcoat to town for me?"

"With pleasure," responded the stranger, "but how will you get it again?"

"Oh, very easily; I intend to remain in it."

{This may be a standard joke, attributed —like many others— to Lincoln.}

8 On hearing the anguished cries of children in the street, one of Lincoln's neighbors in Springfield rushed out of his house in alarm. There he found Lincoln with two of his sons, both of whom were sobbing uncontrollably.

"Whatever is the matter with the boys, Mr. Lincoln?" he asked. "Just what's the matter with the whole world," replied Lincoln resignedly. "I've got three walnuts, and each wants two."

9 When Lincoln ran for Congress as a Whig in 1846, his Democratic opponent was an evangelical Methodist, Peter Cartwright. During the campaign Lincoln attended a religious meeting at which Cartwright, after a stirring address, invited all those who wished to go to heaven to stand up. A few people rose self-consciously to their feet. "Now all those who do not wish to go to hell will stand!" The rest of the audience, with the exception of Lincoln, stood up. Cartwright saw an opportunity to embarrass his rival. "May I inquire of you, Mr. Lincoln, where you are going?" Lincoln stood up and said calmly, "I came here as a respectful listener. I did not know I was to be singled out by Brother Cartwright. I believe in treating religious matters with due solemnity. I admit that the questions propounded by Brother Cartwright are of great importance. I did not feel called upon to answer as the rest did. Brother Cartwright asks me directly where I am going. I desire to reply with equal directness: I am going to Congress."

{One of many Lincoln anecdotes of doubtful authenticity.}

10 In 1858 the Illinois legislature elected Stephen A. Douglas senator instead of Lincoln. A sympathetic friend asked Lincoln how he felt. "Like the boy who stubbed his toe; I am too big to cry and too badly hurt to laugh."

{Adlai Stevenson, when defeated by Dwight Eisenhower in 1952, ruefully recalled this story.}

11 Stephen Douglas was attempting to discomfort Lincoln by making allusions to his lowly start in life. He told a gathering that the first time he had met Lincoln it had been across the counter of a general store in which Lincoln was serving. "And an excellent bartender he was too," Douglas concluded. When the laughter had died away, Lincoln got up and said, "What Mr. Douglas says is quite true: I did keep a general store and sold cotton and candles and cigars and sometimes whiskey, and I particularly remember Mr. Douglas, as he was a very good customer. Many a time I have been on

Ref.  
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WH

# THE BULLY PULPIT

*Quotations from  
America's Presidents*

Edited by  
Elizabeth Frost

A New England Publishing Associates Book



Facts On File Publications  
New York, New York • Oxford, England

White House

I'll be glad to be going—this is the loneliest place in the world.

William Howard Taft  
Comment, Woodrow Wilson, at the latter's inauguration, Washington, D.C.  
March 4, 1913

The White House is a bully pulpit.

Theodore Roosevelt  
Comment, George Haven Putnam, recalled by Putnam at Roosevelt eulogy, the Century Club, New York, New York  
1919

There is the big white jail.

Harry S. Truman  
Comment, on morning walk, reported in *New York Herald Tribune*  
April 14, 1958

Woodrow Wilson

Byzantine logothete.

Theodore Roosevelt  
Cited in Richard Kenin and Justin Wintle, *The Dictionary of Biographical Quotations*

Woodrow Wilson is a perfect trumpet.

Theodore Roosevelt  
Written communication  
1902

He advocated with skill, intelligence and good breeding the outworn doctrines which are responsible for four-fifths of the political troubles of the United States.

Theodore Roosevelt  
Letter, friend  
1912

[That] infernal skunk in the White House

Theodore Roosevelt  
c. 1914-1915

I feel certain that he would not recognize a generous impulse if he met it on the street.

William Howard Taft  
Cited in Alpheus Thomas Mason, *William Howard Taft*

Women

I must not write a word to you about politics, because you are a woman.

John Adams  
Letter, Abigail Adams  
February 13, 1779

Too wise to wrinkle their foreheads with politics.

Thomas Jefferson  
Cited in Howard Zinn, *A People's History of the United States*

The capacity of the female mind for studies of the highest order cannot be doubted, having been sufficiently illustrated by its works of genius, of erudition, and of science.

James Madison  
Letter, Albert Pickett  
September 1821

I go for all sharing the privileges of the government who assist in bearing its burdens. Consequently I go for admitting all whites to the right of suffrage who pay taxes or bear arms (by no means excluding females).

Abraham Lincoln  
Letter, *Sangamo Journal*, Springfield, Illinois  
June 13, 1836

Why does it follow that women are fitted for nothing but the cares of domestic life, for bearing children and cooking the food of a family? . . . I say women exhibit the most exalted virtue when they depart from the domestic circle and enter on the concerns of their country, of humanity, and of their God!

John Quincy Adams  
Speech, House of Representatives  
February 1838

Female virtue is like a tender and delicate flower; let but the breath of suspicion rest upon it, and it withers and perhaps perishes forever.

Andrew Jackson  
Cited in Robert Remini, *Andrew Jackson*

# OF THE UNITED STATES

Editors of Information Please  
 Figures are approximate. For  
 the United States, please refer to the  
 Information Please Almanac.  
 Available at presstime.



## INCOME AND CREDIT

Gross National Product (1987): \$4,488,500,000,000  
 Personal income per capita (1987): \$15,349  
 Average family income (1987): \$29,744  
 Individual Shareholders (1985): 47,040,000  
 Number below poverty level (1986): white, 22,000,000; black and other minorities, 14,100,000  
 Number of billionaires (1988): 49  
 Tax returns with reported adjusted gross income of \$1 million or more (1986): 35,875  
 Credit market debt outstanding (1986): \$93,350,000,000  
 Mortgage debt outstanding (1986): \$2,564,000,000,000  
 Consumer credit outstanding (1986): \$724,000,000,000

## EDUCATION

Public elementary and secondary pupils (est. 1987-88): 40,123,808  
 Public elementary and secondary classroom teachers (est. 1987-88): 2,275,209, Men: 669,691, Women: 1,605,518  
 Avg. annual salaries of public elementary and secondary classroom teachers (est. 1987-88): \$28,031  
 Public high-school graduates (est. 1987-88): 2,419,698  
 College graduates in the population (est. 1987): 31,600,000  
 Money spent on elementary and secondary education (est. 1987): \$170,000,000,000

## CONVENIENCES

Radios (1986): 43,282,000  
 Radio stations (standard and FM, 1986): 8,807  
 Television stations (1988): 1,347  
 Automobiles (est. 1987): 139,041,000  
 Households with telephones (March 1988): 85.3 million (92.9%)  
 Newspaper circulation (morning and evening, Sept. 30, 1987): 62,826,273  
 Cable TV subscribers (1986): 37,500,000  
 Total TV homes (est. Jan. 1, 1988): 88,600,000  
 Homes with VCRs (May, 1988): 59%  
 Personal computers used at home (est. 1987): Over 20 million

## CRIME

Total arrests (1987): 10,795,869; Males, 8,881,528, Under 18, 1,380,748; Females, 1,914,341, Under 18, 400,492  
 Child neglect and abuse cases (1985): 1,299,400  
 Prisoners under sentence of death (1987): 1,984  
 Law enforcement officers killed (1986): 131  
 Total murder victims (1987): 17,859  
 Households touched by crime (Total 1986): 22,201,000 (25%)  
 Violent crime (1986): 4,225,000 households (4.7%)  
 Theft (1986): 15,582,000 households (17.3%)  
 NEC Estimates of School Statistics, 1987-88.

# INFORMATION PLEASE ALMANAC® ATLAS & YEARBOOK

# 1989

## 42ND EDITION

HOUGHTON MIFFLIN COMPANY BOSTON

1989

## History of the Flag

Source: Encyclopaedia Britannica.

the Continental Congress in 1776, which actually replaced the original 13 stripes and to indicate the admission of a new state simply by the addition of a star the following July 4. The 49th star, for Alaska, was added July 4, 1959; and the 50th star, for Hawaii, was added July 4, 1960.

It is uncertain whether the first official flag have been on the Continental Congress in 1776, which actually replaced the original 13 stripes and to indicate the admission of a new state simply by the addition of a star the following July 4. The 49th star, for Alaska, was added July 4, 1959; and the 50th star, for Hawaii, was added July 4, 1960.

etsy Ross made in a paper read Pennsylvania on by, a grandson. stigation found by Congress on tsy Ross's own was that Wash-Ross, as repre Philadelphia of the flag one. However, facture of flags sburg, Pa., for s for the Penn-

of signals in Kentucky and Missouri adopted ordinances of secession. On this basis, the Confederacy, although the official state governments remained in the Union.

### Edge of Allegiance<sup>1</sup> to the Flag

of the United States which is indivisible, with

Sept. 8, 1892.

### The Statue of Liberty

lightening the dark copper face of the ocean from the r. The right hand carries the tablet inscribed with the date of the French Revolution, July 14, 1793.

eric Auguste Bartholdi designed the Statue of Liberty. The statue was dedicated on Oct. 28, 1886. The statue is the symbol of the United States and the French people.

by Richard Stone, both innings de-support the by popular ant Grover Cleveland and the United States.

d M. Nixon

sylvania navy.

On Jan. 13, 1794, Congress voted to add two stars and two stripes to the flag in recognition of the admission of Vermont and Kentucky to the Union. By 1818, there were 20 states in the Union, and as it was obvious that the flag would soon become unwieldy, Congress voted April 18 to return to the original 13 stripes and to indicate the admission of a new state simply by the addition of a star the following July 4. The 49th star, for Alaska, was added July 4, 1959; and the 50th star, for Hawaii, was added July 4, 1960.

The first Confederate flag, adopted in 1861 by the Confederate convention in Montgomery, Ala., was called the Stars and Bars; but because of its similarity in colors to the American flag, there was much confusion in the Battle of Bull Run. To remedy this situation, Gen. G. T. Beauregard suggested a battle flag, which was used by the Southern armies throughout the war. The flag consisted of a red field on which was placed a blue cross of St. Andrew separated from the field by a white fillet and adorned with 13 white stars for the Confederate states. In May 1863, at Richmond, an official flag was adopted by the Confederate Congress. This flag was white and twice as long as wide; the union, two-thirds the width of the flag, contained the battle flag designed for Gen. Beauregard. A broad transverse stripe of red was added Feb. 4, 1865, so that the flag might not be mistaken for a signal of truce.

issue of *The Youth's Companion* in Boston. For years, the authorship was in dispute between James B. Upham and Francis Bellamy of the magazine's staff. In 1939, after a study of the controversy, the United States Flag Association decided that authorship be credited to Bellamy. 2. The phrase "under God" was added to the pledge on June 14, 1954.

dedicated the American Museum of Immigration, housed in structural additions to the base of the statue. In 1984 scaffolding went up for a major restoration and the torch was extinguished on July 4. It was relit with much ceremony July 4, 1986 to mark its centennial.

On a tablet inside the pedestal is engraved the following sonnet, written by Emma Lazarus (1849-1887):

#### The New Colossus

Not like the brazen giant of Greek fame,  
With conquering limbs astride from land to land;  
Here at our sea-washed, sunset gates shall stand  
A mighty woman with a torch, whose flame  
Is the imprisoned lightning, and her name  
Mother of Exiles. From her beacon-hand  
Glows world-wide welcome; her mild eyes command  
The air-brided harbor that twin cities frame.  
"Keep, ancient lands, your storied pomp!" cries she  
With silent lips. "Give me your tired, your poor,  
Your huddled masses yearning to breathe free,  
The wretched refuse of your teeming shore.  
Send these, the homeless, tempest-tost to me,  
I lift my lamp beside the golden door!"

## Presidents

Name and (party) <sup>1</sup>	Term	State of birth	Born	Died	Religion	Age at inaug.	Age at death
1. Washington (F) <sup>2</sup>	1789-1797	Va.	2/22/1732	12/14/1799	Episcopalian		
2. J. Adams (F)	1797-1801	Mass.	10/30/1735	7/4/1826	Unitarian	57	67
3. Jefferson (DR)	1801-1809	Va.	4/13/1743	7/4/1826	Deist	61	90
4. Madison (DR)	1809-1817	Va.	3/16/1751	6/28/1836	Episcopalian	57	83
5. Monroe (DR)	1817-1825	Va.	4/28/1758	7/4/1831	Episcopalian	57	85
6. J. Q. Adams (DR)	1825-1829	Mass.	7/11/1767	2/23/1848	Unitarian	58	78
7. Jackson (D)	1829-1837	S.C.	3/15/1767	6/8/1845	Presbyterian	57	73
8. Van Buren (D)	1837-1841	N.Y.	12/5/1772	7/24/1862	Reformed Dutch	61	78
9. W. H. Harrison (W) <sup>3</sup>	1841	Va.	2/9/1773	4/4/1841	Episcopalian	54	79
10. Tyler (W)	1841-1845	Va.	3/29/1790	1/18/1862	Episcopalian	68	68
11. Polk (D)	1845-1849	N.C.	11/2/1795	6/15/1849	Methodist	51	71
12. Taylor (W) <sup>4</sup>	1849-1850	Va.	11/24/1784	7/9/1850	Methodist	49	53
13. Fillmore (W)	1850-1853	N.Y.	1/7/1800	3/8/1874	Episcopalian	64	65
14. Pierce (D)	1853-1857	N.H.	11/23/1804	10/8/1869	Unitarian	50	74
15. Buchanan (D)	1857-1861	Pa.	4/23/1791	6/1/1868	Episcopalian	48	64
16. Lincoln (R) <sup>4</sup>	1861-1865	Ky.	2/12/1809	4/15/1865	Presbyterian	65	77
17. A. Johnson (U) <sup>5</sup>	1865-1869	N.C.	12/29/1808	7/31/1875	Liberal	52	56
18. Grant (R)	1869-1877	Ohio	4/27/1822	7/23/1885	(*)	56	66
19. Hayes (R)	1877-1881	Ohio	10/4/1822	1/17/1893	Methodist	46	63
20. Garfield (R) <sup>4</sup>	1881	Ohio	11/19/1831	9/19/1881	Disciples of Christ	54	70
21. Arthur (R)	1881-1885	Vt.	10/5/1830	11/18/1886	Episcopalian	49	49
22. Cleveland (D)	1885-1889	N.J.	3/18/1837	6/24/1908	Presbyterian	50	56
23. B. Harrison (R)	1889-1893	Ohio	8/20/1833	3/13/1901	Presbyterian	47	71
24. Cleveland (D) <sup>7</sup>	1893-1897	—	—	—	—	55	67
25. McKinley (R) <sup>4</sup>	1897-1901	Ohio	1/29/1843	9/14/1901	Methodist	55	—
26. T. Roosevelt (R)	1901-1909	N.Y.	10/27/1858	1/6/1919	Reformed Dutch	54	58
27. Taft (R)	1909-1913	Ohio	9/15/1857	3/8/1930	Unitarian	42	60
28. Wilson (D)	1913-1921	Va.	12/28/1856	2/3/1924	Presbyterian	51	72
29. Harding (R) <sup>3</sup>	1921-1923	Ohio	11/2/1865	8/2/1923	Baptist	56	67
30. Coolidge (R)	1923-1929	Vt.	7/4/1872	1/5/1933	Congregationalist	55	57
31. Hoover (R)	1929-1933	Iowa	8/10/1874	10/20/1964	Quaker	51	60
32. F. D. Roosevelt (D) <sup>3</sup>	1933-1945	N.Y.	1/30/1882	4/12/1945	Episcopalian	54	90
33. Truman (D)	1945-1953	Mo.	5/8/1884	12/26/1972	Baptist	51	63
34. Eisenhower (R)	1953-1961	Tex.	10/14/1890	3/28/1969	Presbyterian	60	88
35. Kennedy (D) <sup>4</sup>	1961-1963	Mass.	5/29/1917	11/22/1963	Roman Catholic	62	78
36. L. B. Johnson (D)	1963-1969	Tex.	8/27/1908	1/22/1973	Disciples of Christ	43	46
37. Nixon (R) <sup>4</sup>	1969-1974	Calif.	1/9/1913	—	Quaker	55	64
38. Ford (R)	1974-1977	Neb.	7/14/1913	—	Quaker	56	—
39. Carter (D)	1977-1981	Ga.	10/1/1924	—	Episcopalian	61	—
40. Reagan (R)	1981-	Ill.	2/6/1911	—	Southern Baptist	52	—
					Disciples of Christ	69	—

1. F—Federalist; DR—Democratic-Republican; D—Democratic; W—Whig; R—Republican; U—Union. 2. No party for first election. The party system in the U.S. made its appearance during Washington's first term. 3. Died in office. 4. Assassinated in office. 5. The Republican National Convention of 1864 adopted the name Union Party. It renominated Lincoln for President; for Vice President it nominated Johnson, a War Democrat. Although frequently listed as a Republican Vice President and President, Johnson undoubtedly considered himself strictly a member of the Union Party. When that party broke apart after 1868, he returned to the Democratic Party. 6. Johnson was not a professed church member; however, he admired the Baptist principles of church government. 7. Second nonconsecutive term. 8. Resigned Aug. 9, 1974.

## Vice Presidents

Name and (party) <sup>1</sup>	Term	State of birth	Birth and death dates	President served under
1. John Adams (F) <sup>2</sup>	1789-1797	Massachusetts	1735-1826	Washington
2. Thomas Jefferson (DR)	1797-1801	Virginia	1743-1826	J. Adams
3. Aaron Burr (DR)	1801-1805	New Jersey	1756-1836	Jefferson
4. George Clinton (DR) <sup>3</sup>	1805-1812	New York	1739-1812	Jefferson and Madison
5. Elbridge Gerry (DR) <sup>3</sup>	1813-1814	Massachusetts	1744-1814	Madison
6. Daniel D. Tompkins (DR)	1817-1825	New York	1774-1825	Monroe
7. John C. Calhoun <sup>4</sup>	1825-1832	South Carolina	1782-1850	J. Q. Adams and Jackson
8. Martin Van Buren (D)	1833-1837	New York	1782-1862	Jackson
9. Richard M. Johnson (D)	1837-1841	Kentucky	1780-1850	Van Buren
10. John Tyler (W) <sup>5</sup>	1841	Virginia	1790-1862	W. H. Harrison
11. George M. Dallas (D)	1845-1849	Pennsylvania	1792-1864	Polk
12. Millard Fillmore (W) <sup>5</sup>	1849-1850	New York	1800-1874	Taylor
13. William R. King (D) <sup>3</sup>	1853	North Carolina	1786-1853	Pierce
14. John C. Breckinridge (D)	1857-1861	Kentucky	1821-1875	Buchanan

THE LITTLE, BROWN  
BOOK OF  
❧ ANECDOTES ❧

CLIFTON FADIMAN  
GENERAL EDITOR



LITTLE, BROWN AND COMPANY  
BOSTON TORONTO

London apartment," she told him. "Why don't you go there and pick it up?"

7 At a reception given for Josephine Baker on one of her trips to New York, many theatrical personalities were invited. Among them was Beatrice Lillie, who patiently waited her turn to greet the fabulous Josephine. Unfortunately, Miss Baker chose this occasion to put on her well-known regal air. Holding out her hand for Beatrice to kiss, she purred, "Ah, Lady Peel, eet is a great plaisir." Bea Lillie glanced at the proffered hand: "Ah likes you too, honey," she said.

8 (Clifton Daniel tells the following story.)

"One bright day on Piccadilly I saw an unmistakable figure approaching—Bea on the arm of a man. She had been abroad entertaining the 'trooops,' as she called them, and I hadn't seen her for a long time.

"As she came down the street I maneuvered myself so that she could not avoid running into me. When she did she threw open her arms and embraced me.

"'Darling,' she cried, 'how are you?' Still holding me, she leaned back and examined my face. 'And who are you?'"

9 In Hollywood one day, Miss Lillie was absentmindedly driving on the left-hand side of the road when she suddenly noticed another car bearing down on her. She swerved to the left and crashed, wrecking the car but escaping with a few cuts and bruises. She staggered to the nearest house, which happened to be that of film star John Gilbert. "Why, Bea! What's up?" cried Gilbert as he opened the door. "Heard there was a party," gasped Miss Lillie. "Came."



**LINCOLN, Abraham** (1809–65), *US statesman; 16th president of the United States* (1861–65). Born in a log cabin, Lincoln was a self-educated man. He became a lawyer and in 1847 entered Congress as a representative from Illinois. An opponent of slavery, he was elected president on an antislavery ticket, an election that precipitated the secession of the Southern states and the Civil War. In 1863 Lincoln issued the Emancipation Proclamation, freeing Southern slaves, and two years later masterminded the Thirteenth Amendment, prohibiting slavery

anywhere in the United States. He proposed a generous settlement to the defeated Southerners, hoping to heal the wounds caused by the war, but only a few days after its end he was assassinated while attending the theater in Washington. The most famous of Lincoln's speeches is the Gettysburg Address (1863). A vast fund of anecdotes and humorous stories by him or told of him have accumulated under his name. Many are doubtless apocryphal.

1 As a young man Lincoln was captain of a militia company during the Black Hawk War of 1832. He was not well versed in military procedures. One day, as he was leading a squad of some twenty men across a field, the appropriate word of command for getting them into position for marching through a gate went right out of his mind. In desperation, he shouted, "This company is dismissed for two minutes, and will fall in again on the other side of the gate."

2 When Lincoln was a lawyer, an out-of-town case required him to hire a horse from the local livery stables. Returning the animal, he asked the liveryman whether he kept the horse for funerals. "Certainly not," said its owner indignantly. "I am glad to hear it," said Lincoln, "because if you did, the corpse would not get there in time for the resurrection."

3 Lincoln's friend and fellow-lawyer Ward Lamon was on circuit in Illinois. While waiting outside the courtroom, Lamon was challenged to a wrestling match and in the struggle tore the seat of his trousers. Immediately afterward he was summoned into court for a case. His short coat did not conceal the damaged condition of his trousers. One of the other lawyers facetiously started a subscription paper to buy him a new pair, and it was passed around the various members of the bar. When the paper reached Lincoln, he wrote his name and under the column for the amount the words: "I can contribute nothing to the end in view."

4 In his legal practice Lincoln was never greedy for fees and discouraged unnecessary litigation. A man came to him in a passion, asking him to bring a suit for \$2.50 against an impoverished debtor. Lincoln tried to dissuade him, but the man was determined upon revenge. When he saw that the creditor was not

tes. He proposed a defeated Southerners, caused by the war, 's end he was assassinated in Washington. Lincoln's speeches is (163). A vast fund of stories by him or told under his name. Many

Lincoln was captain of a Black Hawk War. He served in military. He was leading a squad in a field, the approach getting them into a gate went right. In frustration, he shouted, "I'll be damned for two minutes, the other side of the

lawyer, an out-of-hire a horse from the owner. When he kept the horse out," said its owner. "I can't hear it," said Lincoln. The horse corpse would not be resurrected."

Lincoln's fellow-lawyer Ward was in Illinois. While waiting for a trial, Lincoln was challenged. The struggle tore the court apart. Immediately afterward he was for a case. His short-tempered condition of other lawyers' faces on paper to buy him. He stood around the varnish. When the paper showed his name and under it the words: "I can't end in view."

Lincoln was never hurried unnecessary to him in a passion, for \$2.50 against an old man. Lincoln tried to dissuade. He determined upon re- the creditor was not

to be put off, Lincoln asked for and got \$10 as his legal fee. He gave half of this to the defendant, who thereupon willingly confessed to the debt and paid up the \$2.50, thus settling the matter to the entire satisfaction of the irate plaintiff.

5 (A clerk of the court relates the only occasion on which he was fined for contempt of court.)

"Davis fined me five dollars. Mr. Lincoln had just come in, and leaning over my desk had told me a story so irresistibly funny that I broke out into a loud laugh. The judge called me to order, saying, 'This must be stopped. Mr. Lincoln, you are constantly disturbing this court with your stories.' Then to me: 'You may fine yourself \$5.00.' I apologized, but told the judge the story was worth the money. In a few minutes the judge called me over to him. 'What was that story Lincoln told you?' he asked. I told him, and he laughed aloud in spite of himself. 'Remit your fine,' he ordered."

6 A New York firm wrote to Lincoln, then practicing law, requesting information about the financial circumstances of one of his neighbors. The reply was as follows: "I am well acquainted with Mr.—, and know his circumstances. First of all, he has a wife and baby; together, they ought to be worth \$50,000 to any man. Secondly, he has an office in which there is a table worth \$1.50, and three chairs, worth \$1.00. Last of all, there is in one corner a large rat-hole which will bear looking into. Respectfully yours, A. Lincoln."

7 During his time as a lawyer in Springfield, Lincoln was walking into town one day when he was overtaken by a man driving in the same direction. Lincoln hailed him and asked, "Will you have the goodness to take my overcoat to town for me?"

"With pleasure," responded the stranger, "but how will you get it again?"

"Oh, very easily; I intend to remain in it."

{This may be a standard joke, attributed — like many others — to Lincoln.}

8 On hearing the anguished cries of children in the street, one of Lincoln's neighbors in Springfield rushed out of his house in alarm. There he found Lincoln with two of his sons, both of whom were sobbing uncontrollably.

"Whatever is the matter with the boys, Mr. Lincoln?" he asked. "Just what's the matter with the whole world," replied Lincoln resignedly. "I've got three walnuts, and each wants two."

9 When Lincoln ran for Congress as a Whig in 1846, his Democratic opponent was an evangelical Methodist, Peter Cartwright. During the campaign Lincoln attended a religious meeting at which Cartwright, after a stirring address, invited all those who wished to go to heaven to stand up. A few people rose self-consciously to their feet. "Now all those who do not wish to go to hell will stand!" The rest of the audience, with the exception of Lincoln, stood up. Cartwright saw an opportunity to embarrass his rival. "May I inquire of you, Mr. Lincoln, where you are going?" Lincoln stood up and said calmly, "I came here as a respectful listener. I did not know I was to be singled out by Brother Cartwright. I believe in treating religious matters with due solemnity. I admit that the questions propounded by Brother Cartwright are of great importance. I did not feel called upon to answer as the rest did. Brother Cartwright asks me directly where I am going. I desire to reply with equal directness: I am going to Congress."

{One of many Lincoln anecdotes of doubtful authenticity.}

10 In 1858 the Illinois legislature elected Stephen A. Douglas senator instead of Lincoln. A sympathetic friend asked Lincoln how he felt. "Like the boy who stubbed his toe; I am too big to cry and too badly hurt to laugh."

{Adlai Stevenson, when defeated by Dwight Eisenhower in 1952, ruefully recalled this story.}

11 Stephen Douglas was attempting to discomfit Lincoln by making allusions to his lowly start in life. He told a gathering that the first time he had met Lincoln it had been across the counter of a general store in which Lincoln was serving. "And an excellent bartender he was too," Douglas concluded. When the laughter had died away, Lincoln got up and said, "What Mr. Douglas says is quite true: I did keep a general store and sold cotton and candles and cigars and sometimes whiskey, and I particularly remember Mr. Douglas, as he was a very good customer. Many a time I have been on

5/22/89 Governor's Dinner

Chloe's files off

George & Peter Alexander  
Healy pict 5550

Bill Almon → St. Dining room

humor

solute to gov.

history of L.A.H.

living in fascinating times

Frank definition

dining room

def of gov.

Close attention to  
from references  
of Gov

What floor is Lincoln bedroom on? 2nd

NGD - 624 - 5500

Home Book of Questions

Will Rogers

~~56 529 246 958 959 1055 1541~~  
~~1541, 2079, 2181, 2279, 2293~~

back to fireplace

St. dining rm over fireplace  
painted in 1869

~~1938~~

had a competition

- didn't win

- bought by Lincoln family

- in 1938 Mrs. Rob Todd

Lincoln ~~donor~~ bequeathed portrait  
in her will

(Lincoln seated in armchair)  
looks like Peacemakers

brooding, contemplative

1902 - st. dining room was redecorated  
by Teddy Roos.

Andrew Johnson  
made it

1865 → 1902 his study was Cabinet  
Room

Signed peace protocol that  
ended Span. - Ameri War

Lincoln use bedroom as cabinet room

(Lange/Wallace)  
May 17, 1989  
4:40 p.m.  
[GOV.DOC]

PRESIDENTIAL TOAST: GOVERNOR'S STATE DINNER  
STATE DINING ROOM  
MONDAY, MAY 22, 1989  
7:45 P.M.

[ You've already been briefed by Baker, Yeutter, Hills,  
Sununu, Darman, <sup>Mostrecher</sup> Dole... some of the best players on my team. So  
my role here tonight reminds me of when I played ball in college.  
Back then, I was pretty good at batting second clean-up... ]

It's an honor to have you here. Let me commend Governor  
Baliles for his leadership of the NGA. He has defined and  
strengthened this group's international perspective -- in a far-  
reaching, forward-looking way.

I'd also offer my best wishes to Governor Branstad, as he  
becomes your new chairman. It's an awesome task, leading a group  
like this one. [But listen, Terry, if you find yourself being  
pulled in 50 different directions, relax. No one will be able to  
accuse you of drift... ]

You know, there are times when Washington thinks it's the  
center of the universe. You know better. You're not waiting  
for Washington. And that's as it should be.

Local solutions make sense. They're effective -- because  
they go right to the source. Federalism may be the governmental  
equivalent of free-market economics. It is driven by local

initiative. It thrives on individual energy. And above all, it works.

All over the world, we can see what's happening to the concept of all-powerful, centralized government: it's an idea that's sinking like a stone.

What is rising in its place, is one great American export: democracy. The idea that a nation's direction and purpose are best determined by its people. As governors, you bring that idea to life every day.

In recent years, you've become powerful and articulate advocates of local priorities. But even as you've ascended in influence, you've transcended provincial interests. You've moved well beyond the borders that separate states, and even nations.

You're no "interest group." Your interest is in long-term solutions -- reached in partnership with each other, and with all levels of government -- to build a better, more prosperous, more competitive America.

Your priorities have a profound impact on this country's future. And this administration will work with you, to reach solutions that gain strength and stability at the local level.

In child care, that means putting dollars and decisions into the hands of parents, rather than federal bureaucracies. In education, it means choice and flexibility, through a performance-driven, partial deregulation of education. It means providing training for tomorrow's jobs through new partnerships with business and education, Private Industry Councils and JTPA.

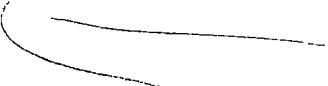
To fight drugs and crime, we'll need coordinated enforcement efforts from local, state, and federal agents. To clean up the environment will demand a coordinated, cooperative campaign from all quarters. And as the EC becomes one market in 1992, we will depend on trade policy that is consistent and multilateral.

This group rightly takes pride in its bipartisan spirit. You're known for taking the initiative. On the issues I've touched on -- and so many others -- it will be crucial that we work together, toward honest, well-conceived solutions.

America must continue to be -- as she has always been -- an inspiration in the eyes of the world. With your leadership -- she will.

In that spirit, I ask all of you here tonight to raise your glasses:

To a peaceful and ever more prosperous America.



(Lange/Wallace)  
May 17, 1989  
11:00 a.m.  
[GOV.DOC]

PRESIDENTIAL TOAST:            NATIONAL GOVERNOR'S ASSOCIATION  
   [PLACE]  
   MONDAY, MAY 22, 1989  
   [TIME]

[     You've already been briefed by Baker, Yeutter, Hills,  
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To fight drugs and crime, we'll need coordinated enforcement efforts from local, state, and federal agents. To clean up the environment will demand a coordinated, cooperative campaign from all quarters. And as the EC becomes one market in 1992, we will depend on trade policy that is consistent and multilateral.

This group rightly takes pride in its bipartisan spirit. You're known for taking the initiative. On the issues I've touched on -- and so many others -- it will be crucial that we work together, toward honest, well-conceived solutions.

And I'd emphasize the importance of moving with deliberate speed. Dean Acheson may have been on to something, when he said, "Don't just do something -- stand there."

We have always been a nation so open to new ideas, so devoted to opportunity, that sooner or later it seems people all over the world either emulate America -- or immigrate here. That ought to make us proud. You might say that immigration is the sincerest form of flattery.

America must continue to be -- as she has always been -- an inspiration in the eyes of the world. With your leadership -- she will.

In that spirit, I ask all of you here tonight to raise your glasses:

To a peaceful and ever more prosperous America.

NGA EXECUTIVE COMMITTEE  
PARTICIPANTS

Governor Gerald L. Baliles (VA) YES  
Governor Terry E. Branstad (IA) YES  
Governor Bill Clinton (AR) NO  
Governor James J. Blanchard (MI) NO  
Governor Thomas H. Kean (NJ) YES  
Governor Carroll A. Campbell (SC) YES  
Governor Norman H. Bangert (UT) YES  
Governor Michael Sullivan (WY) YES  
Governor John Ashcroft (MO) YES  
Governor George A. Sinner (ND) NO  
Governor Edward D. DiPrete (RI) YES  
Governor Madeleine M. Kunin (VT) YES  
Governor Michael D. Castle (DE) YES  
Governor Kay A. Orr (NE) NO  
Governor Richard A. Celeste (OH) YES  
Governor Booth Gardner (WA) YES  
Governor Ray Mabus (MS) NO  
Governor John R. McKernan (ME) YES  
Governor James R. Thompson (IL) NO  
Governor Mario M. Cuomo (NY) NO

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(See page 36 for photo captions.)

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**"Our ability to compete inter-  
nationally faces unprece-  
dented challenge from  
abroad. Our world leader-  
ship is at stake, and so is  
our ability to provide for our  
people the standard of liv-  
ing and opportunities to  
which they aspire."**

**John A. Young, as chairman of  
the President's Commission on  
Industrial Competitiveness in  
*Global Competition: The New Reality***

## **Chairman's Overview Foreword**

**"Whatever the new frontiers in scientific exploration, the development and commercialization of new discoveries must be factored into the equation. The goal is to turn ideas into products. States can take the lead in helping turn the fruits of today's research into exportable products and services."**

Governor Gerald L. Baliles  
Virginia

## Chairman's Overview

The world is growing smaller. Fiber optic networks span the continents, linking remote corners of the globe. Billions of dollars move in seconds from Milan to Tokyo to New York. Goods move across continents in a single day. An individual product may contain parts manufactured in five different countries and be assembled in a sixth. New markets and opportunities emerge almost overnight. In this competitive and rapidly changing environment, success belongs to those who can anticipate, adapt, and respond quickly.

The international frontier is no longer the future—a new age has arrived. The evidence abounds. A common market in Western Europe will be finalized in 1992. The United States and Canada are on a ten-year path toward free trade. World output is shifting dramatically to Japan and the Pacific Rim. And, in an attempt to encourage trade and foreign investment, the People's Republic of China and the Soviet Union are experimenting with capitalism. By the beginning of the twenty-first century, the economic terrain will be one of large trading blocs, instead of individual countries, trying to maximize their growth through trade.

As the global marketplace has emerged, the United States' role as an economic decisionmaker has changed. During the 1960s when the U.S. economy was partially insulated from global influence, it was possible to influence the economy by then-traditional fiscal and monetary policies. With the development of the Euro-dollar market, foreign ownership of a large portion of the federal debt, and huge increases in foreign trade, the economic sovereignty once enjoyed by the United States has been reduced.

Twenty years ago, states were bystanders as international events changed the economic landscape. That, too, has changed. Our boundaries are no longer the borders of our states, but every corner of the globe. As Governors, we are challenged to confront this new reality.

State government is well-positioned to meet the challenges of the next century. But we must begin preparing for this transition. Our agenda includes a six-point offensive. Specifically, we must:

- Discover new and emerging markets abroad for American products, to become again the Yankee traders we once were.
- Bring an international perspective to our daily living—to understand foreign nations and the people beyond our borders . . . to learn the international language of business.
- Expand our research, and use our technology, to create both new products and new processes to maintain America's competitive position.
- Capitalize on the natural advantages of American manufacturers and regain competitiveness in our domestic markets.
- Improve our highways, airports, airways, and ports so we can move our people across town and our products around the globe.
- Invest in the health, education, and training of our children so they can live healthier and more productive lives.

This year, I have created six NGA task forces to examine these issues that together form the foundation for the nation's future:

foreign markets, international education, research and technology, domestic markets, transportation infrastructure, and children.

This is the fourth of the six reports. It centers on an issue of crucial importance to America's future competitiveness: our ability to commercialize technology more rapidly than our competitors.

It all comes down to supporting, securing, and maintaining scientific leadership and technological preeminence. The scientific research community can identify any number of potentially rewarding projects—a supercollider particle accelerator, a biology program to map the human genome, a satellite study of the global environment, a permanent space station, or manned exploration of Mars.

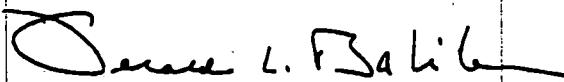
Whatever the new frontiers in scientific exploration, the development and commercialization of new discoveries must be factored into the equation. Capturing the full potential of emerging technologies will require the commitment of government, universities, and thousands of private businesses.

The goal is to turn ideas into products. We must be willing to put our research and development resources into those areas with the greatest commercial promise and to transform our business and academic strategies to take advantage of rapid advances in technology. States can take the lead in helping turn the fruits of today's research into exportable products and services.

This report will demonstrate a need for action, spur debate, and help encourage the formation of a commercialization strategy. Historically, American economic success has been rooted in the imaginative works of the mind and hand. In the past, we have translated scientific discoveries, innovations, and ideas into economic opportunities. It is time to do so again.

In the months ahead, the nation's Governors will continue their work, releasing recommendations on topics ranging from how to finance our aging infrastructure to how to regain our domestic markets. Governors may not agree on every recommendation made in the reports, but we have reached some clear conclusions.

Together, these reports should serve as a guide, outlining the steps Governors and their states can take to lead the nation into the twenty-first century... a road map for an America in Transition.



Gerald L. Baliles  
Governor of Virginia  
Chairman, National Governors' Association

"From basic education to worker training, from technical assistance to strategic planning, from supporting innovative research to establishing trade ties, Governors help provide a healthy climate in which innovation can thrive."

Governor John R. McKernan Jr.  
Maine

## Foreword

Americans have always sought new frontiers—the highest mountain, the deepest ocean, and the furthest reaches of space. In the quest for those frontiers, the United States has led the world in invention and innovation. The international frontier offers a new set of challenges: to master the most advanced technology, create the best possible product, design the most effective export strategy. Success will depend on how well we use our vast human and technological resources to conquer what may be the most extraordinary frontier of all.

In the international economy, a nation's ability to export is vital. Yet the United States is losing ground in many export areas. Our once-large trade surplus has been virtually erased. Although the United States is still the match of any country in research and development of technology, our competitors have become more adept at turning those technologies into products and marketing them around the world.

The cost of missed opportunities is apparent. The United States failed to capitalize fast enough on videocassette recorders and other high-value consumer electronics products. Our competitors moved quickly to capture the world markets for these new technologies and the products derived from them. Meanwhile, the pace of change has quickened. Leadership in the global economy in the next century increasingly will depend on this ability to turn ideas into marketable products for consumers worldwide.

The first challenge is to meet our competitors head-on. We must adapt our business practices and government policies to changes that have taken place in manufacturing and international trade. Our second challenge is to stay on the cutting edge of emerging technologies. The

opportunities are enormous, from telecommunications to superconductivity, from biotechnology to space technology. To meet these challenges, the United States must address certain critical issues.

A growing number of foreign competitors are aggressively pursuing world markets. Their export-driven growth strategies have been successful, while our trade balance has worsened.

America can tap the vast potential in technological innovation, but to do so we must recognize that the process of commercializing technology has changed. Research and development efforts must be more attuned to market needs; they must be driven by rapid technological innovation and consumer preferences. Speed, adaptability, and quality products are essential.

Tapping this potential requires concerted effort from both government and business. Over the last several years, the United States has spent a declining percentage of its gross national product (GNP) on commercially applicable research and development, while other nations have increased their investment. Federal spending on research and development has gone increasingly toward meeting specialized military needs, which are not necessarily translated into benefits for the civilian sector. Similarly, U.S. industry is giving less priority to the quest for knowledge and more to the drive for short-term profits. Mergers and acquisitions are on the rise, while research and development budgets are slashed or eliminated.

We have an enormous resource in our science and engineering workforce, but we do not use this segment of the workforce as effectively as we should to manufacture and commercialize products.

The new international economy increasingly will demand a highly skilled workforce that is technically proficient and can adapt to change. Yet, we are witnessing a shortage of math and science teachers, a serious future shortage of engineers, and a widespread lack of technical literacy among American citizens. Consistently, U.S. students are outscored in math and science by students in other nations.

Federal policies have not kept pace with international and technological changes. Current policies in areas of tax, antitrust, and patent protection, for example, inhibit innovation.

Much in these areas lies outside the realm of state authority. Furthering the commercialization of technologies, to a great extent, requires action by the federal government and industry.

To this end, we call upon the federal government to increase its commitment to commercial research and development, while retaining a strong foundation in basic research; to make research in federal laboratories more accessible to business; to step up translation of foreign scientific journals for use by U.S. industry; and to create a better climate for innovation through more effective tax policy, anti-trust laws, and international agreements.

However, Governors are not waiting for the federal government to act. Governors have seen the need to ensure the economic vitality of our states and the prosperity of our citizens, and have focused traditional state strengths on the problem.

Already Governors are taking the lead in promoting economic growth and vitality.

From basic education to worker training, from technical assistance to strategic planning, from supporting innovative research to establishing trade ties, Governors help provide a healthy climate in which innovation can thrive.

Governors also play a role in making sure that the technological changes are understood. They can foster a basic understanding among U.S. citizens of technology's fundamental role in the future of the economy and of society as a whole.

In recent years, states have taken a more aggressive role in promoting commercialization. A variety of innovative programs have been established, including efforts to stimulate research, introduce technology into firms, support capital acquisition, improve management, and determine overall state technology policy. Governors also have led the new wave of U.S. education reform, promoting programs to improve teacher and student training in math and science, and investing more in university laboratories and research.

Further state actions should focus on the following objectives.

- **Expand research and development.** States should establish long-term direct support for commercial research, encourage business research consortia, and provide incentives for collaborative research projects between industry and higher education. In the international arena, states should sponsor international exchanges, negotiate joint technology agreements with other countries, and use their overseas offices to track international technological advances.
- **Convert ideas into products.** States should enhance the climate for innovation by developing guidelines for state

**"To bring science back to its proper place in society, we need to bring society back to science. We must establish a broad and balanced research program. We need a plan. We need priorities. We need clearly articulated goals for science, technology, and education, so American citizens can see they have a stake in the outcome."**

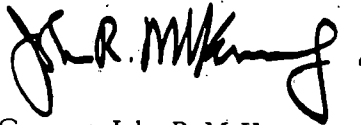
Governor Richard F. Celeste  
Ohio

policy goals, teaming up with other states to initiate such programs as regional product development centers, and providing entrepreneurship training and assistance through the state university system. States should help develop a world-class workforce by improving technology literacy in both schools and the workplace; offering incentives for math and science students; retaining top science and engineering faculty; and providing continuing education opportunities for corporate managers, scientists, and engineers. States can help businesses develop new products by enhancing seed capital programs, expanding advanced technology and industrial research centers, and strengthening incentives for university-industry collaboration.

- **Develop products for the international marketplace.** In helping develop better manufacturing processes, states can do the following: establish flexible manufacturing centers and networks; direct higher education institutions to reform business administration and engineering programs to emphasize manufacturing and production management; and establish Governors' award programs for excellence in manufacturing. Awards serve as an incentive for quality achievement and heighten public and media awareness of technology's importance.

Just as the United States built a public education system that created the most skilled and productive labor force in the world; just as we built an interstate highway system and transportation network to move raw materials and finished goods to their markets inexpensively; just as we built a research and development capacity that harnessed nuclear energy, developed the transistor and the integrated circuit,

and landed men on the moon — we now must act to rekindle our innovative and entrepreneurial spirit and develop a successful commercialization capacity.



Governor John R. McKernan Jr., Maine  
Chairman, NGA Task Force on Research  
and Technology

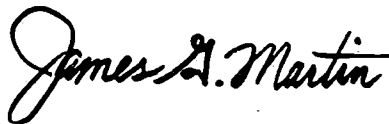
**Members of the Task Force**



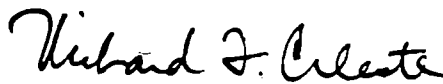
Governor Roy Romer, Colorado



Governor Terry E. Branstad, Iowa



Governor James G. Martin, North  
Carolina



Governor Richard F. Celeste, Ohio

## The Challenge

**"Global competition has created new ground rules for technology. The keys to success are speed and teamwork. We've been too slow, too fragmented, too uncoordinated, and too adversarial. We must become faster, more focused, more comprehensive, and more collaborative. And this means a new, more active partnership with government."**

**Admiral B. R. Inman, Chairman and CEO, Westmark Systems, Inc. and former CEO of Microelectronics and Computer Technology Corporation**

**"Even in times of prosperity and strength, we must look to the future and invest in it. Winning strategies for the next century are the ones that will both strengthen America's position as the international wellspring of scientific discovery and dramatically accelerate our ability to develop and commercialize emerging technologies."**

**Governor John R. McKernan Jr.  
Maine**

## The Challenge

Invention, innovation, and entrepreneurial spirit are fundamental to the American way of life. These attributes have driven our productivity, our ability to export, and our high standard of living. Today, these attributes are also the cornerstone of a new world economy in which research and technology are being utilized to create new products and manufacturing processes around the world.

As the world marketplace becomes more open, more diverse, and more dynamic, a greater economic premium is being placed on a nation's ability to export. Economic leadership in the twenty-first century will belong to those countries that effectively apply research and technology to maximize their exports in an ever-changing world market. How America responds to this challenge will fundamentally determine its economic future.

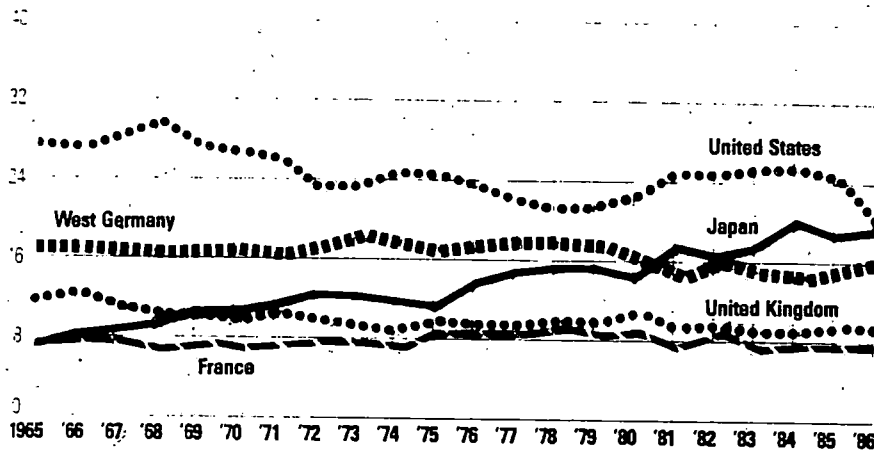
U.S. industry can improve its competitive position by applying advanced technology design and manufacturing processes to its products. Even so, the United States will find it increasingly difficult to compete with low-wage countries in manufacturing, particularly those that are introducing technology at a rapid rate. This troubling fact means that a strategic emphasis on the export of technology-related products is essential to America's continued economic leadership.

The United States is still the match of any country in research and development, spending more than any other country—about \$120 billion in 1988. However, the United States is not translating this research and technology into commercial products rapidly enough to maintain leadership in the future.

- **The U.S. share of the world technology market is declining.** The President's Council on Industrial Competitiveness reported in 1985 that seven of ten U.S. technology sectors had lost world market share between 1960 and 1980.
- **The United States' trade balance in high technology has eroded.** Trade in technology-related goods was a leading U.S. export strength throughout the post-war era. But the technology trade surplus began to decline sharply in the 1980s, swinging from a surplus of \$27.3 billion in 1980 to a first-ever deficit of \$700 million in 1986. In the last two years, surpluses have been achieved: \$2.7 billion in 1987 and \$8.1 billion in 1988.
- **The United States lags in the introduction of new products.** Too often ideas generated in the United States are lost to other countries. From the videocassette recorder to laser technology to semiconductors, the United States has often advanced state-of-the-art technology only to lose out to foreign competitors that have more effectively designed, produced, and marketed the final product. The three companies awarded the highest number of U.S. patents in 1987 all were Japanese.
- **Our competitors are accelerating their spending on research and technology.** The United States continues to increase spending on research and technology development, but other nations are increasing their spending at a faster rate. Thus the U.S. share of world research and development spending has dropped from nearly 70 percent in 1965 to 53 percent in 1985.

## 1 Share of High Technology Exports for Major Industrial Countries

Percentage

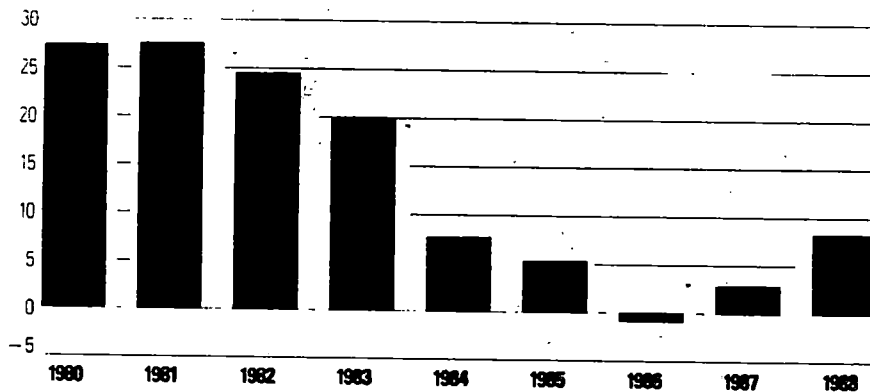


Notes: Figures reflect information from 24 reporting countries on exports to, and imports from, each country from nearly 200 partner countries. Technology-intensive products are defined as those for which R&D exceeds 20 percent of value-added. The industrial countries are Austria, Belgium, Canada, Denmark, France, Italy, Japan, Luxembourg, Netherlands, Norway, Sweden, Switzerland, United Kingdom, United States, and West Germany.

Source: U.S. Department of Commerce, International Trade Administration, Office of Trade and Investment Analysis, 1989.

## 2 U.S. Trade Balance in High Technology Goods

Values in Billions of Dollars



Note: Imports are calculated on a customs-value basis.

Source: U.S. Department of Commerce, International Trade Administration, Office of Trade and Investment Analysis, 1989.

If these trends continue, the United States may well find itself shut out of major markets in the future. America's ability to maintain a vibrant consumer electronics industry, for example, is jeopardized by our failure to manufacture videocassette cameras and compact disc players. In turn, this limits our capacity to develop related technologies in areas such as office surveillance equipment, compact disc computer memory storage, and robotic equipment for space exploration.

The failure to keep this and other major sectors of the U.S. economy viable will have significant costs, both in lost exports and increased imports. The results will be lost jobs, lost income, and lost economic opportunity.

The United States must act now to reassert itself as a world leader in technology development and commercialization—rapidly bringing innovations to the product stage and quickly adapting them to world markets. We must keep abreast of technology developed in other countries and blend it with other discoveries or technologies to create new products for export. Success will require new perspectives, new priorities, and new partnerships.

The future holds additional challenges. Emerging technologies will add new dimensions to the impact of scientific discoveries, and the world economy will only increase its rate of change.

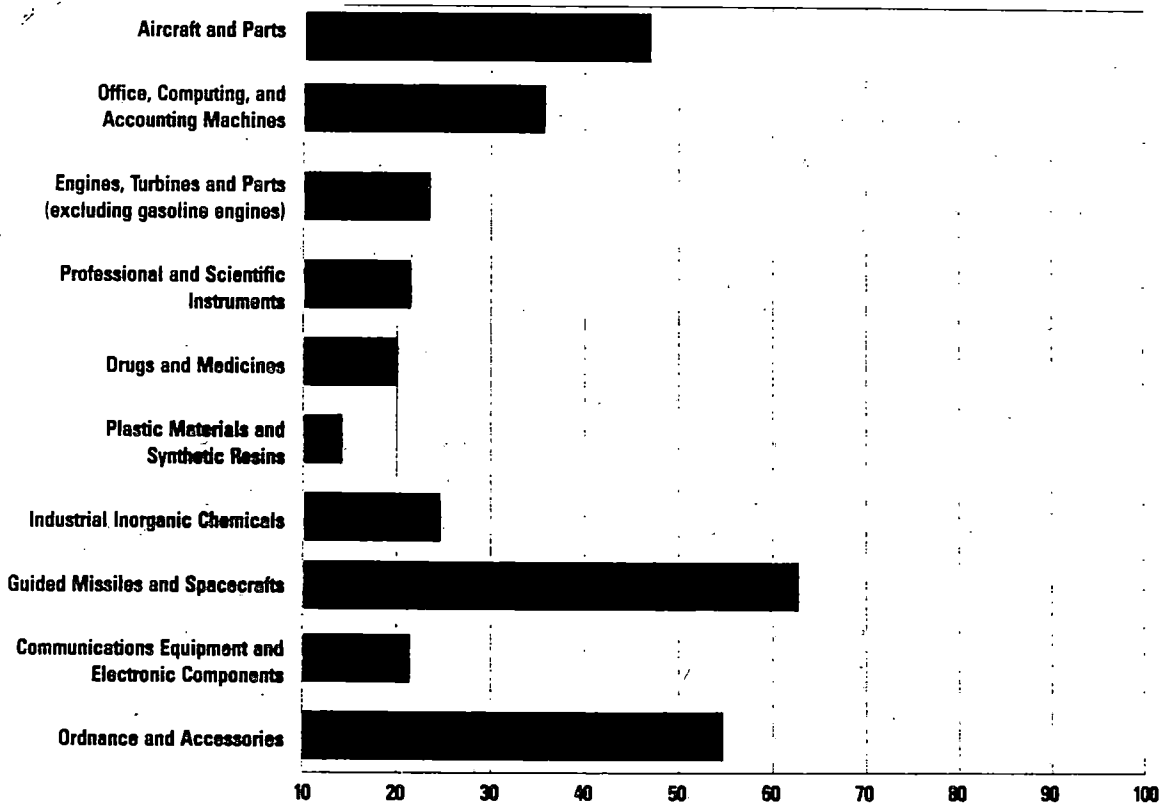
Already biotechnology is restructuring the agricultural and pharmaceutical industries. Advances in superconductivity hold the promise that much of the electronic machinery, equipment, and products being used today could become obsolete within a relatively short period of time. Innovations in new materials such as borons and

ceramics—now used for sports equipment and automobile engine production—can rapidly advance into the construction industry and the manufacture of industrial equipment. The development of digital compatibility in televisions, telephones, radios, recordings, and movies will link all of these products with computers, revolutionizing these industries.

The United States must make a national commitment to capture the economic potential of these and other technologies. Our future position in the world and our national standard of living depend upon it. The nation that develops the most effective research and technology strategy will lead the world into the twenty-first century.

**Figure 3 U.S. Share of Selected High Technology Exports, 1984**

(Among major industrialized countries)  
Percentage



Note: Categories represent 10 highest ranking industries in research and development spending as a percentage of output.

Source: U.S. Department of Commerce, International Trade Administration, Office of Trade and Investment Analysis, 1989.

## The Context

**"The continued economic progress of the United States demands that we maintain and improve our international competitiveness. Our ability to do that depends on the full development of our human resource potential, promotion of scientific and technological progress, removal of barriers to innovation, careful assessment of any governmentally imposed burdens on the free economic system, and removal of domestic barriers to the flow of goods and services."**

**President George Bush, announcing  
the creation of the White House  
Council on Competitiveness,  
April 1989**

**"If you're the only contender in the race, you can stroll across the finish line with your new product. For years the United States was in that position. America often is still the first out of the starting gate with an idea, but we have to do better at completing the race to commercialization—and winning it."**

**Governor James G. Martin  
North Carolina**

## **The Context**

For most of our history, economic strength was based largely on access to natural resources, inexpensive transportation, scale of production, and size of market. In each of these areas, the United States had advantages over its foreign competitors and thus controlled the world economy.

The U.S. dominance of world markets in the 1950s and 1960s also stemmed from the condition of economic competitors who were reconstructing after the war, as well as America's worldwide leadership in science and technology, which resulted from large investments in research.

Today, however, the U.S. market is about 25 percent of the world market, compared with nearly 60 percent at the end of World War II. Today more products are created from man-made materials that require manufacturing know-how rather than plentiful natural resources. Today our competitors have thriving economies. The world has changed and we must change with it.

Recapturing our role as a world leader, particularly in research and technology, requires prompt and decisive action. It requires an appreciation of the competition the United States faces in commercializing technology. It requires a grasp of how commercial product development has changed and an understanding of the players and their roles in the commercialization process. Finally, it requires a vision of the potential impact of today's emerging technologies.

Our trading partners, especially Germany and Japan, have dramatically increased their technology-intensive exports over the last decade. Japanese products are now beginning to dominate the market in three major areas: communications and

electronics equipment, professional and scientific instruments, and office and accounting machines. This dramatic change is partly the result of these countries' committing more than 2.8 percent of their GNP to civilian research and development, while the United States spends only about 1.7 percent.

Japan and Western Europe do not present the only challenges to our economic future and standard of living. The "Four Tigers of East Asia"—Hong Kong, Singapore, South Korea, and Taiwan—also have started to challenge our leadership. Their economies have achieved almost unprecedented growth in some high technology product areas by adapting new technology, developing a talented scientific and engineering workforce, and streamlining manufacturing processes.

The story of the videocassette recorder epitomizes the United States' failure in the development of technology-related products. Ampex, a U.S. corporation, invented the videotape recorder, but sold its patents to Japan's Sony after it was unable to develop a marketable product. By shifting from tapes to cassettes and designing a machine that could manufacture video recording heads at a reasonable price, the Japanese developed a product that revolutionized the television and film industries. In 1987 Japan manufactured more than 72 percent of all videocassette recorders; the United States produced less than 1 percent.

Similar stories can be told about stereo sound equipment and phonographs. The United States was at one time a major exporter of each of these products; today we export almost none. Our competitors found a way around our vast lead in

technology by focusing their attention on developing products for important world markets.

Today in consumer electronics—an area once dominated by American firms—the top ten worldwide companies (by dollars of sale) include only two U.S. firms: IBM and General Electric. Of the other companies, six are Japanese and two are Western European.

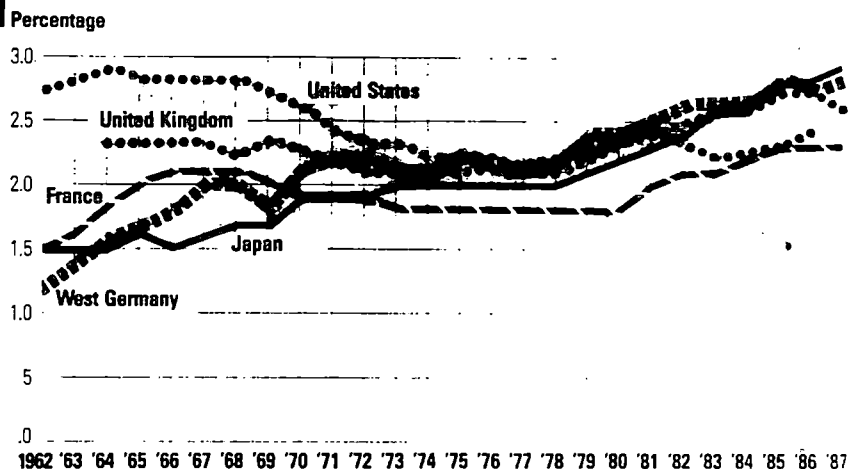
Leadership in the global economy now is associated with the ability to translate the latest advances in research and technology into products for consumer markets. Future economic strength will be linked to this ability to “commercialize” research and technology.

### The Commercialization Process

During the glory days of U.S. high technology dominance, the commercialization process was straightforward and clear: it was driven by research. Scientists and researchers worked in laboratories and when their discoveries seemed useful to an industry, that industry—automobile, steel, textile—would adopt the change. America was the world’s manufacturer. There was no significant competition. Universities trained U.S. engineers and scientists, and the government supported academic research and financed scientific advances in areas such as aerospace, computers, and nuclear power.

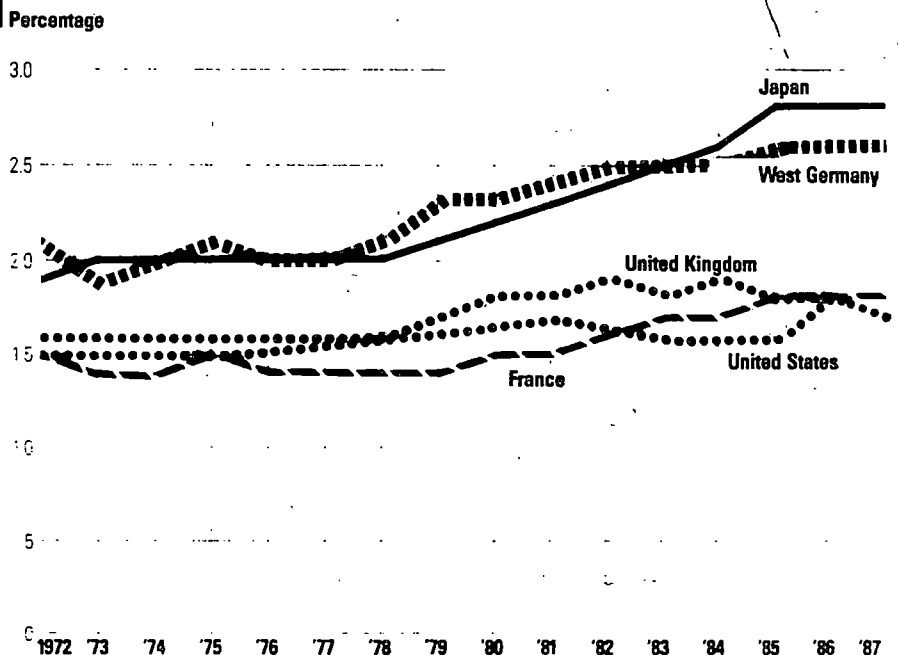
Today there is a new model. A focus on the market and a continual and open communication system between all participants in the process are key ingredients, according to the Council on Competitiveness’ latest study, *Picking Up the Pace*:

Figure 4 Total R&D Spending as a Percentage of GNP



Source: National Science Foundation, *Science Indicators*.

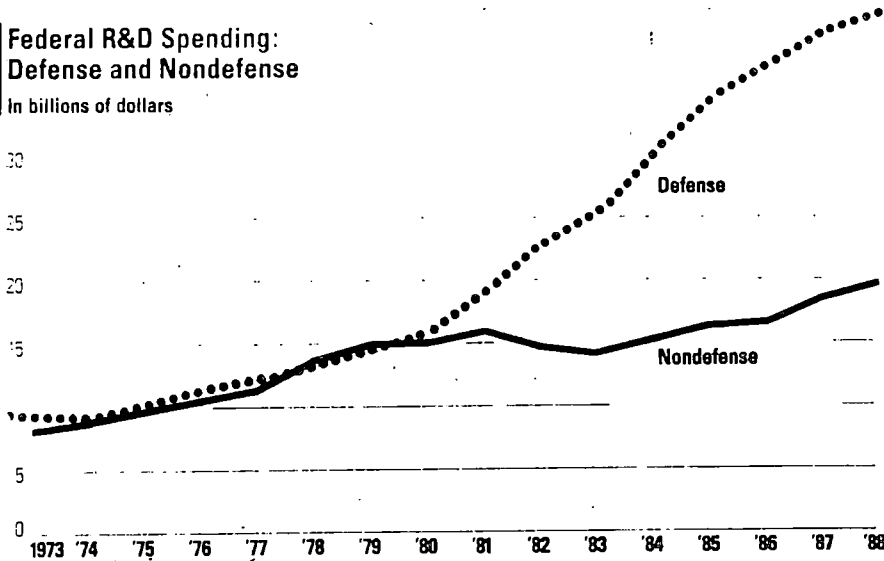
Figure 5 Nondefense R&D Spending as a Percentage of GNP



Note: Figures reflect national R&D expenditures, excluding government funds for defense.

Source: National Science Foundation, *Science Indicators*.

Fig. 1  
**Federal R&D Spending:  
 Defense and Nondefense**  
 In billions of dollars



Source: National Science Foundation, *Science Indicators*.

"Innovation is an interactive, interdependent process in which design, manufacturing, and product development all drive—and, at the same time, are highly dependent on—research. In policy terms it suggests that science and engineering must be viewed as closely linked and as both the product and source of technology. It also suggests that products must be rapidly advanced to the marketplace so that market feedback can be factored into new research and improved technologies."

No longer does university or laboratory research automatically set the pace for advancement. Science and engineering now make contributions throughout the process, beyond the initiation stage. Comments from product users—market feedback—are an integral part of the process.

Our competitors know that everyone in the process has information that can improve the product. Their manufactur-

ing processes involve a greater amount of worker involvement. Workers suggest ways a product can be assembled more easily or more efficiently with fewer mistakes, or how a slight change might make the product attractive to an entirely new set of users. The Sony Walkman was the result of an incremental shift in the manufacture of cassette players that has changed the sidewalks of the world.

In the United States, three players are involved in the commercialization process: industry, academia, and government.

**Industry.** Business is *the* major player. The structure of businesses and industries, the communication flow, the allocation of resources, personnel decisions—nearly every business decision is related to commercialization. The majority of the individuals involved in the process are employed in the private sector. Well over half of commercially applicable research and development money comes from industry funds.

In 1987, U.S. industry funded 52 percent of total U.S. nondefense research and development, and performed 73 percent of all U.S. research. For the most part, U.S. companies engage in research and development to support existing business activities, rather than to uncover new business opportunities. Large corporations perform most industrial research and development, but in 1985, smaller businesses introduced a greater number of new high technology products for each dollar spent on research and development.

U.S. industry spending on research and development as a percentage of pre-tax profits varies by sector. Electronics firms make the greatest investment, followed by office equipment, computer, and telecommunications firms. However, today many large U.S. firms are cutting back on corporate research and are closing their laboratories. Overall, U.S. industry's involvement in research and development which had increased 6 percent over inflation in 1986—grew by less than 4 percent over inflation in 1987.

The United States has a large number of scientists and engineers in its workforce, but given the size of our country, the difference is misleading. We are further behind our competitors when scientists and engineers are viewed as a percentage of the total workforce, and when compared to those actually engaged in research and development. Finally, the nature of the workforce is changing. By the year 2000, women and minorities, traditionally underrepresented in science and engineering, will represent 85 percent of new entrants to the nation's workforce. To ensure an adequate supply of scientists and engineers to meet future demands, education and training programs must reflect these and other changes.

**Academia.** Colleges and universities play a key role in the commercialization process because they train scientists, engineers, business managers, and corporate executives. They play a more direct role by conducting research: either basic scientific research or applied research in conjunction with individual companies.

Federal funding for university-based research has been steadily increasing, from \$7 billion in fiscal 1980 to \$11 billion in fiscal 1989 in constant 1982 dollars. However, the federal share of funding for university-based research fell from 68 percent in fiscal 1980 to 59 percent in fiscal 1989. In addition, federal funding for modernization of university research facilities fell approximately 35 percent in constant 1982 dollars between fiscal 1980 and fiscal 1986.

Salaries for engineers in industry have been increasing, which has drawn more and more faculty into private business. The result has been a shortage of university engineering faculty. The National Academy of Engineering reported that about 1,300 engineering faculty positions—8.8 percent of the total—were vacant in 1985. Further, many of the science and engineering faculty recruited in the 1950s in response to the launch of Sputnik are expected to retire in the early 1990s, which will exacerbate the shortage.

Increasing the number of engineers and scientists in the United States faces still another hurdle. The U.S. college-age population peaked in 1983, and even though the percentage enrolled in engineering programs is slowly increasing, absolute numbers are still declining.

**Government.** Government policies play a major role in creating the climate for scientists, engineers, manufacturers, and

managers to succeed. This includes tax, fiscal, and antitrust policies; patent enforcement; education and training; and financial and technical assistance to businesses.

Traditionally, the federal government has confined its role in technology development to funding basic research that contributes to the technology base and funding applied research in areas such as national defense, energy, and health. It acts only indirectly to encourage commercialization by the private sector.

- Federal agencies spent approximately \$60 billion on research and development in 1988. Nearly 68 percent went for defense, up from 55 percent in 1981. Outside of defense, aerospace, and health, federal agencies spend little on applied research and development.
- More than 700 laboratories representing a dozen different federal agencies operate today. They receive about

**\$20 billion—or one-third of total federal research and development spending.**

The most significant development in government involvement over the past decade has been the increased involvement by state governments in promoting the commercialization and adaptation of technology. By 1988 forty-four states had established programs to support commercialization. With total spending of more than \$550 million in fiscal 1988, these programs stimulate research, introduce technology into firms, support capital acquisition, improve manufacturing practices and management skills, and determine overall state technology policy.

### **The Future**

Tomorrow's challenges offer a myriad of opportunities. Emerging technologies such as superconductivity, biotechnology, and advanced materials will drive the develop-

**"Technology is not a 'thing,' but a dynamic process involving the application of knowledge, resources, and technique to problem solving. It is not simple or neat, nor does it happen only in one way. Technology emerges not only from the laboratory and university, but also from the manufacturing process. Often technology is born on the factory floor."**

**Lewis B. Kaden, as chairman of the Cuomo Commission on Trade and Competitiveness, in *The Cuomo Commission Report, 1988***

ment of new and popular products. High-definition television alone is estimated to create a market of \$40 billion by the year 2007. Compact disc players with the capacity to record will likely create a worldwide market, and could displace audio cassette recorders.

Telecommunications products and services are projected to account for more than 10 percent of world GNP by the year 2000, according to the U.S. Department of Commerce. The market for ceramics, \$4 billion in 1980, is expected to grow by at least 10 percent each year through the 1990s.

The Japanese have developed the Linear Motor Car, a train levitated by superconducting magnets, that has reached speeds above 320 mph, fast enough to replace commuter airlines. U.S. biotechnology firms have genetically engineered corn plants resistant to a wide range of pests, which could reduce the pesticides needed to guarantee a healthy crop. The frontiers of science continue to expand.

Just as countries with gold once led the world, followed in turn by countries with plentiful natural resources and inexpensive energy, the twenty-first century will dawn with countries successful in technology commercialization leading the way.

## Critical Issues

**"Military research during World War II led to the jet engine, computers, and nuclear power. Today, however, 97 percent of military R&D spending goes not for basic science that can yield a spectrum of benefits, but for weapons development and testing—work that does little of use in the civilian sector. Such military spending has helped the United States maintain its global market share in military-intensive areas such as aircraft, guided missiles, and spacecraft, even as the country lost its competitiveness in civilian technology markets."**

**Judith B. Rapp**  
Cornell University economist at  
American Association for the  
Advancement of Sciences meeting,  
January 1983

"The increasingly competitive global marketplace demands constant product refinements. We must learn to do better even those things we now do very well. Our long-standing leadership in health sciences and biotechnology is one area where an already strong foundation can support a rich set of opportunities for the future."

Governor Terry Branstad  
Iowa

## Critical Issues

The opportunities presented by emerging technologies make the need for action doubly critical. The United States must revitalize existing industries to benefit from the approaches to innovation and manufacturing that have worked for our competitors. We also must push more aggressively toward discovery and implementation of these new technologies.

It is time to unleash the creative energies of the American people and rekindle an entrepreneurial spirit to meet these challenges. There are barriers in our path, but by overcoming them the nation stands to benefit. Doing so will strengthen our ability to compete and succeed in world markets as emerging technologies are incorporated into every industry.

### Emerging Technologies

Throughout time, "each technological innovation has met a critical need while creating the demand and the opportunity for the next breakthrough," says Trevor I. Williams, author of *The History of Invention*. Technology continues to shape modern society, and some innovations bring revolutionary change.

Harnessing electricity brought light to the world and powered much of the Industrial Revolution. The telephone was the vanguard of a host of communications products and services that provide the foundation for economic, political, and social activity. Jet aircraft have brought even the most remote points of the globe within comfortable reach. Television has had a profound effect on activities as diverse as medical diagnosis and the conduct of foreign policy.

Today, fiber optics and computer circuitry are being integrated into a broad cross-section of business and other activities, with even more potential for innovations and applications. Still further in the future, other emerging technologies have the potential to revolutionize the way we live. What are some of these emerging technologies and what role could they play in restructuring U.S. industries? Following are some technologies most frequently cited as holding promising applications.

■ **Space Technology.** The world already has benefited from a number of products derived from space program research and development, including miniaturized batteries for pacemakers and watches, heat-reflective material to insulate shock patients, and new approaches to treating and recycling wastewater. But even more profound innovations may be in store. Planet and space exploration technologies and discoveries aid environmental, meteorological, and geological endeavors, and have implications for materials research and communications. The ability to use the zero-gravity conditions of space for sustained periods may make it possible to produce new materials that cannot be produced on earth. Space-grown crystals could accelerate the design of new pharmaceuticals or synthetic vaccines. Containerless processing of materials eliminates contamination problems and permits production of special glasses and fiber optics useful in high-energy laser applications and superconducting ceramics. Sustained microgravity aids the suspension of materials, which could lead to the creation of new super-pure metals with greater strength and improved physical properties.

■ **Biotechnology.** Experiments in genetic engineering hold the promise for agricultural, medical, and pharmaceutical products unimagined a generation ago. They would cost less than the products they replace, be safer and more effective than those currently available, and could virtually alleviate world problems such as malnutrition, energy production, disease, and pollution.

■ **High-Definition Television.** In the very near future, this new technology could render an entire generation of home video and studio equipment technologically obsolete, as it opens up new dimensions and opportunities in video imaging for medical and defense purposes. It has been estimated that high-definition television could result in as much as \$200 billion in economic activity and create 180,000 new jobs over the next several decades.

■ **Superconductivity.** Prototype superconducting magnets have been developed that cost about one-fifth as much to operate as conventional magnets; new low-temperature superconductivity generators can produce 25 horsepower per pound compared to only 2 horsepower per pound for conventional generators; and new microprocessors can operate twenty-five times faster than comparable silicon chips and use only 0.5 percent as much power. Eventually, superconductivity could make it possible to develop low-loss electric transmission systems, high-speed computers, and other forms of magnetic technologies such as metal sorting, purifying, and recycling.

In addition, polymer plastics and ceramics have electronic and structural uses as alternatives to metal, yet take less energy to make and are immune to corrosion. Polymers' enormous ability to absorb energy and vibrations makes them useful in robot arms, tennis rackets, and automobile bodies. Ceramics can be used to make engines more lightweight and fuel-efficient, to make cutting tools tougher and more precise, and as bone and joint replacements.

These and technologies such as robotics, artificial intelligence, and microelectronics could immensely affect our economic future. Innovations and products derived from these technologies could mean tremendous commercial opportunities for the United States, but only if it is willing to mobilize its resources. In a number of areas, there is evidence that we are already losing ground.

■ Twenty-five years ago, only the United States and the Soviet Union had the capacity to travel to space. Today, at least ten countries have established

facilities for space launches. This gives our competitors access to space in order to conduct research and development in the full array of space products and processes.

■ Eight countries—Australia, Austria, France, Germany, Japan, Netherlands, Sweden, and the United Kingdom—have made biotechnology an established research and development or industrial priority. The United States has yet to identify official priorities for industrial biotechnology research and development.

■ Only one U.S.-owned company produces television sets, and some of its plants are not located in the United States. Without that manufacturing base, we may be shut out of the high-definition television market altogether. Sony will soon offer a complete line of high-definition television equipment, including video cameras and recorders, monitors, display and transfer systems, and post-production equipment. Fiber-optic cable, currently used primarily by telephone companies in this country, is ideal for transmitting high-definition television signals. Japan has already announced construction of a fiber-optic and satellite-based network to distribute high-definition television services to ten Japanese cities within three years.

■ In analyzing U.S. efforts in superconductivity, the Congressional Office of Technology Assessment noted that the financial criteria that drive decision-making in American corporations work against a technology like superconductivity that has uncertain prospects and delayed profits. The short-term view fostered by U.S. financial markets could put American companies behind the

Japanese within two or three years—if they are not already behind. Japanese firms are much more aggressive in studying possible applications of superconductivity. Their companies have more people working on the topic, many of them applications-oriented engineers and business planners who can convert discoveries into products for the marketplace.

The opportunities created by these emerging technologies are plentiful, far-reaching, and largely still within our grasp. However, with each passing day, with each action not taken, the gap between the promise and the reality widens. Too often, opportunities slip through our fingers and into the hands of our major international competitors.

### Barriers to Success

The barriers to developing these technologies are apparent when one considers the way ideas are converted into successful products. Doing this as effectively as our competitors is central to gaining a share of the world market in many product areas.

### Research and Development

Research and development, where the commercialization process begins, is the cornerstone of competitiveness in emerging technologies. This is also the area where the United States in the past has enjoyed its greatest competitive advantage. At any level of comparison, today we are at a disadvantage.

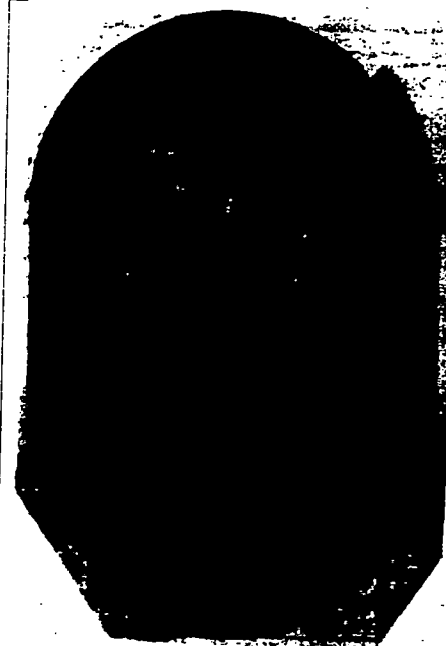
- The United States spends more money on total research and development activities than any other country. However, in commercially applicable research,

the situation is very different. The United States spent 1.7 percent of its GNP on nondefense research and development in 1987, compared with 2.6 percent in West Germany and 2.8 percent in Japan. Both countries have been ahead of the United States on this measure since the 1960s. Throughout the 1980s, they have seen their nondefense research and development rise as a percentage of GNP faster than that of the United States.

- Of the total \$60 billion federal research and development budget in 1988, 68 percent went for national defense, compared with 50 percent in 1978. Defense projects have become increasingly specialized and less likely to provide support for broader commercial technology development and application. Because this work is based on the concept of "the best product regardless of price," it fails to deliver cost-efficient spin-offs for industry.
- Smaller U.S. corporations that have relied heavily on the results of federal research and development activities have suffered as the federal emphasis has shifted to more specialized defense projects.
- U.S. industry is outspent by its competitors. Japanese industry spending for research and development represents 1.9 percent of GNP, compared with only 1.3 percent for U.S. industry, much of which is concentrated among our largest industrial corporations.

The results of this change in the relative level of research spending are already showing.

Figure 7 Federal R&D Spending by Purpose



1968

- Defense 52%
- Health 6%
- Space 27%
- General Science 3%
- Energy 4%
- Natural Resources and Environment 2%
- Other 7%

Note: Figures may not total 100 percent due to rounding.

Source: National Science Foundation, *Science Indicators*.

- Between 1975 and 1987, the share of U.S. patents granted to foreigners rose from 35 percent to 46.6 percent, with the Japanese share more than doubling.
- General Electric, which for twenty-five years had been the annual recipient of the greatest number of U.S. patents, slipped to number four in 1987, surpassed by Canon, Hitachi, and Toshiba.
- In a number of key product areas, U.S. inventors are granted a lesser share of U.S. patents than Japanese or German inventors. These include primary metals, aircraft, and motor vehicles.

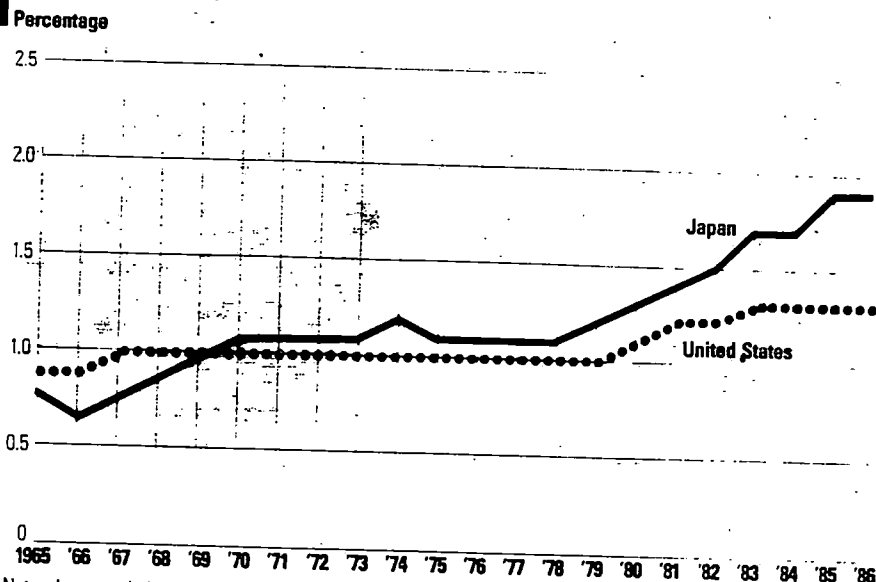
### New Product Development

The actual development of full-scale models of new products is the most expensive portion of the commercialization process, requiring both long-term investment and the highest risk of capital. Our competitors often establish consortia to spread this risk, and they utilize their strengths in state-of-the-art manufacturing techniques to deliver a well-designed and engineered product. They also benefit from having a more technologically literate workforce with superior math and science skills and significantly more engineers per capita.

U.S. industry's focus today is short term—the quarterly profit and loss statement. Rather than viewing long-term investments in product development and improved manufacturing processes as assets, the financial markets consider them as expenses.

“Merger mania” preoccupies many major U.S. firms. Press reports on takeovers far outnumber reports on successful solutions to manufacturing problems or technological advances. These pressures only drive management's attention further from the

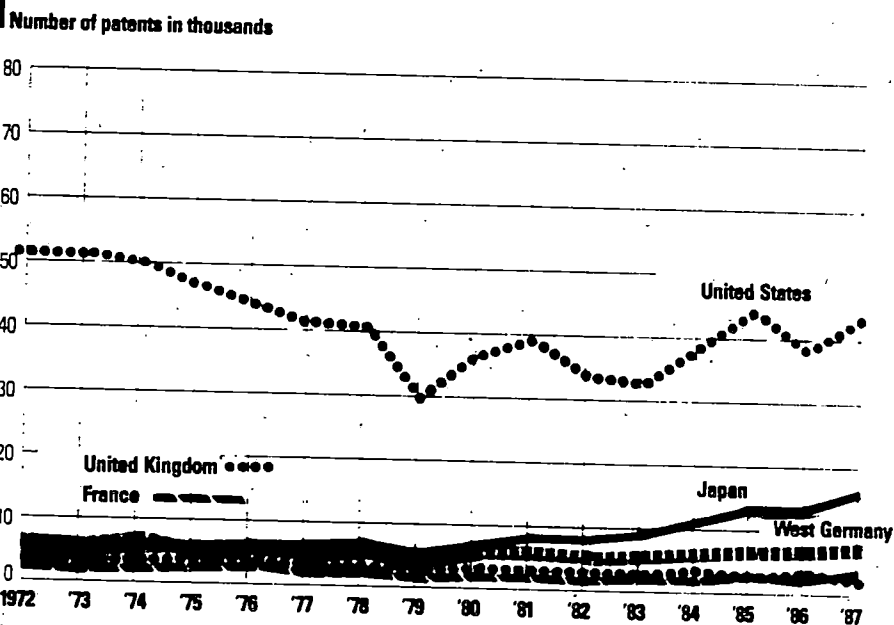
Figure 9 **Company-Funded R&D as a Percentage Of GNP, U.S. v. Japan**



Note: Japanese industrial R&D is more than 98 percent company-funded.

Source: National Science Foundation, *The Science and Technology Resources of Japan: A Comparison with the United States*, June 1988.

Figure 10 **U.S. Patents Granted by Country of Inventor**



Note: U.S. patent counts for 1979 are unreliable because Patent and Trademark Office did not have enough money in that year to print all approved patents.

Source: U.S. Department of Commerce, U.S. Patent and Trademark Office, "Technology Assessment and Forecast Report: All Technologies Report, 1963-1987," March 1988.

critical goal of creating new products, and hinder greater investment in research and development. The National Science Foundation's annual Survey of Industrial Research and Development showed that out of the 200 companies that account for 90 percent of U.S. industrial research and development, twenty-four companies involved in mergers or leveraged buyouts reduced their research and development expenditures by 5.3 percent between 1986 and 1987, while the remaining companies experienced an increase of 5.4 percent.

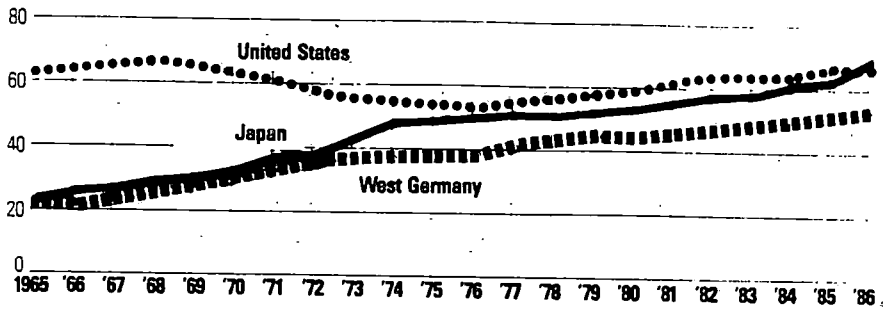
The difficulties associated with establishing cooperative ventures with other companies—antitrust uncertainties, tax treatment, and corporate structure and control—have limited the chance for U.S. firms to share risks more efficiently. Sematech, the recently established joint industry consortium to find improved processes for manufacturing semiconductor chips and the Microelectronics and Computer Technology Corporation Project (MCC) are two exceptions that illustrate the potential in joint industry efforts.

In addition, the failure of U.S. companies to profit from earlier discoveries due to the inability to enforce international patents adds to the risk of product development. Corning, which discovered fiber optics, lost the major share of profit on its discovery after investing more than \$200 million in research.

The quality of the workforce will remain an issue in the next century unless decisive action is taken. The United States faces a very serious shortage of engineers. The National Science Foundation indicates that between 1989 and 2010, the nation will fall short—by more than 700,000—of the expected demand by industry and academia for degreed scientists and engineers.

**Figure 11 Scientists and Engineers Engaged in R&D**

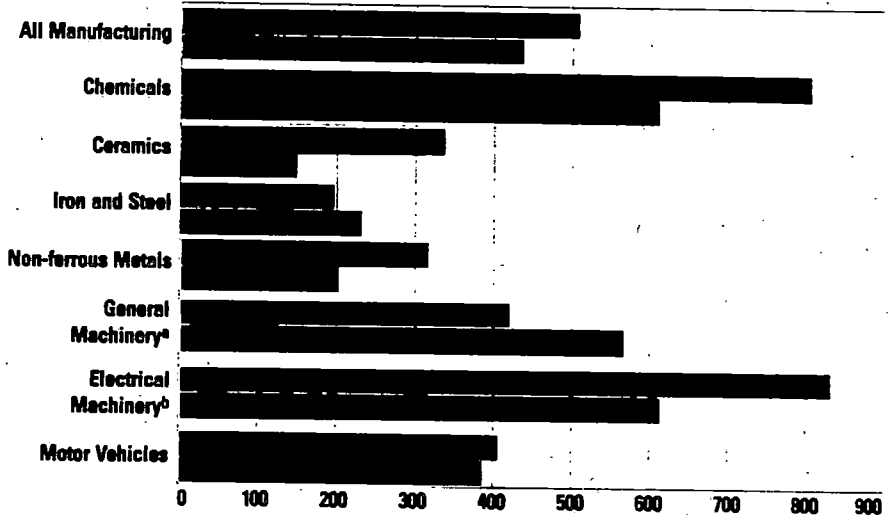
Per 10,000 labor force population



Note: Figures include all scientists and engineers engaged in R&D on a full-time equivalent basis, except those for Japan, whose data include persons primarily employed in R&D.  
Source: National Science Foundation, *Science Indicators*.

**Figure 12 Industrial Scientists and Engineers Engaged in R&D per 10,000 Employees for Selected Manufacturing Industries, 1986**

Japan  
United States



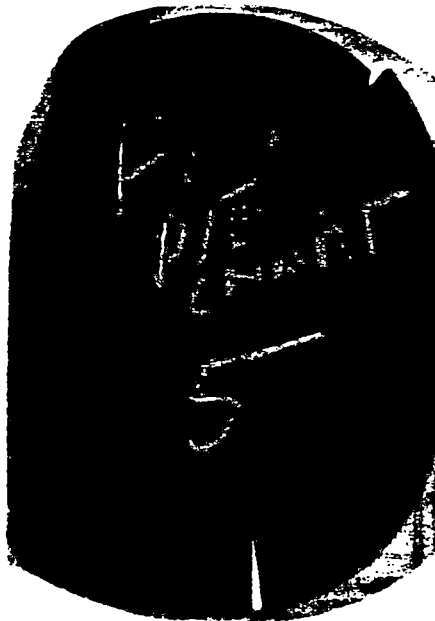
Notes: a. Number of U.S. scientists and engineers are in full-time equivalents; Japanese are total numbers of scientists and engineers engaged in R&D.

b. These categories are not comparable for the United States and Japan because they represent different SIC product groupings. The U.S. category includes computers, whereas computers are classified under electrical machinery in Japan.

Source: National Science Foundation, *The Science and Technology Resources of Japan: A Comparison with the United States*, June 1988.

Figure 13

### Distribution of Costs for Development and Introduction of New Products and Processes



#### Percentage of Total Project Cost Japanese Companies

- Research, Development, and Design 21%
- Prototype or Pilot Plant 16%
- Tooling and Equipment 44%
- Manufacturing Start-Up 10%
- Marketing Start-Up 8%

#### U.S. Companies

- Research, Development, and Design 26%
- Prototype or Pilot Plant 17%
- Tooling and Equipment 23%
- Manufacturing Start-Up 17%
- Marketing Start-Up 17%

Note: Figures may not total 100 percent due to rounding.

Notes: Survey figures are from 1985 for 50 matched pairs of U.S. and Japanese firms. In the category "prototype or pilot plant," for cases of product development, the costs include investments in pilot plants.

Source: Congressional Office of Technology Assessment, *Commercializing High-Temperature Superconductivity*, June 1988.

The United States has critical shortages of qualified teachers in key science areas. The National Science Foundation estimates that 60,000 math and science teachers in U.S. secondary schools are not fully qualified, and that an additional 30,000 secondary school math and science teachers will be needed by 1995. In addition, in 1985 8.8 percent (or about 1,300) of all university engineering faculty positions were vacant, a situation that will get worse as the faculty recruited in the 1950s in response to the launch of Sputnik retire during the next ten years.

The continuing acceleration of scientific discoveries and technological advancement requires that education be viewed as a continuing process for scientists and engineers, as well as for industry—both labor and management. As emerging technolo-

gies are integrated into businesses, continuing education will be needed to understand the opportunities these discoveries offer.

#### Manufacturing

Manufacturing is essential to realizing the full potential of the commercialization process. Without adequate capacity in manufacturing, much of the information needed for the design of a product is lost. Further, when research is market-driven, the manufacturing process is the place where changes can be made quickly, resulting in either a more successful product or greater reductions in cost.

In today's markets—especially for technology-related products—product lives are so short (an average of six months)

that once a product is being manufactured, its successor must already be in the late design stages. This demands flexible manufacturing facilities, regular retraining of workers, and close cooperation between design and manufacturing divisions to assure efficient crossovers to new products.

Success in incorporating emerging technologies also demands a broad, stable, and efficient manufacturing capacity that can provide the materials, the trained workers, and the machinery required to manufacture the new products. The loss of manufacturing capacity in certain industries can seriously hamper future product development.

Yet, a survey of European executives involved in industry, trade, banking, and investment ranked the United States twelfth overall in its production techniques, behind such countries as Japan (No. 1), Sweden (No. 2), Switzerland (No. 3), Germany (No. 4), and Finland (No. 5).

Unfortunately, many U.S. business administration programs focus more on financial management than on management of the manufacturing process or management of the entire production process. This lack of familiarity with manufacturing engineering results in less flexibility and creativity when analyzing proposed production costs, and poses greater difficulties for product design, which must work within a narrower set of constraints.

If the United States' goal is to lead in emerging technologies, that goal demands immediate and decisive action by both the private and public sectors. America needs a national commitment to move forward into the future more aggressively.

**"Some states, and some Governors, have been able to integrate universities, industries, and state policies in a package of technological innovation and competition that is quite impressive. It shows a greater awareness of the way the world is going than you find in many places in Washington. It's where the action is in many key sectors."**

**Frank Press, President  
National Academy of Sciences**

## **The State Role**

**"In the states, a new consensus is already forming, with a new state commitment to research. This reality may be the most important development in science policy in the 1980s. For the first time, state legislators and citizens are joining scientists and engineers to support long-term research. Even more significant, perhaps, is that states are cooperating with each other in these efforts."**

Governor Richard F. Celeste  
Ohio

## The State Role

The ability of the United States to increase technology-intensive exports in the twenty-first century will depend on the effectiveness of both federal and state policy. State policies operate within the framework of federal policies that significantly affect business decisions in research and development, investment, intellectual property rights, and international trade. Because of this influence, defining the state role requires an initial discussion of federal responsibilities.

Federal dollars and priorities propel much of both civilian and national defense research and development, and federal anti-trust regulations affect the ability of firms to enter into joint research agreements. Federal tax policies encourage—or discourage—investment in new product development, and federal patent and intellectual property right protections determine whether U.S. firms will benefit from their discoveries. The federal government has constitutional responsibility for international trade agreements, such as the General Agreement on Tariffs and Trade (GATT), that set quotas and tariffs on high technology products. Finally, the federal government must approve exports of many high technology goods because of their national defense sensitivity. The federal government drives public investment, as well as the overall tax, legal, and international regulatory framework for technology development and export in the United States.

While the federal role in science and technology includes substantial support for long-term basic research, states have focused greater attention on applied research and development. State technology and economic development programs have encouraged greater commercialization of new products and processes. And states have the primary responsibility for

educating future scientists and engineers, both through education policies at every level and the resources they invest in schools and universities.

Governors are in a unique position to focus attention on the need to improve the United States' ability to commercialize new scientific discoveries. In state after state, Governors have forged partnerships with the private sector to spur economic development. State governments work closely with the business community and are in a position to influence business decisions and to operate as brokers to bring together the creators and users of new technologies.

The recognition that states needed to take a more aggressive role in promoting commercialization came about in the early 1980s when several states hit hardest by the 1982 recession—most notably Michigan, Ohio, and Pennsylvania—reassessed their state policies. In fiscal 1988, forty-four states spent \$550 million on their applied research and technology activities. A variety of innovative programs—including research consortia, seed and venture capital funds, incubators, endowed university chairs, technology fellowships, and equipment subsidies—were developed to build on existing strengths and to capitalize on research already occurring at universities, colleges, and federal laboratories. These new programs include efforts to stimulate research, introduce technology into firms, support capital acquisition, improve management, and determine overall state technology policy.

State support for applied research and the establishment of advanced technology centers is encouraging more market-driven research and is influencing the relationships between university researchers and

Figure 4

## State Spending on Science and Technology Initiatives, Fiscal 1988

Technology/Research Centers	41.2%
Research Grants	27.3%
Technology Transfer	8.3%
Research Parks/Incubators	6.7%
Seed Capital	4.0%
Venture Capital	2.8%
Technical/Managerial Assistance	2.0%
Other Technology Programs	7.7%

Note: For description of state technology programs, see page 22.

Source: Minnesota Department of Trade and Economic Development, *State Technology Programs in the United States*, 1988.

industry representatives. New institutions have been established to provide early seed capital to projects that have commercial potential. Support structures have been established to help technological innovators and entrepreneurs translate research into new products.

Governors also have led the new wave of education reform in the United States. They are promoting programs to require additional teacher training in basic science and mathematics and are establishing new highly competitive scientific secondary schools. Further, this education reform stresses more performance measurement, greater accountability, and more parental choice in schools. In higher education, states again play a major role.

States provide the principal funding for research facilities. While the National Science Foundation supports research

facilities at fifty of the nation's largest universities, state funds are the primary support in the majority of colleges and universities, where the vast majority of industry's engineers are trained. States also invest directly in research, and perform educational assessments.

States have built an impressive track record in technology development and commercialization that will contribute substantially to reasserting America's future leadership in technology.

## Descriptions of State Technology Programs

**Technology Offices.** These include boards, commissions, authorities, or offices that oversee or coordinate state technology initiatives. The most common type of structure is a public/private partnership of representatives from private firms, academia, and state government. Technology offices may operate as independent public agencies or private nonprofit corporations. The duties and responsibilities of technology offices range from the administration of multi-million dollar technology centers to information dissemination and advisory services.

**Technical/Managerial Assistance.** Technical or managerial assistance programs assist in the development of business plans and marketing strategies, advise firms on personnel, accounting, and legal matters, and identify sources of financing. Professionals also evaluate product lines and manufacturing processes, assist in the use of state-of-the-art design and manufacturing tools, and identify special expertise at universities and other research centers.

**Technology/Research Centers.** These centers, also known as "Advanced Technology Centers" or "Centers of Excellence," are usually located at universities or affiliated with them. They strive to increase cooperation between academic institutions and state-based industries. These centers generally concentrate on a particular field of research that draws on the strengths of a university and/or the major industries in the state. Technology or research centers assist in the creation of new firms through the development and enhancement of products and processes, attracting new industries to the state, and enhancing the competitiveness of existing industries through the application of advanced technology processes or products.

**Technology Transfer.** Technology transfer programs facilitate the transmission of new technologies from the laboratory to the private sector. These technologies can become the impetus for the creation of new businesses, the introduction of new product lines for established firms, or the revitalization of mature industries. Technology transfer is achieved through information exchange and active outreach programs that seek users for existing and newly developed technologies.

**Research Grants.** Research grants are usually made to universities based on joint proposals from the university and a private sector sponsor. Most often, these grants require a certain level of matching funds from the private sector. Grant approval usually depends on its potential for economic development and future job creation.

**Incubators.** Incubator facilities provide below-market rates for office and lab space for start-up companies. In addition, these facilities offer shared support for clerical, reception, and computer services. Once a company has progressed to a specified development level, it is expected to leave the incubator in order to allow the facility to accommodate new start-up companies. Incubator facilities are usually located in or near advanced technology centers and commercial research parks.

**Research Parks.** Research parks are planned groupings of technology companies, often near universities, that encourage university/private partnerships. They draw industry to a particular location and provide incubator facilities and services that encourage the development of new businesses. Generally, states provide initial capital with the requirement that future funds come from private sources.

**Seed/Venture Capital.** Seed and venture capital programs provide risk financing to early-stage companies that are unable to secure funds from traditional sources. Funding is provided to start-up companies whose projects have commercial and/or job creation potential. Seed capital is provided to companies that have yet to develop a marketable product. Venture capital financing is available to developing companies with established business plans and commercially feasible projects.

**Technical Training.** Realizing the significance of a skilled workforce for attracting high technology businesses, states offer various training programs. States either sponsor programs through an institute for higher learning or provide financial assistance to private companies to implement their own training programs.

**Equity/Royalty Investment.** States with equity or royalty investment programs provide risk capital to new start-up businesses and developing firms. Funding is generally available to companies with commercially feasible products and processes. Typically, funds are used as working capital for land and equipment purchases, organizational expenses, and research and development efforts. Equity investments provide the state with a share by ownership in the financial success of the firm. Royalty investments require a repayment to the state based either on a dollar amount per unit sold or a percentage of gross or net revenues.

## State Action Agenda

**"Rather than target specific industries or products, most states are targeting *processes*: technological innovation, capital formation, new business formation, the commercialization of research, and the adoption of new manufacturing technologies. They are not trying to *plan* economic activity, but to quicken the pace of innovation, to sharpen our ability to bring new ideas to market, to increase the technological sophistication with which we manufacture."**

David Osborne, in  
*Laboratories of Democracy*

**"We have no way of knowing what new problems will appear tomorrow, or next year. But we can be certain that we will still need more knowledge to cope with these problems. In an uncertain world, knowledge—along with the scientists and engineers who produce it—is our most important resource. In an increasingly technological world, many more of our leaders in industry, in government, and in academia must have technical training if we are to control events."**

**Erich Bloch, Director  
National Science Foundation**

## **State Action Agenda**

Expanding research and development efforts, converting ideas into new products, and manufacturing those products for the international marketplace are essential for success. The United States must act decisively in each of these areas to be a viable leader in the international arena. Capturing the potential of emerging technologies through commercialization will help assure continued U.S. economic strength into the next century.

Governors play a pivotal role in forging partnerships among business, academia, and government that can create strategies to reverse the decline in high technology exports. Such partnerships can define the steps needed to secure a world market share for a wide range of emerging technology applications, despite unprecedented international competition.

Emerging technologies have the potential to restructure some industries and to spawn others. Governors can help assure that governments at all levels thoroughly understand the opportunities and issues, and can take appropriate steps to remove roadblocks and provide incentives.

### **Expanding Research and Development**

Meeting the technology needs of U.S. business begins with maintaining a strong and broad research base. Science provides the fertile ground on which commercially viable innovations grow and flourish. But preeminence in research does not automatically lead to technological and commercial success. In the increasingly competitive environment of the international economy, the United States must learn to use its research strengths to create commercial advantages. Government

and industry must focus on development, while retaining a strong foundation in basic research.

**OBJECTIVE:** Direct more public and private resources toward market-driven research and development.

The U.S. government provides the funding for about half of all research and development in the country, directly affecting the total U.S. effort. Because of its fundamental role, the following steps are recommended for federal action.

- **Commercial Focus.** Federal research and development spending should provide a better balance between commercially viable technology and narrowly focused classified defense research. National security is appropriately a pre-eminent federal concern. However, economic security is essential, too, and attention should be paid to defense research and development that has the potential for commercialization. For instance, the U.S. Department of Defense recently used research funds to support development of U.S. capacity in high-definition television and to support work by the Sematech program involving the semiconductor industry.
- **Federal Laboratories.** Technological and scientific discoveries made in federal laboratories still are not readily available to U.S. industries. The federal government should take further steps to make this research more accessible to business and to work with the states to speed the transfer of technology to commercial uses.
- **International Scientific Journals.** In addition, the federal government should step up its support for the translation

of leading foreign scientific journals and other materials, especially in strategic emerging technology areas. This would increase U.S. business access to technological discoveries outside the United States.

Just as government should focus more on commercial technology research, so should industry. While the private sector is the largest contributor to U.S. applied research and development efforts, it still spends much less of its research and development budget on process innovations than do foreign corporations. Although research and development is not treated as an asset by U.S. business accounting principles, it is critical to the long-term economic future of both industry and the nation.

State governments have taken the lead in responding to America's research and development needs. Since the early 1980s, more than forty states have initiated programs to support applied research by industry and universities. States are working collectively at both the national and regional levels to address common problems and share ideas and innovative practices to encourage market-driven research.

As further steps, states should:

- Establish long-term direct support for commercially applicable research through advanced technology centers and applied research grants. More than half the states already have established competitive grant programs, such as the one operated by Virginia's Center for Innovative Technology. This program awards funds on a competitive basis to colleges and universities to fund research with commercial potential.

"If we cannot promote the growth of wider understanding of the world view of science and technology, we endanger not only our own abstract enterprises, but even the essence of democracy. For the necessities of economics will eventually enforce a social division into islands of the trained who understand enough to devise and operate an increasingly complex technology, with a sea of onlookers—bemused, indifferent, and even hostile."

Philip Morrison, Professor of Physics, Massachusetts Institute of Technology and host, PBS science series, "Ring of Truth"

**"High tech is indeed the leading edge, but there cannot be an edge without a knife. There cannot be a viable high-tech sector by itself any more than there can be a healthy brain in a dead body. There must be an economy full of innovators and entrepreneurs, with entrepreneurial vision and entrepreneurial values, with access to venture capital, and filled with entrepreneurial vigor."**

**Peter F. Drucker,**  
*Innovation and Entrepreneurship*

Requiring matching funds from industry and, including joint industry-university panels to direct projects helps ensure that the efforts are market-driven.

- Support business research consortia aimed at achieving technological advances for strategic industries. The Microelectronics Center of North Carolina brings together universities and affiliated private firms to conduct research and development in microelectronics. New Jersey and Michigan, among other states, support similar efforts in biotechnology.
- Provide incentives for collaborative industry-university research to promote closer relationships between the two and to encourage more state-of-the-art research projects for students and faculty. These projects also would direct a greater portion of university research funds into market-driven research projects. Through Colorado's Advanced Technology Institute, the state has established four Centers of Excellence, which bring together universities and private businesses to conduct research in specific technological areas. Technologies targeted for development include advanced materials, optoelectronic computing systems, artificial intelligence, and biotechnology.

**OBJECTIVE:** Expand international cooperation efforts.

Scientific discoveries and technological development know no national boundaries. Any nation that presumes it can stand alone in research will soon find itself trailing rather than leading. Governors should take the lead in their states to promote international cooperation and collaboration.

States can:

- Sponsor international exchange programs for scientists and engineers. North Carolina, for example, has established an exchange program in cooperation with a West German state to allow scientists and engineers from North-Rhine Westphalia to conduct collaborative research with scientists and engineers in North Carolina.
- Negotiate joint technology agreements with other countries. Maine has an agreement with the Research and Productivity Center in New Brunswick, Canada, in which Maine's small firms can purchase engineering and design services on a fee-for-service basis. Such agreements are particularly important for small firms to get access to public domain research typically found in advanced technology centers.

In Virginia, the Governor signed a cooperative agreement with a French association of more than 7,000 small businesses to exchange technology and capital through joint ventures with Virginia businesses. The state will support the formation of strategic alliances between French and Virginia-based small and medium-sized companies. Ohio and the state of Parana in Brazil have entered into an agreement to provide for scientific and technological cooperation. Goals of the agreement include exchanging researchers, conducting joint research, and sharing information on technology transfer methods.

- Use overseas offices to keep state businesses informed of technological advances made outside the United States. As of 1988, forty-one states had established 133 foreign trade offices that can provide a direct link between industry, universities, and foreign trading partners. By strengthening linkages between technology programs and trade programs, Governors can make both programs more effective.

### **Converting New Ideas Into New Products**

Central to success with emerging technologies is moving ideas rapidly from concept to products suitable for manufacture and sale. Only countries that commit to this expensive, long-term process will be well-positioned to capture significant world market shares of products derived from new technologies.

**OBJECTIVE:** Improve the climate for long-term investment and innovation.

As in research and development, the federal government bears the greatest responsibility. A number of U.S. policies do not address the realities of the new global economy by failing to recognize the market-driven model of innovation. These policies are often inconsistent and create uncertainty and economic risk in the private sector, which hinders U.S. industry from taking a longer-term view of investment in developing new products.

Because of its fundamental policy role, the federal government should address some of these risks:

- **Antitrust Policy.** Revise antitrust laws to promote rather than hinder the collaborative research and development needed for success in today's world markets.

■ **Tax Policy.** Revise federal tax laws to reward corporate investment in research and development, and protect these incentives over a reasonable period of time. For example, a reliable tax credit on research and development is a strong incentive for long-term investment in development projects.

■ **International Agreements.** Negotiate agreements that provide guidance for international technology exchange and access, and facilitate patent procurement and product commercialization. The recent U.S.-Japan technology agreement offers a bilateral framework for cooperation in research and technology development. Adequate enforcement of international intellectual property rights agreements also is needed to ensure that U.S. corporations secure a fair return on their product development costs. Multilateral negotiations underway to update the General Agreements on Tariffs and Trade are attempting to address this issue for the ninety-six GATT countries.

States can do their own part in encouraging innovation. States should:

■ **Direct Governors' technology task forces or commissions to develop a strategic investment plan for science and technology. Membership on these task forces can be drawn from education, government, and a broad cross-section of industry. Their guidance can better focus and more effectively leverage state program funds. In Vermont, the Governor created by executive order a Governor's Advisory Council on Technology. The council is developing a strategy both to help existing business adopt new technologies and to aid emerging industries that offer opportunities for the application of technology.**

■ **Team up with other states to foster regional and state-to-state initiatives. States can pool their resources, for example, to promote shared use of a regional supercomputer or an interactive telecommunications network. Such collaboration can provide innovators in those states with higher quality research and development tools.**

Governors of the six New England states passed a resolution to establish a New England Technology Advisory Council that will coordinate resources to address issues of regional importance involving technological research, development and commercialization. The NGA Working Group on State Initiatives in Applied Research, made up of Governors' science and technology advisers, has met regularly to exchange information and discuss the implications of national and international developments on state programs.

■ **Inform students and small business leaders about the commercialization process and entrepreneurial opportunities. Courses, seminars, and conferences in the college and university system can provide a forum for discussing the link between entrepreneurship and technological innovation to stimulate interest in pursuing the development of innovative products.**

**OBJECTIVE:** Create a world-class workforce.

Leadership in the new global economy requires that American workers be technologically literate, imaginative, and adaptable to rapid change. It also requires more scientists, engineers, mathematicians, technicians, and computer specialists in the workforce. A large contingent of highly skilled, technology-oriented workers is a critical asset in the commercialization of new technologies.

As traditional stewards of the nation's education and training system, states must take steps to address both long-term academic needs as well as short-term requirements.

States should:

- Raise math and science skills at the K-12 level to enable students to compete with the children of our foreign trading partners. In addition, states can incorporate information about the role of technology in today's society throughout the K-12 curriculum. The pervasive influence and importance of technology can be emphasized in the teaching of almost any subject, including history, English, music, civics, and health, as well as the physical, life, and social sciences.
- Meet existing and expected demand for science and math teachers and engineers. Actions include increasing scholarships in science and engineering, providing forgivable educational loans to students who agree to become math and science teachers, and promoting an increase in the number of women and minorities who pursue science and engineering degrees.
- Establish incentives to retain highly competent faculty. For example, a state can set up endowed chairs and professorships in engineering, mathematics, and life and physical sciences.
- Design new programs emphasizing technological literacy to meet the needs of today's—and tomorrow's—workforce. Workplaces of the future will require even stronger computer

and communications skills. Other areas for emphasis might include computer-aided design and manufacturing (CAD/CAM), and manufacturing technology.

The Center for Productivity, Innovation and Technology at Chattanooga State Technical Community College is one such program. The center trains two-year degree students in state-of-the-art technologies and retains workers and consultants to industries seeking to adopt new technologies. The center houses a prototype automated factory as well as an automated CAD/CAM center. The factory includes completely automated flexible manufacturing cells, various kinds of robots, and quality control units. At six of its technical colleges, South Carolina has created centers focused on advanced machine tool technology, microelectronics, computer applications, water quality, and robotics.

- Utilize the resources of the state's colleges and universities to provide advanced technology and science courses at business sites for corporate managers, scientists, engineers, and workers.

**OBJECTIVE:** Strengthen the effectiveness of business in new product development.

Government policy changes can do only so much. Ultimately, business must respond to the challenges posed by international competition. Both the current growth of U.S. imports and the revolution in worldwide manufacturing demand

**"The world is rapidly changing. To prepare our children for the future we must educate critical thinkers who can adapt to change in an increasingly competitive environment."**

**Governor Roy Romer  
Colorado**

**"In today's international economy, virtually all aspects of the commercialization process have become globalized. For U.S. companies, this means that they must become as much 'hunters and gatherers' of technology as they are generators . . ."**

**Council on Competitiveness,  
Picking Up the Pace**

an appropriate response from U.S. businesses. They must make the kinds of structural and policy changes that permit maximum flexibility and communication throughout every step of the commercialization process. But states can take steps to help businesses get started.

States should:

- Provide financing through seed capital programs that support the development of commercial ideas, feasibility testing, and prototype development. Ohio's Edison Seed Development Fund provides capital both for early-stage research and for the development of a product, process, or system for commercialization, or for a demonstration prototype. In 1983, Iowa established the Iowa Product Development Corporation. The corporation helps innovators that need risk capital to bring a new product or process to the market. In its first few years, the corporation created more than 300 new jobs by investing approximately \$3 million in new ventures.
- Use advanced technology or industrial resource centers to disseminate technical assistance and information. These centers should provide services covering the entire commercialization process, from patent procurement to product design to market information. Where feasible, states can pool resources to fund these centers.

Illinois has established sixteen technology commercialization centers throughout the state. These centers directly assist entrepreneurs in such specific areas as research, feasibility studies, prototype development, product testing, financing, production, and marketing. Pennsylvania's \$30 million, three-year

industrial resource center program is designed to help Pennsylvania companies identify and implement new technologies. Nine centers have been established to assist small and medium-sized manufacturers. Through the statewide Virginia Community College system, ten directors of economic and technology development help Virginia businesses apply research to new product development.

- Encourage close collaboration between university and industry for joint projects to develop new products. To promote the chances of success, business must be required to invest along with the state and must participate in managing the effort. California's recently established competitive technology program requires matching funds, includes a board of business leaders and leading scientists, and focuses on projects holding the most commercial promise.

### **Manufacturing Products for the International Marketplace**

As a new product is being developed, attention also must be given to the process for producing it quickly and economically, without sacrificing quality. It is essential that products and processes be developed concurrently. As technological advances and consumer preferences dictate changes in product design, the accompanying manufacturing process must be able to adapt as well.

It is likely that many new innovations will rely on the capacity of the existing manufacturing base. Only by retaining expertise in manufacturing and a viable manufacturing capacity can the United States expect to successfully manage the commercialization process.

**OBJECTIVE:** Develop faster, more flexible manufacturing processes.

States can:

- Establish flexible manufacturing centers. These centers provide a single location for training and actual manufacturing capacity with state-of-the-art procedures. Michigan's Industrial Technology Institute offers a flexible inspection and assembly laboratory designed to assist firms in every step of product design and manufacturing.
- Foster flexible manufacturing networks. These networks are contractual arrangements among groups of companies that can respond to changing production schedules and requirements. Maine is setting up a network designed to foster collaborative production between small firms—which can result in the ability to quickly manufacture high quality finished products for international markets.
- Direct colleges and universities to review and revise business administration and engineering programs. These disciplines should include sufficient manufacturing training, with an emphasis on production management. Oregon State University and the University of Massachusetts, for example, have established graduate programs in manufacturing engineering.
- Establish Governors' award programs for excellence in manufacturing. Improved efficiency, quality control, and the development of improved processes could be rewarded, providing an incentive for excellence and focusing public and media attention on the value of quality manufacturing.

### Conclusion

The race is on. The competition is tough. Opportunities abound. To excel in this contest requires leadership at home. The federal government must exert its leadership and bring together all of the players to develop a national approach to this challenge. A national commitment on the part of industry, academia, and government is central to realizing the nation's full potential in research and technology.

As chief executives, Governors can use their leadership and policymaking abilities to help the United States become more successful in developing new products and manufacturing techniques, and capturing the potential of emerging technologies. Already, Governors are taking steps to establish pioneering programs and focus national attention on the importance of research and technology to the nation's economy.

The United States must act now to build and shape the future. Making the most of its traditional strengths, America can confidently and successfully meet the economic challenges and opportunities that lie ahead.

**"There is a Japanese proverb that says it is far easier to recover from military defeat than from economic conquest. Japan's experience in recent years is certainly an example of the first part of the proverb. We must make a national commitment to ensure our economic competitiveness in world markets or we may suffer an economic conquest from which we may never recover."**

**Governor John R. McKernan Jr.  
Maine**

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## Photo Captions

**Cover.** The Space Shuttle Orbiter Discovery lifting off from Kennedy Space Center on August 24, 1984.

**Page 9.** A research engineer checks the alignment of laser beams used to measure air velocity inside a combustion chamber.

**Page 10.** Artist's concept of the baseline configuration of Space Station Freedom manned base. Freedom is an international space complex comprised of the permanently manned orbiting base and unmanned scientific platforms to be placed into orbit in the mid 1990s.

**Page 13.** Weighing less than 20-millionths of an ounce, the bar code glued to this worker bee lets researchers automatically monitor the bee's passage through the hive entrance as it goes for nectar and pollen. Scientists hope the system will, among other things, help determine how resistant bees are to pesticides.

**Page 24.** New Engineering Research Center. Jacques Pankove, a program manager for Colorado's Optoelectronic Computing Systems Center, was the first to demonstrate high-luminescence efficiency in gallium arsenide. He also discovered and explained radiative tunneling in semiconductors.

**Page 27.** Superconductivity, the ability of certain materials to conduct electricity without loss at low temperatures, is demonstrated by the so-called Meissner effect. When the superconductor is chilled to the temperature of liquid nitrogen (about minus 300 degrees Fahrenheit), it repels a magnetic field (the magnet is the object being held) and the superconductor will remain suspended or levitated.

**Page 28.** Hair-thin strands of ultrapure glass today carry voice, data, and video signals in the form of digital laser impulses that traverse continents and oceans. In systems now being installed, a pair of these fibers is capable of transmitting nearly 50,000 simultaneous phone calls.

**Page 31.** Engineer working at Interact 3000 series work station with computer-aided design.

**Page 32.** A modern automotive assembly line.

(Lange/Wallace)  
May 17, 1989  
9:00 a.m.  
[GOV.DOC]

PRESIDENTIAL TOAST:

**GOVERNORS' STATE DINNER**  
NATIONAL GOVERNOR'S ASSOCIATION  
[PLACE] **STATE DINNER ROOM**  
MONDAY, MAY 22, 1989  
[TIME] 7:45

[ You've already been briefed by Baker, Yeutter, Hills, Sununu, Darman, Dole... some of the best players on my team. So my role here tonight reminds me of when I played ball in college. Back then, I was pretty good at batting second clean-up... ]

It's an honor to be here. Let me commend Governor Baliles for his leadership of the NGA. He has defined and strengthened this group's international perspective -- in a far-reaching, forward-looking way.

I'd also offer my best wishes to Governor Branstad, as he becomes your new chairman. It's an awesome task, leading a group like this one. [But listen, Terry, if you find yourself being pulled in 50 different directions, relax. No one will be able to accuse of you drift... ]

Given everything the governors have been doing for America, this toast will be an easy one. It's going to sound something like the advice the Royals manager used to give George Brett, on his hitting. He would tell him, "Attaway to hit, George."

~~That is the kind of guidance you ought to be getting.~~

You're not waiting for Washington. And that's as it should be.

Local solutions make sense. They're effective -- because they go right to the source. Federalism may be the governmental equivalent of free-market economics. It is driven by local initiative. It thrives on individual energy. And above all, it works.

All over the world, we can see what's happening to the concept of all-powerful, centralized government: it's an idea that's sinking like a ~~rock with a hole in it~~.

What is rising in its place, is one great American export: democracy. The idea that a nation's direction and purpose are best determined by its people. As governors, you bring that idea to life every day.

In recent years, you've become powerful and articulate advocates of local priorities. But even as you've ascended in influence, you've transcended provincial interests. You've moved well beyond the borders that separate states, and even nations.

You're no "interest group." Your interest is in long-term solutions -- reached in partnership with each other, and with all

levels of government -- to build a better, more prosperous, more competitive America.

Your priorities have a profound impact on this country's future. And this administration will work with you, to reach solutions that gain strength and stability at the local level.

In child care, that means putting dollars and decisions into the hands of parents, rather than federal bureaucracies. In education, it means choice and flexibility, through a performance-driven, partial deregulation of education. It means providing training for tomorrow's jobs through new partnerships with business and education, Private Industry Councils and JTPA.

To fight drugs and crime, we'll need coordinated enforcement efforts from local, state, and federal agents. To clean up the environment will demand a coordinated, cooperative campaign from all quarters. And as the EC becomes one market in 1992, we will depend on trade policy that is consistent and multilateral.

This group rightly takes pride in its bipartisan spirit. You're known for taking the initiative. On the issues I've touched on -- and so many others -- it will be crucial that we work together, toward honest, well-conceived solutions.

X { And I'd emphasize the importance of moving with deliberate speed. Dean Acheson may have been on to something, when he said, "Don't just do something -- stand there."

Well, we're going to stand firm -- for an education system second to none in the world; for a drug-free America; for trade relations that are truly multilateral; for peace, and for prosperity; and for democracy and representative government, worldwide.

We have always been a nation so open to new ideas, so devoted to opportunity, that sooner or later it seems people all over the world either emulate America -- or immigrate here. That, too, is as it should be. You might say that immigration is the sincerest form of flattery.

America must continue to be -- as she has always been -- an inspiration in the eyes of the world. With your leadership -- she will ~~do~~.

It has been a great pleasure to be with you tonight. ~~Thank~~  
~~you for inviting me.~~

Thank You for being here.

Gov. State Dinner - May 22

- B. Deb. Anderson

- 7:30

Extended Toast

7170 - Steve Gilson - Michelle

VP. + Mrs Q

Judy Spangler - Social Office

- Tuesday 16th

1:30 - 2:00

Nat'l Gov's Assoc Exec Committee

12-15 - remarks

19 Governors.

Seunund  
Darman  
Doh (?)

7:45 - Dinner

Rm. 162

30 Govs - (22 or 23)

Rm 160 - Samy  
Cuffield

see further

AB  
Hills

Washburn (?)

briefing at State

in afternoon. 3:50-5:30

Social Substance is over

- Va Gov. is Chman - ~~London~~ <sup>July 22nd</sup> -  
- Branstad Iowa is incoming

Social Office

mtg. in  
Chicago  
Changeover.

Crime.  
Ed.

~~Wednesday~~

- The car is taken from T.B.

Bliss -

2nd - mention at dinner.

- Just Baker - looking empty

Hills (?)

Master (3)

Acknowledge Report! - He might have our  
Research + Technology.

Jong-kun

involvement in future

Environment & Business

Crime -

Education.

Program

Handbook

Bob

Work force

Project

Richard

Wilson

Planned study before

→ Funding for evidence

refer

Barman commitment (?)

Partnership - Jong-kun

→ Focus on a few - anticipate  
Jong-kun

P.A.  
N.G.A. - 624-5300

- outgoing ~~to~~ Gerald Baliks Va. D  
- (804) 786-2211

- incoming Jerry Branstad ~~to~~ Iowa R  
- (515) 281-5211  
- Keith Huffman - 582-1234

Gerald Baliks  
Susan O'Brien - Chris Bridge  
Theme - America in Transition: the International  
Frontier

6 task focus  
foreign mkt }  
Intl Education } Beyond our  
Research + Tech } borders

Released by end of Summer - Domestic mkt }  
- Transportation Infrastructure } w/ more  
Chelburov's Issues } borders.

How state prgms are taking the  
initiative  
- We can't wait on Washington

Fed Prog. haven't kept pace  
w/ demands on state

- benchmarks for 200's into 21st century.

Transportation + Int'l trade are his  
biggies in-state.

- Huge track overhaul  
- Improved Foreign Trade relations.

- Teaching foreign languages
  - Alliance w/ Nat'l Geographic
  - Export - Int'l Ed.
- 

↳ Fed Gov is backing off in certain areas - States should fill the role -

- Biggest prob. is Transport.  
↳ Highway trust fund.

Crime - support of P. -  
focus public attention  
Federal fms.

State taking up pricing + responsibility

↳ Transition in focus from D.C. to State.

Welfare Reform - Disappointed.

Anne Zimmerman - Communications Director

- Environment (?) as Gov.

- Ed. Gov.

- rewrote school aid

Ed. Excellence

Superspiration + Dwell.

Askes  
Shedding Responsibility  
Passing it back.

Quotes on Federalism