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Engineering Awards 2/20/90 [OA 4728]

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THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release February 20, 1990

REMARKS BY THE PRESIDENT
UPON PRESENTATION OF THE
CHARLES STARK DRAPER PRIZE FOR ENGINEERING

The State Department
Washington, D.C.

8:50 P.M. EST

THE PRESIDENT: Thank you all. Thank you, Jack. I got worried there when Jack was saying when we want somebody that is well known to present the prize, I was thinking Barbara's not here. (Laughter.) But, Jack, thank you for those very kind remarks.

To our honorees, Kilby and Noyce; and to Ambassador Dubinin, our Soviet Ambassador here who's doing such a good job for his country; and Dr. White; Dr. Charyk; and my old friend, Dr. Seamans; also another old friend, Steve Bechtel; Mr. Morrow; and the Undersecretary Selin; and Don Atwood here from the Defense Department. And members and Guests of the National Academy of Engineering.

I'm reminded of the famous story of the guy that called the insurance company after it closed one evening. A voice answered and he said, "Sir, I'd like to talk to you about converting my 20 pay life into the cash value immediately. And further, I've heard more about your key man insurance that insures the very key people, and we'd like a little more information on that. And lastly, we have this family -- I have six kids and we want a family health plan." The voice on the other end said, "Look," he said, "I'm the janitor around here just cleaning up, and after I said hello that's all I know at all about insurance."

I feel the same way about engineering here tonight -- (laughter) -- surrounded by all this brain power. It's overwhelming. But I am pleased to be here. I deem it a very great pleasure to help honor and celebrate National Engineers Week. And, of course, it is an honor to salute the first two recipients of this, engineerings highest international award, the Charles Stark Draper Prize.

Let me begin with a story that will show you my understanding of engineering, that I see it. It concerns three men that were scheduled to be executed on the same day of the French Revolution. One was a lawyer, another a politician, the third an engineer. First, came the lawyer. He put his head in the guillotine and the blade went two-thirds of the way down the track and then stopped. The man was set free. Next, the politican. When the guillotine stopped short of his head, he, too, was spared. Finally, came the third man, the engineer, and he focused on the matter at hand. "I think that guillotine has a problem," he told the executioner, "but don't worry I think I have the solution." (Laughter.)

I say that with respect -- (laughter) -- but as you see, engineers just can't help themselves -- whatever the cost -- (laughter) -- they keep aiming for perfection. And they've helped make our century a time of extraordinary exploration, opening doors into an age where mankind not only moved into the future, but reinvented it.

Tonight, we honor Jack Kilby and Bob Noyce. And their landmark work, the microchip, an invention which has already taken its place among the greatest of all time. Not to date myself, but when I was growing up, PACMAN was a hiker, not a video game. The microchip came along and changed all of that and helped America change the world.

Think, for example, of a computer the size of a room shrunk down to the size that fits on your lap -- the microchip made all that possible. Or a calculator slashed from the size of a refrigerator to the size of a wristwatch. Think, finally, of our planet, and how the microchip has stirred the new breeze of democracy.

Maybe it's a good day to salute that because today the President of Czechoslavakia Vaclav Havel came over to the Oval Office and then was our guest at the White House for lunch. And what a stirring moment -- I'll just divert for one second -- I took him up to the Lincoln bedroom, which is not normally the thing when you have these official visits. But I wanted him to see the room in which Abraham Lincoln had signed the Emancipation Proclamation. And I think I detected tears in his eyes, this playwright who not so many month ago was in jail and here he is the President of a fine, new, burgeoning democratic country. It was a very moving experience.

As I talked with him, I thought of how images of the past year have linked the peoples of Prague and Warsaw and Budapest and Berlin. Images of bravery and defiance -- of humanity's quest for freedom. And it was the microchip which carried them from one nation to another, becoming an instrument of liberty, the symbol in this information age. Integrated circuits have enabled us to do the unimaginable. Now it is unimaginable to believe we could ever live without them.

Already, the microchip has helped America not to de-industrialize, but reindustrialize. To paraphrase Churchill, never has something so small done so much for so many. Yet remember, too, that if we are to lead the world, we must provide that world with further breakthroughs, for engineering is always a beginning, never a consummation.

I know that the National Academy of Engineering shares this belief. So it has studied how America's engineering talent enhances our competitiveness, and is exploring new ways to protect the globe from environmental abuse. You realize that truly informed decisions on issues like climate change require us to better integrate science, technology, and engineering into the public equation -- policy equation.

Our administration agrees, and so, supports research and development in all areas of science, technology, and engineering. We've asked for a record high $71 billion for R&D in our budget for Fiscal 1991. And to short-circuit the prediction that America will run short of engineers, we've introduced a National Science Scholars Initiative to give kids a new incentive to excel in science, math, and engineering. And I have announced an ambitious goal, one of our national goals reached after great consultation with the governors -- but one, a goal that we can achieve -- that U.S. students will be number one by the year 2000.

You can tell -- I hope you can tell from looking around, that I have great respect for people who have an understanding of science. Jim Watkins is a member of our Cabinet, Secretary of Energy; I'm pleased to see Dr. Bromley here; and Secretary Rice; and, of course, my own Chief of Staff John Sununu, such a man -- engineer. Yet, ultimately, I am convinced -- not that we duck our responsibility in the federal government -- but ultimately, I am convinced that it is the private sector that not only has shaped American opportunity, but will continue to bring opportunity to the new millennium.

Look at -- Jack, I don't want to embarrass you -- but

look at GE, spending $1.2 million a year on minority science scholarships. And a $20 million commitment to involve more inner-city kids in engineering. Or Mobil -- launching great programs -- grant programs to help students enhance America's technological ability. I know that I'm going to, just through omission, risk embarrassing others because so many in this room are responsible for programs of this nature.

These efforts, both private and public, will sustain the computer revolution, for they rely on the qualities of American drive and determination. Qualities that will contribute, as your Academy says, "to the advancement of engineering and the well-being of all humanity." And that are central to the man for whom this evening's prize is named.

Charles Draper was, first, an idealist pushing back the boundaries of mankind's technological future, and yet at the same time a practical man. I'm reminded of a writer who was asked what he would take if his home were on fire and he could remove only one thing. "I would take the fire," he replied. (Laughter.) Dr. Draper knew that Yankee ingenuity revolves around what works.

Finally, he was indomitable -- a fighter who looked to himself for inspiration. Albert Einstein once spoke of this genius of engineering, which explains in turn the greatness of Dr. Draper. He said, "Only men who are free create the inventions and intellectual works which make life worthwhile." Working in freedom, Charles Draper well used that freedom. Used it to create and to inspire -- to make history move his way.

This evening, we honor two men who themselves have made history and made each American proud. So let me now present to Jack Kilby and Bob Noyce engineering's highest award -- the Charles Stark Draper Prize. And say thank them, thanks to both of you for your inspirational leadership.

Thank you all, and God bless the United States of America.
Thank you very much. (Applause.)

END 8:54 P.M. EST

ENGINEERING AWARDS / TUESDAY, FEBRUARY 20, 1990
STATE DEPARTMENT / 8:45 P.M.

MR. WELCH. MR. KILBY AND DR. NOYCE. DR. WHITE, DR. CHARYK [CHAIR-IK], DR. SEAMANS, MR. BECHTEL, MR. MORROW. UNDERSECRETARY SELIN, AMBASSADOR DUBININ. MEMBERS AND GUESTS OF THE NATIONAL ACADEMY OF ENGINEERING. LADIES AND GENTLEMEN. THANK YOU, JACK, FOR THAT INTRODUCTION, AND FOR YOUR WARM RECEPTION.

((YOU KNOW, AS A BOY I USED TO DREAM OF BEING AN ENGINEER. IN FACT, WHEN ONE OF MY GRANDKIDS HEARD I WAS ADDRESSING AN AUDIENCE OF MY HEROES, HE SAID, "COULD YOU BRING BACK ONE OF THOSE NEAT STRIPED HATS THEY WEAR?")) // WELL, TONIGHT LET THERE BE NO CONFUSION.

IT IS INDEED A PLEASURE TO BE WITH YOU DURING NATIONAL ENGINEERS WEEK. AND TO SALUTE THE FIRST TWO RECIPIENTS OF ENGINEERING'S HIGHEST INTERNATIONAL AWARD, THE CHARLES STARK DRAPER PRIZE.

((LET ME BEGIN WITH A STORY WHICH I THINK CAPTURES THE SPIRIT OF THIS EVENING. IT CONCERNS THREE MEN SCHEDULED TO BE EXECUTED ON THE SAME DAY OF THE FRENCH REVOLUTION. ONE WAS A LAWYER, ANOTHER A POLITICIAN, THE THIRD AN ENGINEER.

((FIRST, CAME THE LAWYER. HE PUT HIS HEAD IN THE GUILOTINE -- AND THE BLADE WENT TWO-THIRDS OF THE WAY DOWN THE TRACK, THEN STOPPED. THE MAN WAS SET FREE. // NEXT, CAME THE POLITICIAN. WHEN THE GUILOTINE STOPPED SHORT OF HIS HEAD, HE, TOO, WAS SPARED. // FINALLY, CAME THE THIRD MAN -- AND TYPICALLY, THE ENGINEER FOCUSED ON THE <u>PROBLEM</u>, NOT HIMSELF. "THAT GUILOTINE," HE TOLD THE FOREMAN, "I THINK I HAVE THE ANSWER.")) //

AS YOU CAN SEE, ENGINEERS JUST CAN'T HELP THEMSELVES -- WHATEVER THE COST, THEY KEEP AIMING FOR PERFECTION. AND THEY HAVE HELPED MAKE OUR CENTURY A TIME OF EXTRAORDINARY EXPLORATION. OPENING DOORS INTO AN AGE WHERE MANKIND NOT ONLY MOVED INTO THE FUTURE -- BUT RE-INVENTED IT.

TONIGHT, WE HONOR JACK KILBY AND BOB NOYCE. // AND THEIR LANDMARK WORK -- THE MICROCHIP -- AN INVENTION WHICH HAS ALREADY TAKEN ITS PLACE AMONG THE GREATEST OF ALL TIME. //

NOT TO DATE MYSELF, BUT WHEN I WAS GROWING UP, PAC-MAN WAS A HIKER, NOT A VIDEO GAME. // THE MICROCHIP HAS CHANGED ALL THAT -- AND HELPED AMERICA CHANGE THE WORLD.

THINK, FOR EXAMPLE, OF A COMPUTER THE SIZE OF A ROOM -- SHRUNK DOWN TO A SIZE THAT FITS ON YOUR LAP. THE MICROCHIP MADE IT POSSIBLE. OR A CALCULATOR SLASHED FROM THE SIZE OF A REFRIGERATOR TO THE SIZE OF THIS WATCH. [HOLD UP ARM WITH WATCH]

THINK, FINALLY, OF OUR PLANET. AND HOW THE MICROCHIP HAS STIRRED THE NEW BREEZE OF DEMOCRACY. // TODAY, THE PRESIDENT OF CZECHOSLOVAKIA, VACLAV HAVEL, VISITED THE WHITE HOUSE. AND AS WE TALKED, I THOUGHT OF HOW IMAGES OF THE PAST YEAR HAVE LINKED THE PEOPLES OF PRAGUE AND WARSAW, BUDAPEST AND BERLIN. IMAGES OF BRAVERY AND DEFIANCE -- OF HUMANITY'S QUEST FOR FREEDOM.

AND IT WAS THE MICROCHIP WHICH CARRIED THEM FROM ONE NATION TO ANOTHER -- BECOMING AN INSTRUMENT OF LIBERTY AND THE SYMBOL OF THE INFORMATION AGE. // INTEGRATED CIRCUITS HAVE ENABLED US TO DO THE UNIMAGINABLE. NOW, IT IS UNIMAGINABLE TO BELIEVE WE COULD EVER LIVE WITHOUT THEM.

ALREADY, THE MICROCHIP HAS HELPED AMERICA NOT TO DE-INDUSTRIALIZE -- BUT RE-INDUSTRIALIZE. TO PARAPHASE CHURCHILL, NEVER HAS SOMETHING SO SMALL DONE SO MUCH FOR SO MANY. //

YET REMEMBER, TOO, THAT IF WE ARE TO LEAD THE WORLD, WE MUST PROVIDE THAT WORLD WITH FURTHER BREAKTHROUGHS. FOR ENGINEERING IS "ALWAYS A BEGINNING, NEVER A CONSUMMATION." //

I KNOW THAT THE NATIONAL ACADEMY OF ENGINEERING SHARES THIS BELIEF. SO IT HAS STUDIED HOW AMERICA'S ENGINEERING TALENT ENHANCES OUR COMPETITIVENESS. AND IS EXPLORING NEW WAYS TO PROTECT THE GLOBE FROM ENVIRONMENTAL ABUSE. //

YOU REALIZE THAT TRULY INFORMED DECISIONS ON ISSUES LIKE CLIMATE CHANGE REQUIRE US TO BETTER INTEGRATE SCIENCE, TECHNOLOGY, AND ENGINEERING INTO THE PUBLIC POLICY EQUATION. //

OUR ADMINISTRATION AGREES -- AND SO SUPPORTS RESEARCH AND DEVELOPMENT IN ALL AREAS OF SCIENCE, TECHNOLOGY, AND ENGINEERING. WE HAVE ASKED FOR A RECORD HIGH 71 BILLION DOLLARS FOR R&D IN OUR BUDGET FOR FISCAL YEAR 1991. //

AND TO SHORT-CIRCUIT THE PREDICTION THAT AMERICA WILL RUN SHORT OF ENGINEERS, WE HAVE INTRODUCED A NATIONAL SCIENCE SCHOLARS INITIATIVE TO GIVE KIDS A NEW INCENTIVE TO EXCEL IN SCIENCE, MATHEMATICS, AND ENGINEERING.

AND I HAVE ANNOUNCED AN AMBITIOUS GOAL -- BUT ONE WE CAN ACHIEVE -- THAT U.S. STUDENTS WILL BE NUMBER ONE BY THE YEAR 2000. //

YOU CAN TELL THAT I RESPECT PEOPLE WHO HAVE AN UNDERSTANDING OF SCIENCE. MY CHIEF OF STAFF, JOHN SUNUNU, IS SUCH A MAN. AS ARE ADMIRAL JIM WATKINS, OUR ENERGY SECRETARY, AND DR. ALLAN BROMLEY, MY SCIENCE ADVISOR. YET, ULTIMATELY, IT IS THE PRIVATE SECTOR THAT HAS SHAPED AMERICAN OPPORTUNITY -- AND WILL CONTINUE TO BRING OPPORTUNITY TO THE NEW MILLENNIUM. // LOOK AT GENERAL ELECTRIC, WHICH IS SPENDING $1.2 MILLION A YEAR ON MINORITY SCIENCE SCHOLARSHIPS.

AND A $20 MILLION COMMITMENT TO INVOLVE MORE INNER-CITY KIDS IN ENGINEERING. // OR MOBIL -- LAUNCHING GRANT PROGRAMS TO HELP STUDENTS ENHANCE AMERICA'S TECHNOLOGICAL CAPABILITY.

THESE EFFORTS -- BOTH PRIVATE AND PUBLIC -- WILL SUSTAIN THE COMPUTER REVOLUTION. FOR THEY RELY ON THE QUALITIES OF AMERICAN DRIVE AND DETERMINATION.

QUALITIES THAT WILL CONTRIBUTE, AS YOUR ACADEMY SAYS, "TO THE ADVANCEMENT OF ENGINEERING . . . AND THE WELL-BEING OF ALL HUMANITY." AND THAT ARE <u>CENTRAL</u> TO THE MAN FOR WHOM THIS EVENING'S PRIZE IS NAMED. //

CHARLES DRAPER WAS, FIRST, AN <u>IDEALIST</u> PUSHING BACK THE BOUNDARIES OF MANKIND'S TECHNOLOGICAL FUTURE. YET AT THE SAME TIME, A <u>PRACTICAL</u> MAN. ((I'M REMINDED OF A WRITER WHO WAS ASKED WHAT HE WOULD TAKE IF HIS HOME WERE ON FIRE AND HE COULD REMOVE ONLY ONE THING. //

"I WOULD TAKE THE FIRE," HE REPLIED.)) DR. DRAPER KNEW THAT YANKEE INGENUITY REVOLVES AROUND WHAT WORKS.

FINALLY, HE WAS INDOMITABLE -- A FIGHTER WHO LOOKED TO HIMSELF FOR INSPIRATION. ALBERT EINSTEIN ONCE SPOKE OF THIS GENIUS OF ENGINEERING -- WHICH EXPLAINS, IN TURN, THE GREATNESS OF DR. DRAPER. HE SAID: "EVERYTHING THAT IS REALLY GREAT AND INSPIRING IS CREATED BY INDIVIDUALS WHO LABOR IN FREEDOM." LABORING IN FREEDOM, CHARLES DRAPER WELL USED THAT FREEDOM.

USED IT TO CREATE AND TO INSPIRE -- AND TO MAKE HISTORY MOVE HIS WAY. //

THIS EVENING, WE HONOR TWO MEN WHO THEMSELVES HAVE MADE HISTORY -- AND MADE EACH AMERICAN PROUD. SO LET ME NOW PRESENT TO JACK KILBY AND BOB NOYCE ENGINEERING'S HIGHEST AWARD -- THE CHARLES STARK DRAPER PRIZE. AND SAY: THANK YOU, GOD BLESS YOU, AND GOD BLESS THE UNITED STATES OF AMERICA.

# # #

THE WHITE HOUSE

WASHINGTON

February 14, 1990

POTUS changes 5:10pm 2/16/90

INFORMATION

MEMORANDUM FOR THE PRESIDENT

THROUGH: CHRISS WINSTON cw

FROM: CURT SMITH CS

SUBJECT: REMARKS FOR DRAPER ENGINEER AWARD

I. SUMMARY

On Tuesday, February 20, at 8:45 p.m., you will address about 200 people at the first Charles Draper Prize ceremony. The two distinguished engineers, Jack Kilby and Robert Noyce, who independently co-invented the microchip will be honored with the Draper Prize. Dr. Bob White, President of The National Academy; Dr. Joseph Charyk, Chairman of the Draper Laboratory; Dr. Robert Seamans, Chairman of the Draper Prize Committee; and Mr. Jack Welch, Chairman of the National Academy and CEO of General Electric will each give brief introductory remarks. Also attending will be Mr. Stephen Bechtel, Honorary Chairman of National Engineering Week; Mr. Richard Morrow, Chairman of Amoco; Soviet Ambassador Yuri Dubinin; and the State Department host, Undersecretary Ivan Selin.

II. DISCUSSION

The attached remarks (8 minutes, speechcards) praise Jack Kilby and Robert Noyce for their remarkable invention. The creation of the microchip has changed the world and nurtured the information age, making our global village even smaller.

(Smith/Blessey)
5 P.M.
February 14, 1990
DRAPER

PRESIDENTIAL REMARKS: ENGINEERING AWARDS
TUESDAY, FEBRUARY 20, 1990
STATE DEPARTMENT
8:45 P.M.

Mr. Welch. Mr. Kilby and Dr. Noyce. Dr. White, Dr. Charyk [CHAIR-ik], Dr. Seamans, Mr. Bechtel, Mr. Morrow. Undersecretary Selin, Ambassador Dubinin. Members and Guests of the National Academy of Engineering. Ladies and gentlemen. Thank you, Jack, for that introduction, and for your warm reception.

((You know, as a boy I used to dream of being an engineer. In fact, when one of my grandkids heard I was addressing an audience of my heroes, he said, "Could you bring back one of those neat striped hats they wear?")) // Well, tonight let there be no confusion.

It is indeed a pleasure to be with you during National Engineers Week. And to salute the first two recipients of engineering's highest international award, the Charles Stark Draper Prize.

((Let me begin with a story which I think captures the spirit of this evening. It concerns three men scheduled to be executed on the same day of the French Revolution. One was a lawyer, another a politician, the third an engineer.

((First, came the lawyer. He put his head in the guilotine -- and the blade went two-thirds of the way down the track, then stopped. The man was set free. // Next, came the politician.

When the guilotine stopped short of his head, he, too, was spared. // Finally, came the third man -- and typically, the engineer focused on the **problem**, not himself. "That guilotine," he told the foreman, "I think I have the answer.")) //

As you can see, engineers just can't help themselves -- whatever the cost, they keep aiming for perfection. And they have helped make our century a time of extraordinary exploration. Opening doors into an age where mankind not only moved into the future -- but re-invented it.

Tonight, we honor Jack Kilby and Bob Noyce. // And their landmark work -- the microchip -- an invention which has already taken its place among the greatest of all time. // Not to date myself, but when I was growing up, PAC-Man was a hiker, not a video game. // The microchip has changed all that -- and helped America change the world.

Think, for example, of a computer the size of a room -- shrunk down to a size that fits on your lap. The microchip made it possible. Or a calculator slashed from the size of a refrigerator to the size of this watch. [HOLD UP ARM WITH WATCH]

Think, finally, of our planet. And how the microchip has stirred the new breeze of democracy. // Today, the President of Czechoslovakia, Vaclav Havel, visited the White House. And as we talked, I thought of how images of the past year have linked the peoples of Prague and Warsaw, Budapest and Berlin. Images of bravery and defiance -- of humanity's quest for freedom. And it was the **microchip** which carried them from one Nation to another

-- becoming an instrument of liberty and the symbol of the Information Age. // Integrated circuits have enabled us to do the unimaginable. Now, it is unimaginable to believe we could ever live without them.

Already, the microchip has helped America not to **de**-industrialize -- but **re**-industrialize. To paraphase Churchill, never has something so **small** done so **much** for so **many**. // Yet remember, too, that if we are to lead the world, we must **provide** that world with **further** breakthroughs. For engineering is "always a beginning, never a consummation." //

I know that the National Academy of Engineering shares this belief. So it has studied how America's engineering talent enhances our competitiveness. And is exploring **new** ways to protect the globe from environmental abuse. // You realize that truly **informed** decisions on issues like climate change require us to better integrate science, technology, and engineering into the public policy equation. //

Our Administration agrees -- and so supports research and development in **all** areas of science, technology, and engineering. We have asked for a **record high** 71 billion dollars for R&D in our budget for Fiscal Year 1991. // And to short-circuit the prediction that America will run short of engineers, we have introduced a National Science Scholars initiative to give kids a new incentive to excel in science, mathematics, and engineering. And I have announced an ambitious goal -- but one we **can** achieve -- that U.S. students will be Number One by the year 2000. //

You can tell that I respect people who have an understanding of science. My Chief of Staff, John Sununu, is such a man. As are Admiral Jim Watkins, our Energy Secretary, and Dr. Allan Bromley, my Science Advisor. Yet, ultimately, it is the **private** sector that has shaped American opportunity -- and will continue to **bring** opportunity to the New Millennium. // Look at General Electric, which is spending $1.2 million a year on minority science scholarships. And a $20 million commitment to involve more inner-city kids in engineering. // Or Mobil -- launching grant programs to help high-school students enhance America's technological capability.

These efforts -- both private and public -- will sustain the computer revolution. For they rely on the qualities of American drive and determination. Qualities that will contribute, as your Academy says, "To the advancement of engineering . . . and the well-being of all humanity." And that are **central** to the man for whom this evening's prize is named. //

Charles Draper was, first, an **idealist** pushing back the boundaries of mankind's technological future. Yet at the same time, a **practical** man. ((I'm reminded of a writer who was asked what he would take if his home were on fire and he could remove only one thing. // "I would take the fire," he replied.)) Dr. Draper knew that Yankee ingenuity revolves around what **works**.

Finally, he was **indomitable** -- a fighter who looked to **himself** for inspiration. He knew no government planner decided that Marconi would invent the wireless. And what might have

happened -- or worse, might **not** -- had Henry Ford been forced to wait for Washington's approval before testing his model-T? // If he had, Barbara and I might have come here on a bicycle built for two. //

Albert Einstein once spoke of this **genius** of engineering -- which explains, in turn, the **greatness** of Dr. Draper. He said: "Everything that is really great and inspiring is created by individuals who labor in freedom." Laboring in freedom, Charles Draper well **used** that freedom. Used it to create and to inspire -- and to make history move his way. //

This evening, we honor two men who **themselves** have made history -- and made each American proud. So let me now present to Jack Kilby and Bob Noyce engineering's highest award -- the Charles Stark Draper Prize. And say: Thank you, God bless you, and God bless the United States of America.

# # # #

Document No. 113193

WHITE HOUSE STAFFING MEMORANDUM

DATE: 02/16/90 ACTION/CONCURRENCE/COMMENT DUE BY: ----

SUBJECT: PRESIDENTIAL REMARKS: DRAPER ENGINEER AWARD (02/14 5:00 p.m. draft)

	ACTION	FYI		ACTION	FYI
VICE PRESIDENT	☐	☑	MCCLURE	☐	☑
SUNUNU	☐	☑	NEWMAN	☐	☐
SCOWCROFT	☐	☑	PORTER	☐	☑
DARMAN	☐	☑	ROGICH	☐	☑
BATES	☐	☑	UNTERMEYER	☐	☐
CARD	☐	☑	ROGERS	☐	☑
CICCONI	☐	☑	PINKERTON	☐	☑
DEMAREST	☐	☑	WINSTON	☐	☑
FITZWATER	☐	☑	BROMLEY	☐	☑
GRAY	☐	☑	_____	☐	☐
HAGIN	☐	☐	_____	☐	☐

REMARKS:

The attached has been forwarded to the President.

RESPONSE:

90 FEB 16 P5:50

James W. Cicconi
Assistant to the President
and Deputy to the Chief of Staff
Ext. 2702

THE WHITE HOUSE
WASHINGTON

1990 FEB 14 PM 6:05

February 14, 1990

INFORMATION

MEMORANDUM FOR THE PRESIDENT

THROUGH: CHRISS WINSTON cw

FROM: CURT SMITH CS

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Already, the microchip has helped America not to **de**-industrialize -- but **re**-industrialize. To paraphase Churchill, never has something so **small** done so **much** for so **many**. // Yet remember, too, that if we are to lead the world, we must **provide** that world with **further** breakthroughs. For engineering is "always a beginning, never a consummation." //

I know that the National Academy of Engineering shares this belief. So it has studied how America's engineering talent enhances our competitiveness. And is exploring **new** ways to protect the globe from environmental abuse. // You realize that truly **informed** decisions on issues like climate change require us to better integrate science, technology, and engineering into the public policy equation. //

Our Administration agrees -- and so supports research and development in **all** areas of science, technology, and engineering. We have asked for a **record high** 71 billion dollars for R&D in our budget for Fiscal Year 1991. // And to short-circuit the prediction that America will run short of engineers, we have introduced a National Science Scholars initiative to give kids a new incentive to excel in science, mathematics, and engineering. And I have announced an ambitious goal -- but one we **can** achieve -- that U.S. students will be Number One by the year 2000. //

You can tell that I respect people who have an understanding of science. My Chief of Staff, John Sununu, is such a man. As are Admiral Jim Watkins, our Energy Secretary, and Dr. Allan Bromley, my Science Advisor. Yet, ultimately, it is the **private** sector that has shaped American opportunity -- and will continue to **bring** opportunity to the New Millennium. // Look at General Electric, which is spending $1.2 million a year on minority science scholarships. And a $20 million commitment to involve more inner-city kids in engineering. // Or Mobil -- launching grant programs to help high-school students enhance America's technological capability.

These efforts -- both private and public -- will sustain the computer revolution. For they rely on the qualities of American drive and determination. Qualities that will contribute, as your Academy says, "To the advancement of engineering . . . and the well-being of all humanity." And that are **central** to the man for whom this evening's prize is named. //

Charles Draper was, first, an **idealist** pushing back the boundaries of mankind's technological future. Yet at the same time, a **practical** man. ((I'm reminded of a writer who was asked what he would take if his home were on fire and he could remove only one thing. // "I would take the fire," he replied.)) Dr. Draper knew that Yankee ingenuity revolves around what **works**.

Finally, he was **indomitable** -- a fighter who looked to **himself** for inspiration. He knew no government planner decided that Marconi would invent the wireless. And what might have

happened -- or worse, might **not** -- had Henry Ford been forced to wait for Washington's approval before testing his model-T? // If he had, Barbara and I might have come here on a bicycle built for two. //

Albert Einstein once spoke of this **genius** of engineering -- which explains, in turn, the **greatness** of Dr. Draper. He said: "Everything that is really great and inspiring is created by individuals who labor in freedom." Laboring in freedom, Charles Draper well **used** that freedom. Used it to create and to inspire -- and to make history move his way. //

This evening, we honor two men who **themselves** have made history -- and made each American proud. So let me now present to Jack Kilby and Bob Noyce engineering's highest award -- the Charles Stark Draper Prize. And say: Thank you, God bless you, and God bless the United States of America.

# # # #

Document No. 113193

WHITE HOUSE STAFFING MEMORANDUM

DATE: 02/12/90 ACTION/CONCURRENCE/COMMENT DUE BY: 4:00 p.m. 02/13/90

SUBJECT: PRESIDENTIAL REMARKS: ENGINEERING AWARDS (02/12 5:00 p.m. draft)

	ACTION	FYI		ACTION	FYI
VICE PRESIDENT	☐	☑	MCCLURE N/C	☑	☐
SUNUNU	☐	☑	NEWMAN	☐	☐
SCOWCROFT	☑	☐	PORTER	☑	☐
DARMAN	☑	☐	ROGICH	☑	☐
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CICCONI	☐	☑	PINKERTON	☑	☐
DEMAREST	☑	☐	BROMLEY	☑	☐
FITZWATER	☐	☑	WINSTON	☐	☑
GRAY	☑	☐	_____	☐	☐
HAGIN	☐	☐	_____	☐	☐

REMARKS:

Please provide any comments/recommendations directly to Chriss Winston by 4:00 p.m. on Tuesday 02/13, with a copy to my office. Thanks.

RESPONSE:

James W. Cicconi
Assistant to the President
and Deputy to the Chief of Staff
Ext. 2702

(Smith/Blessey)
5 P.M.
February 12, 1990
DRAPER

1990 FEB 12 PM 6:20

PRESIDENTIAL REMARKS: ENGINEERING AWARDS
TUESDAY, FEBRUARY 20, 1990
STATE DEPARTMENT

Mr. Welch. Mr. Kilby and ~~Mr.~~ Dr. Noyce. Dr. White, Dr. Charyk [CHAIR-ik], Dr. Seamans, ~~Dr.~~ Mr. Bechtel, Mr. Morrow. Members and Guests of the National Academy of Engineers. Ladies and gentlemen. Thank you, Jack, for that introduction, and for your warm reception.

((You know, as a boy I used to dream of being an engineer. In fact, when one of my grandkids heard I was addressing an audience of my heroes, he said, "Could you bring back one of those neat striped hats they wear?")) // But tonight let there be no confusion.

Tonight, it is indeed a pleasure to be with you during National Engineers Week. And to salute the first two recipients of engineering's highest international award, the Charles Stark Draper Prize.

((Let me begin with a story which I think captures the spirit of this evening. It concerns three men scheduled to be executed on the same day of the French Revolution. One was a lawyer, another a politician, the third an engineer.

((First, came the lawyer. He put his head in the guilotine -- and the blade went two-thirds of the way down the track, then stopped. The man was set free. // Next, came the politician. When the guilotine stopped short of his head, he, too, was spared. // Finally, came the third man -- and typically, the engineer

focused on the **problem**, not himself. "That guilotine," he told the foreman, "I think I have the answer.")) //

As you can see, engineers just can't help themselves -- whatever the cost, they keep aiming for perfection. And they have helped make our century a time of extraordinary exploration. Opening doors into an age where mankind not only moved into the future -- but re-invented it.

Tonight, we honor Jack Kilby and ~~Robert~~ Bob Noyce. // And their landmark work -- the microchip -- an invention ~~perhaps no less crucial than the discovery of fire.~~ which has already taken its place among the historic inventions of mankind all time. // Not to date myself, but when I was growing up, PAC-Man was a hiker, not a video game. // The microchip has changed all that -- and helped America change the world.

Think, for example, of a computer the size of a room -- shrunk down to a size that fits on your lap. The microchip made it possible. Or a calculator slashed from the size of a refrigerator to the size of this pen. [PULL PEN CALCULATOR FROM POCKET] Integrated circuits have enabled us to do the unimaginable. Now, it is unimaginable to believe we could ever live without them.

Already, the microchip has helped America not to **de**-industrialize -- but **re**-industrialize. To paraphase Churchill, never has something so **small** done so **much** for so **many**. // Yet remember, too, that if we are to lead the world, we must **provide** that world with **further** breakthroughs. For engineering is "always a beginning, never a consummation." //

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Porter INSERT →

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REMARKS:

Please provide any comments/recommendations directly to Chriss Winston by 4:00 p.m. on Tuesday 02/13, with a copy to my office. Thanks.

RESPONSE:

OK S.R

90 FEB 14 A9:47

James W. Cicconi
Assistant to the President
and Deputy to the Chief of Staff
Ext. 2702

(Smith/Blessey)
5 P.M.
February 12, 1990
DRAPER

1990 FEB 12 PM 6:20

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TUESDAY, FEBRUARY 20, 1990
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Document No. 113193

WHITE HOUSE STAFFING MEMORANDUM

DATE: 02/12/90 ACTION/CONCURRENCE/COMMENT DUE BY: 4:00 p.m. 02/13/90

SUBJECT: PRESIDENTIAL REMARKS: ENGINEERING AWARDS (02/12 5:00 p.m. draft)

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SUNUNU	☐	☑	NEWMAN	☐	☐
SCOWCROFT	☑	☐	PORTER	☑	☐
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FITZWATER	☐	☑	WINSTON	☐	☑
GRAY	☑	☐	_____	☐	☐
HAGIN	☐	☐	_____	☐	☐

REMARKS:

Please provide any comments/recommendations directly to Chriss Winston by 4:00 p.m. on Tuesday 02/13, with a copy to my office. Thanks.

RESPONSE:

N/C 2/13/90

James W. Cicconi
Assistant to the President
and Deputy to the Chief of Staff
Ext. 2702

Document No. 113193

WHITE HOUSE STAFFING MEMORANDUM

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REMARKS:

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RESPONSE:

Cant - looks fine
Mention Governor
Summit - perhaps
other engineers in
admin - if there are
Andy Card?

90 FEB 13 A10:08

James W. Cicconi
Assistant to the President
and Deputy to the Chief of Staff
Ext. 2702

(Smith/Blessey)
5 P.M.
February 12, 1990
DRAPER

1990 FEB 12 PM 6:20

PRESIDENTIAL REMARKS: ENGINEERING AWARDS
TUESDAY, FEBRUARY 20, 1990
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perhaps overstated

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# # # #

THE WHITE HOUSE
WASHINGTON

February 13, 1990

MEMORANDUM FOR CHRISS WINSTON
DEPUTY ASSISTANT TO THE PRESIDENT FOR
COMMUNICATIONS

FROM: JAY S. BYBEE
ASSOCIATE COUNSEL TO THE PRESIDENT

SUBJECT: Presidential Remarks: Engineering Awards

Counsel's office has reviewed the above-referenced matter. We have no legal objections.

Thank you for the opportunity to comment on this matter.

cc: James W. Cicconi

Document No. 113193

WHITE HOUSE STAFFING MEMORANDUM

DATE: 02/12/90 ACTION/CONCURRENCE/COMMENT DUE BY: 4:00 p.m. 02/13/90

SUBJECT: PRESIDENTIAL REMARKS: ENGINEERING AWARDS ~~(02/12 5:00 p.m. draft)~~

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HAGIN	☐	☐	_____	☐	☐

REMARKS:

Please provide any comments/recommendations directly to Chriss Winston by 4:00 p.m. on Tuesday 02/13, with a copy to my office. Thanks.

RESPONSE: See comments -- Also may want to add more re: Royce + Kilby -

Grady
x4844

90 FEB 13 P4:03

James W. Cicconi
Assistant to the President
and Deputy to the Chief of Staff
Ext. 2702

(Smith/Blessey)
5 P.M.
February 12, 1990
DRAPER

1990 FEB 12 PM 6:20

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We have increased the government's investment in science, math and engineering education across the board -- a 26% increase to over $1 billion in FY 1991. Grady 74844

Yet, ultimately, it is the **private** sector that has shaped American opportunity -- and will continue to **bring** opportunity to the New Millennium. // Look at General Electric, which is spending $1.2 million a year on minority science scholarships. And $20 million annually to involve more inner-city kids in engineering. // Or Mobil -- launching grant programs to help high-school students enhance America's technological capability.

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Grady X4844

# # # #

Document No. 113193

WHITE HOUSE STAFFING MEMORANDUM

DATE: 02/12/90 ACTION/CONCURRENCE/COMMENT DUE BY: 4:00 p.m. 02/13/90

SUBJECT: PRESIDENTIAL REMARKS: ENGINEERING AWARDS (02/12 5:00 p.m. draft)

	ACTION	FYI		ACTION	FYI
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DARMAN	☑	☐	ROGICH	☑	☐
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FITZWATER	☐	☑	WINSTON	☐	☑
GRAY	☑	☐		☐	☐
HAGIN	☐	☐		☐	☐

REMARKS:

Please provide any comments/recommendations directly to Chriss Winston by 4:00 p.m. on Tuesday 02/13, with a copy to my office. Thanks.

— pm 122

RESPONSE:

Excellent!

90 FEB 13 P2:58

James W. Cicconi
Assistant to the President
and Deputy to the Chief of Staff
Ext. 2702

(Smith/Blessey)
5 P.M.
February 12, 1990
DRAPER

1990 FEB 12 PM 6:20

PRESIDENTIAL REMARKS: ENGINEERING AWARDS
TUESDAY, FEBRUARY 20, 1990
STATE DEPARTMENT

Mr. Welch. Mr. Kilby and Mr. Noyce. Dr. White, Dr. Charyk [CHAIR-ik], Dr. Seamans, Dr. Bechtel. Members and Guests of the National Academy of Engineers. Ladies and gentlemen. Thank you, Jack, for that introduction, and for your warm reception.

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# # # #

THE WHITE HOUSE

WASHINGTON

February 13, 1990

MEMORANDUM FOR CHRISS WINSTON

FROM: ROGER B. PORTER RBP

SUBJECT: Presidential Remarks: Engineering Awards

The speech is well written and tailored to this audience. We have one suggestion which we believe will strengthen the remarks and resonate with this group. In the second paragraph of the third page, second sentence, we recommend replacing the word "begun" with the word "introduced". In addition, we suggest inserting the following passage at the end of the second paragraph:

OK

> You may know that I have been working with the Nation's Governors on setting -- for the first time -- education goals for America. And that among these is a goal for U.S. students to be the best in the world in mathematics and science achievement by the year 2000. This is an ambitious goal. And it won't be easy. But with role models such as tonight's honorees, America will be number one.

If you have any questions or we can help in any other way, please let me know.

cc: James W. Cicconi

90 FEB 13 P6:05

Document No. 113193

WHITE HOUSE STAFFING MEMORANDUM

DATE: 02/12/90 ACTION/CONCURRENCE/COMMENT DUE BY: 4:00 p.m. 02/13/90

SUBJECT: PRESIDENTIAL REMARKS: ENGINEERING AWARDS ~~(02/12 5:00 p.m. draft)~~

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RESPONSE:

James W. Cicconi
Assistant to the President
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Ext. 2702

(Smith/Blessey)
5 P.M.
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DRAPER

1990 FEB 12 PM 6:20

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# # # #

THE WHITE HOUSE

WASHINGTON

February 13, 1990

90 FEB 13 P4:50

MEMORANDUM FOR CHRISS WINSTON

FROM: AUSTEN FURSE A.F.

SUBJECT: Engineering Awards Draft

This event is an opportunity to go beyond the conventional, expected, and proper "attaboy" remarks in order to speak to wider issues. The technique of using an essentially pro forma event to leverage a wider, deeper message has proven very effective.

One example: the President's Wizner Park speech in Houston, went beyond what would have been adequate -- a pat on the back for a worthy neighborhood group -- in order to make substantive points about his policies and their philosophical underpinnings (e.g., crime as evil, the necessity of just punishment, and the importance of cultivating character). That speech received a lot of attention in part because it built a visionary superstructure on top of its "attaboy" frame.

The current draft could stand improvement even as an "attaboy" speech. As it now stands, aside from the intro. and conclusion, Kilby and Noyce are mentioned only once (at pg. 2, para. 3, line 1), and the significance of their contributions are lightly touched upon in the following two grafs. The stupendous significance of their work cries out for at least doing better justice to the facts -- that is the minimum requirement of the "attaboy" aspect. Much space, a full one-quarter of the speech, is given to praise of the Draper award's namesake. Another one-quarter is spent on jokes. This space could be used to speak both about the award winners and a larger theme.

Their invention truly is a milestone in human history, as numerous books and articles will attest. Attached is a relevant excerpt from one such book by George Gilder. Consider, for example, (and here is the visionary superstructure to build around the "attaboy" frame) that these two men are literally partly responsible for the liberation of Eastern Europe.

(more)

The microchip symbolizes the greater freedom of individual expression worldwide. Kilby and Noyce's invention brought the power of the computer down to the individual level where it could not be touched by the central authorities: PC's, fax machines, portable xerox machines, VCR's, etc.

Therefore, the overarching theme of the speech, going beyond the necessary praise of the award winners, could be to link this enormous technological achievement with the New Breeze (not to mention increased American competitiveness, the creation of jobs, and the assurance of military superiority vis a vis the USSR). It is particularly relevant given the upcoming visit of Havel (and to a lesser extent Mandela).

Below, then, is some suggested language focusing on the significance of Kilby and Noyce's invention in contributing to the New Breeze:

"Jack Kilby and Robert Noyce, perhaps the greatest legacy your work has wrought lies not so much in the greater convenience provided by the myriad of new devices that the microchip has made possible -- nor the endless hours of time that have been saved by those devices -- nor the creation of countless jobs and untold wealth -- nor even the rich veins of knowledge and information that would have lain untapped but for the awesome power of the microchip.

"Your work, the etching of your imaginations on the material of history, is perhaps best rewarded by the microchip's worldwide liberation of human expression -- human expression that had been trapped by the heavy hand of the state; because no tyranny can long contain an aspiring mind in a world of personal computers, modems, fax machines, copiers and all the thousands of ways in which the microchip has harnessed the power of knowledge for the individual.

"Your work has marked the beginning of a new epoch. **For years the brutal hands of state authority have hurled sand into the eyes of history itself. But now a New Breeze blows that same sand back in the form of the microchip -- the symbol of the Information Age.**

"I have often spoken about the New Breeze. Very simply it is the force of an idea: the idea of freedom and democracy. Technological change can reinforce freedom -- it actually does, at this very moment. The technological change of the Information Age is helping to fan the New Breeze and ventilate long-stifled centers of expression. Together, the Information Age, symbolized by the microchip, and the New Breeze of freedom and democracy reinforce each other.

"The darkness that for many nations has long obscured vast areas of history and knowledge -- what the Czech writer, Milan Kundera has called the "Kingdom of Forgetting" -- is suddenly being dispelled and blown away. Whole peoples are awaking from an artificial amnesia imposed upon them by brute force of the state.

"What emerges to take its place will depend mainly on what the people themselves do in those places where which the New Breeze has been blowing. But what emerges will also depend in part on us: on all those who have long treasured the traditions of the free exchange of ideas and information -- on engineers like Jack Kilby and Robert Noyce who have helped create the knowledge-based economy and the technologies of the Information Age.

"We, by our own actions and our own example will help determine whether the Kingdoms of Forgetting develop into, as it were, the Republics of Remembering -- new commonwealths of memory: Memory not just in the sense that the microchip has memory, but more importantly memory in the sense of treasuring the Western traditions of democratic, limited government that ensures our freedom. We today can better safeguard our freedoms and our past because great imaginations like Kilby's and Noyce's looked to future. And for that your country is very grateful."

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RESPONSE:

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Ext. 2702

ver Mead had called it as a teenager. It was a replacement part, king back hungrily at vacuum tube slots rather than forward to the of the microcosm. Individual discrete transistors were relevant to ultimate promise of the technology chiefly because they provided ining in the ways of silicon.

The silicon transistor was the key to the cosmos only because mil-ns could ultimately be packed together on single chips and insu-ed by their own oxide. Packed so tightly together, slow silicon nsistors would operate incomparably faster than any assemblage of edier germanium devices. No one at TI at the time could even agine such a thing.

CHAPTER 5

The Monolithic Idea

In the move into the microcosm—Planck's invisible sphere—the idea of combining many transistors and other circuit elements on a single piece of silicon, one chip, marked a point of no return. An engineer could see and handle single discrete transistors and connect them to other devices with ordinary copper wire. He could still imagine that he was working with ordinary materials in a visible world. He was still manipulating the solid stuff of his sensory experience. But putting an entire system of electrical components on one chip the size of a fingernail was a new challenge, which required the crossing of a great divide. The integrated circuit would take the industry down a slippery slope from the familiar shores of the senses into a quantum sea.

Yet this invention was not made at a major industrial or university laboratory full of quantum physicists and expensive equipment. Making the plunge instead were two engineers at two small companies, following the logic of information technology wherever it should lead.

One of these engineers arrived early in 1958 at the Dallas headquarters of Texas Instruments. A tall, quiet man named Jack Kilby, he had been designing small systems for hearing-aid companies at a firm

in Wisconsin called Centralab. He would apply unpackaged transistors and other devices to a ceramic substrate and then connect them by depositing metal lines and resistors on the surface of the ceramic by a silk-screen process. Although far inferior to true integrated circuits—ICs on single chips—this hybrid approach was more efficient than wiring together separately packaged devices. Kilby's idea was appealing enough that as late as 1964, IBM, in a moment of typical conservatism, adopted it for the breakthrough 360 mainframe computer series.

Kilby's first assignment in Texas, however, was to develop "micromodules" that seemed actually inferior to the ceramic systems he had built in Wisconsin. The micromodule concept envisaged encasing each transistor or other component, together with all its wiring, in a separate plastic package. These identical modules could be plugged together like Lego blocks. The key appeal of the micromodule to TI was its sponsor, the U.S. Army. Its appeal to the Army was its secure footing in the known world of the macrocosm. With careful directions, even a small child could assemble any specified circuit from these fungible units.

The problem was, so it seemed to Kilby, that the small child would grow old and gray before any important project was finished. By the time Kilby arrived at TI, military systems for such functions as missile control, space travel, supercomputers, airplane avionics, and other complex uses entailed many millions of components. Built out of so-called micromodules, they would fill skyscrapers. The Army's proposal in fact illustrated the futility of macrocosmic approaches to microcosmic technology.

Still, the Army wanted it and was willing to pay, so Kilby set out to design appropriate modules . . . and if they were tiny enough, perhaps . . . if they were cheap enough, possibly . . . they could be dumped on the market to sell as miniature Lego blocks at Christmas. Then, in July 1958, TI dispersed for one of its mass vacations, leaving Jack Kilby—as a recent arrival unentitled to time off—in effective command of the semiconductor laboratory. An exciting sense of freedom possessed him. It was a chance, thought Kilby, to come up with something different.

From extended interviews with Kilby, T. R. Reid, author of a vivid history of *The Chip,* composed an inventor's fugue, which went something like this: "If Texas Instruments was going to do something . . . it probably had to involve silicon." Fair enough. . . . What could you

do with silicon? Obviously transistors . . . diodes . . . already being done. But by contrast silicon did not make very good resistors and capacitors, both crucial to managing power and storing it in most circuits. It would be original, certainly, to make a silicon resistor. But it would also be absurd to use preciously purified silicon to make a device that cost a penny in carbon. Yet, thought Kilby, who had contrived various novel capacitors for Centralab, one just might be able to produce a silicon capacitor. Its performance wouldn't approach that of the standard metal and ceramic capacitor but it would do the job . . . particularly in the low power world of solid state. . . . For that matter, you *could* make a silicon resistor. . . . And come to think of it—this was the idea that would revolutionize electronics—"if you could make all the essential parts of a circuit out of one material, you could manufacture all of them, all at once, in a monolithic block of that material."

This was the integrated circuit: a group of transistors and other components interconnected on one tiny piece of semiconductor. It could be a hearing aid, a computer memory cell, a radio oscillator . . . in the end it might even be logic for avionics or a hand-held calculator (Kilby would later patent a calculator chipset, together with a tiny thermal printer for the readout). Kilby did not know what the limits would be. But his thought process captured the essence of the semiconductor revolution in America.

Because it consisted of a series of second-best solutions—inferior resistors and capacitors, for example—which ended only in a radical drop in manufacturing costs, Kilby's concept would have been unlikely to emerge from a laboratory of pure science. A breakthrough in product design, it likely would have sprung neither from a capital equipment producer nor from a semiconductor factory, both of which focus on existing products. Because it threatened the jobs of computer engineers who made their living combining electronic components into elegant configurations on circuit boards, the new device would not have been invented or accepted readily in the computer industry. A synthesis of technical and economic speculations based on materials science, circuit design, processing techniques, and a wild hunch, it was the kind of solution most doggedly obstructed by the usual divisions of labor and specialization in large companies. And it happened at Texas Instruments, in part, because most of the company was not there.

When the company returned from vacation, however, things began

to go wrong. Kilby's boss, Willis Adcock, was enough intrigued by his new employee's crabbed circuit sketches to set him to work producing two prototypes. But TI was then moving toward a new system of diffusing impurities onto the wafers in hot ovens, where they could be processed like so many cookies. Because the first diffused devices were germanium "mesa" transistors, Kilby agreed to make his prototypes on a piece of germanium. It was a fatal step away from the microcosm.

The device was called the mesa because in shape it resembled a flat-topped southwestern mountain rising above the sands of a usually silicon substrate. Because the emitter and base were in the protruding part, the mesa was accessible from above and was isolated from neighboring mesas by air. Previous transistors had lead wires sticking out from their two ends below the surface of the block of silicon or germanium. Thus they could not be pushed together or made on one piece of semiconductor. Mesas could be built in groups on one chip without the wires getting in the way. The wires between the mesa tops could be added later. The mesa seemed a godsend for integrated circuits, and indeed it would play a critical role in their development at two companies. But only Jack Kilby would actually use mesas to make integrated circuits.

So it was that for his revolutionary device Kilby chose a fatefully obsolete material and a fatally obsolescent transistor design. On a sliver of germanium less than one half inch long, with spidery gold wires awkwardly soldered from one mesa top to another, Kilby contrived one of the ugliest little devices since the original point contact transistor.

Hearing of the device back in Mountain View, California, however, one engineer working at Fairchild Semiconductor quietly brought forth some similar designs he had been working on. His name was Robert Noyce, and most people in the industry regard him as the true inventor of the integrated circuit.

The son of a minister in an Iowa farm community, Noyce as a boy had created a flying machine and used it to glide down safely from the tops of barns. During his course through Grinnell College, MIT, and Philco-Ford Semiconductor, this "can-do" confidence grew into a sense of high destiny in the world.

Then he came a cropper. At Shockley Semiconductor Laboratories, also in Mountain View, where Noyce worked from 1955 to 1959, the great scientist had treated Noyce like a youth in his twenties

learning from the master. In Noyce's presence, Shockley would call former colleagues at Bell to check out any novel results the young man achieved.

For example, before Esaki's Nobel Prize-winning invention of the tunnel diode was announced, Noyce presented to Shockley a detailed proposal for such a device. But Shockley was not interested. He never seemed quite to realize that the young men he had assembled in Palo Alto—for all their humble beginnings and bulging Windsor knotted ties—were in many ways superior to the polished authorities he had left behind him at Bell Labs.

Eventually the group left Shockley in favor of an offer from Fairchild of Syosset, Long Island, which was interested in establishing a semiconductor firm. Shockley is now said to see Noyce as "traitorous." But by holding the eight key men from Shockley Labs together, Noyce succeeded not only in saving Shockley's most precious legacy to the industry but also in creating the team that would bring the world of electronics massively back to Shockley's original vision of a field effect transistor (FET). Elegantly simple and easy to miniaturize, eventually the FET would be a key to the microcosm.

The eight defectors from Shockley Semiconductor were Noyce, Moore, Julius Blank, Victor Grinich, Eugene Kleiner, metallurgist Sheldon Roberts, Jay Last, an expert on photo optics from Corning Glass, and Jean Hoerni, a physicist with two doctorates. In a sense they were the founders of Silicon Valley. While rapidly expanding their numbers—hiring among others a tall, burly young engineer named Charles Sporck from a GE components factory in Schenectady, New York, and Andrew Grove—they set to work to redefine the industry.

Together the group swept past TI in integrated circuits and in the process transformed Kilby's hunch into one of the most important inventions in the history of technology. Known as the planar integrated circuit, Fairchild's concept comprised the essential device and process that dominates the industry today. In the 1960s, it gave Fairchild a lead in the new phase of the industry comparable to the vantage that TI had achieved in the 1950s manufacturing silicon transistors. Ultimately it moved the industry deep into the microcosm, and put America on the moon.

The first steps toward dominance came from the team of Moore and Hoerni. Setting out to design large diffusion furnaces that could process scores of silicon wafers at one time, they began batch-process-

ing the very kind of transistor that TI was then making in germanium: the mesa. The precision of the diffusion method, as mastered by Gordon Moore, allowed Fairchild rapidly to make its mark in this technology.

Nevertheless, there were flaws in the mesa. For one thing, it still needed tiny gold wires hooked up to the promontory. For another, its exposed surfaces tended to attract contaminants. This problem became Fairchild's historic opportunity.

To protect the mesa from contaminants during manufacture, Hoerni and Moore began playing with the idea of depositing a layer of silicon dioxide over its surface. But running a thin silicon dioxide film up and down the mesa's steep slopes was nearly impossible, even with the new diffusion method. It would be better, Hoerni thought, to have a *plain*. Thus he stumbled into the historic idea of flattening the mesa. Then he saw he could use the flat layer of silicon dioxide for two purposes at once. Unlike the oxides of other elements, silicon dioxide could both protect devices from chemicals during fabrication and insulate them during their electrical operations.

Suddenly an entirely new and better approach to semiconductor production began to emerge in his mind. The diffusion process made it possible to create transistors not by adding layers to the top, but by diffusing the impurity "dopants" into the surface. Hoerni proposed that a single transistor be created, with a flat surface and with all its regions accessible on that surface. Such a device, which Hoerni called "planar," would solve the problem of contamination because a relatively flat topography could be protected nicely by a planar film of that excellent insulator, silicon dioxide, that could easily be grown on silicon by heating it in an oxidation furnace with pure oxygen or steam.

This concept revolutionized the semiconductor world, for it prompted Bob Noyce to think of integrating large numbers of electronic components on one flat chip of silicon. Neatly disposing of the nagging, labor-intensive problem of bonding gold wires to each electrode (as was necessary in Jack Kilby's mesa IC), Noyce proposed to interconnect the parts by aluminum lines evaporated onto the insulating oxide surface. The aluminum could be connected with each transistor through holes in the oxide.

While Kilby had invented two integrated circuits, Noyce was ready to show how to mass-produce them. And because Noyce was clearer in specifying the mode of interconnection and insulation, he was allowed to share in the IC patent—after some ten years of litigation

between TI and Fairchild—despite conceiving of it and building prototypes well after Kilby.

The decision was just. The image of those mesas, with wires running between them like gold transmission lines above the intervening desert, countervailed the claim in his patent application that they could be "laid down" on the surface. They couldn't. The wires could not be laid down without an insulator and Kilby had offered none. Indeed, none would work on germanium mesas. Planar silicon dioxide insulation was what made the IC a reality and made Noyce the real inventor (with key assists from Hoerni and Moore).

Just as important as these conceptual advances in the move to the microcosm, however, was an entire chain of manufacturing techniques that Moore, Sporck, and the other Fairchild engineers perfected over the following years. Although integrated circuits operate with incomprehensible speed, they can take long months to produce. Even in 1989, with the most modern equipment, the usual fabrication process—often after many man-years of design work—usually takes some six weeks or more. During Fairchild's world-beating rush of 1959 and 1960, the process dragged out over a year.

The diffusion step, in which gaseous impurities or dopants slowly sink into the surface of the substrate, occurs at a temperature approaching the melting point of silicon (1200 degrees Celsius), and takes a period of hours. Then comes the photolithography: creating a pattern on a chip by exposing its surface—covered with a light-sensitive chemical called photoresist—to light through a glass photomask inscribed with the design.

In effect, the designs are projected onto the wafer like a slide on a screen, but with all the lenses reversed to miniaturize the image rather than magnify it. After the design is set by exposing the photoresist to light, the resist is etched away in accordance with the desired pattern. The designs are "developed," hundreds on each wafer at a time, much like a photograph of hundreds of chips.

By repeating these steps for several layers, the pattern of transistors and other IC components is created. Finally, a scheme of holes, or vias, is developed in the oxide insulator. These holes are for the metallization: the evaporated layer of aluminum, photo-etched into precise patterns, that would actually *integrate*—by interconnecting—the elements in the circuit.

Thus eliminated were all the thousands of wires—sticking out from both ends and from the top of each discrete component—that made transistor manufacture and packaging a laborious, expensive, and fre-

quently unreliable process. At every potentially disruptive step, particularly during the etching away of unwanted metal, the Fairchild inventors used silicon dioxide to protect the device.

These general techniques embraced thousands of exacting particulars, and it is the details that are everything in semiconductor work. Suffice it to say that it took nearly three years for other companies to master the intricate interplay among the different steps. By the time others worked it all out in the mid-sixties, Fairchild had become the dominant company in the microcosm, moving fully into "the invisible sphere" that Planck had defined.

Like their intellectual precursors in physics, these callow young men could find no easy idiom to describe their achievements. Their feats defied every analogy to the world in which they—and all of us—were raised and in which our very language was formed. They had to deal in sizes that confound any metaphor of the minute, from motes to mites; in numbers, of precise trillions of drifting or diffusing electrons, that dwarf the merely astronomical; in speeds—nanoseconds (billionths of seconds)—that render agonizingly and viscidly slow the snapping of a finger. Even to begin they had to create clean rooms that flout any standard of the immaculate, any concept of sterilization, any simile of snow.

Cleanliness for these purposes is judged in particles of a diameter more than 1 micron per cubic foot. "Class 100," then necessary in a semiconductor fabrication area, measures one hundred times cleaner than the some 10,000 such particles per cubic foot in the operating room of a hospital. One of these infinitesimal particles athwart a transistor channel looms in the micrographic photos—as in the common speech of the Valley—as a "boulder." Now taken for granted in an industry moving to class 10 and below, these conditions had to be created for the first time at Fairchild.

Like TI before it, Fairchild achieved its breakthroughs with virtually no government assistance while its largest competitors—chiefly the vacuum tube companies—were receiving collectively hundreds of millions of dollars in grants. But when the government needed a way to miniaturize the circuitry for its Minuteman missiles and its space flights, it did not use micromodules or any of the other exotic technologies it had subsidized. It turned first to Fairchild rather than to its early favorites and beneficiaries. Fairchild's lack of military entanglement in the late fifties finally allowed the company to get the bulk of military and aerospace contracts in the early 1960s.

Meanwhile, at TI, Haggerty's balance between defense and civilian

production went severely awry. Military contracting grew rapidly and TI lost some of its creative edge, particularly in the metal oxide silicon (MOS) technologies of Gordon Moore's parable. One day in 1966, Willis Adcock, Kilby's former boss, quit TI and walked dazzled through Fairchild, marveling at their efficiency with the planar process. The invisible sphere had shifted again.

D2 - Mention Gov. Sununu & Andy Card and any othe Eng. within the Admin - are there any?

Staffed

(Smith/Blessey)
5 P.M.
February 12, 1990
DRAPER

PRESIDENTIAL REMARKS: ENGINEERING AWARDS
TUESDAY, FEBRUARY 20, 1990
STATE DEPARTMENT

Undersecs Selin, Atwood, Reed, Ambassador —

Mr. Welch. Mr. Kilby and Mr. Noyce. Dr. White, Dr. Charyk [CHAIR-ik], Dr. Seamans, Dr. Bechtel. Members and Guests of the National Academy of ~~Engineers~~ Engineering. Ladies and gentlemen. Thank you, Jack, for that introduction, and for your warm reception.

((You know, as a boy I used to dream of being an engineer. In fact, when one of my grandkids heard I was addressing an audience of my heroes, he said, "Could you bring back one of those neat striped hats they wear?")) //

Tonight, it is indeed a pleasure to be with you during National Engineers Week. And to salute the first two recipients of engineering's highest international award, the Charles Stark Draper Prize.

((Let me begin with a story which I think captures the spirit of this evening. It concerns three men scheduled to be executed on the same day of the French Revolution. One was a lawyer, another a politician, the third an engineer.

((First, came the lawyer. He put his head in the guilotine -- and the blade went two-thirds of the way, then stopped. The man was set free. // Next, came the politician. When the guilotine stopped short of his head, he, too, was spared. // Finally, came the third man -- and typically, the engineer

Dave, I think this will respond to suggestions of Austin Furse: I think, lastly, of our planet. And how the microchip has stirred the new breeze of democracy. Today, the new President of Czechoslovakia, Vaclav Havel, visited the White House. And as we talked, I thought of how images of the past year have linked the peoples of Prague and Warsaw, Budapest and Berlin. Images of bravery and defiance -- of humanity's quest

for freedom. And it was the microchip which carried them from one nation to another. [Recognition of Kilby.]

focused on the **problem**, not himself. "That guilotine," he told the foreman, "I think I have the answer.")) //

As you can see, engineers just can't help themselves -- whatever the cost, they keep aiming for perfection. And they have helped make our century a time of extraordinary exploration. Opening doors into an age where mankind not only moved into the future -- but re-invented it.

Tonight, we honor Jack Kilby and Robert Noyce. // And their landmark work -- the microchip -- an invention perhaps no less crucial than the discovery of fire. // Not to date myself, but when I was growing up, PAC-Man was a hiker, not a video game. // The microchip has changed all that -- and helped America change the world.

Think, for example, of a computer the size of a room -- shrunk down to a size that fits on your lap. The microchip made it possible. Or a calculator slashed from the size of a refrigerator to the size of this pen. [PULL PEN CALCULATOR FROM POCKET] Integrated circuits have enabled us to do the unimaginable. Now, it is unimaginable to believe we could ever live without them.

Already, the microchip has helped America not to **de**-industrialize -- but **re**-industrialize. To paraphase Churchill, never has something so **small** done so **much** for so **many**. // Yet remember, too, that if we are to lead the world, we must **provide** that world with **further** breakthroughs. For engineering is "always a beginning, never a consummation." //

I know that the National Academy shares this belief. So it has studied how America's engineering talent enhances our competitiveness. And is exploring **new** ways to protect the globe from environmental abuse. // You realize that truly **informed** decisions on issues like climate change require us to better integrate science, technology, and engineering into the public policy equation. //

Our Administration agrees -- and so supports research and development in **all** areas of science, technology, and engineering. We have asked for a **record high** 71 billion dollars for R&D in our budget for Fiscal Year 1991. // And to short-circuit the prediction that America will run short of engineers, we have begun a National Science Scholars initiative to give kids a new incentive to excel in science, mathematics, and engineering.

Yet, ultimately, it is the **private** sector that has shaped American opportunity -- and will continue to **bring** opportunity to the New Millennium. // Look at General Electric, which is spending $1.2 million a year on minority science scholarships. And $20 million annually to involve more inner-city kids in engineering. // Or Mobil -- launching grant programs to help high-school students enhance America's technological capability.

These efforts -- both private and public -- will sustain the computer revolution. For they rely on the qualities of American drive and determination. Qualities that will contribute, as your Academy says, "To the advancement of engineering . . . and the

well-being of all humanity." And that are **central** to the man for whom this evening's prize is named. //

Charles Draper was, first, an **idealist** pushing back the boundaries of mankind's technological future. Yet at the same time, a **practical** man. ((I'm reminded of a writer who was asked what he would take if his home were on fire and he could remove only one thing. // "I would take the fire," he replied.)) Dr. Draper knew that Yankee ingenuity revolves around what **works**.

Finally, he was **indomitable** -- a fighter who looked to **himself** for inspiration. No government planner, he knew, decided that Marconi would invent the wireless. And what might have happened -- or worse, might **not** -- had Henry Ford been forced to wait for Washington's approval before testing his model-T? // If he had, Barbara and I might have come here on a bicycle built for two. //

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# # # #

Blessey's Des

(Smith/Blessey)
5 P.M.
February 12, 1990
DRAPER

1990 FEB 12 PM 6:20

PRESIDENTIAL REMARKS: ENGINEERING AWARDS
TUESDAY, FEBRUARY 20, 1990
STATE DEPARTMENT

Mr. Welch. Mr. Kilby and ~~Mr.~~ Dr. Noyce. Dr. White, Dr. Charyk [CHAIR-ik], Dr. Seamans, ~~Dr.~~ Mr. Bechtel. Mr. Morrow Members and Guests of the National Academy of Engineers. Ladies and gentlemen. Thank you, Jack, for that introduction, and for your warm reception.

((You know, as a boy I used to dream of being an engineer. In fact, when one of my grandkids heard I was addressing an audience of my heroes, he said, "Could you bring back one of those neat striped hats they wear?")) But there's no confusion // tonight.

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Think, for example, of a computer the size of a room -- shrunk down to a size that fits on your lap. The microchip made it possible. Or a calculator slashed from the size of a refrigerator to the size of this ~~pen~~ watch. [Hold up arm with calculator wristwatch ~~[PULL PEN CALCULATOR FROM POCKET]~~ Integrated circuits have enabled us to do the unimaginable. Now, it is unimaginable to believe we could ever live without them.

Already, the microchip has helped America not to **de**-industrialize -- but **re**-industrialize. To paraphase Churchill, never has something so **small** done so **much** for so **many**. // Yet remember, too, that if we are to lead the world, we must **provide** that world with **further** breakthroughs. For engineering is "always a beginning, never a consummation." //

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Our Administration agrees -- and so supports research and development in **all** areas of science, technology, and engineering. We have asked for a **record high** 71 billion dollars for R&D in our ~~budget~~ introduced for Fiscal Year 1991. // And to short-circuit the prediction that America will run short of engineers, we have begun a National Science Scholars initiative to give kids a new incentive to excel in science, mathematics, and engineering. And I have announced an ambitious goal - but one we can achieve - that U.S. students will be #1 by the year 2000.

Policy Broadbase

Yet, ultimately, it is the **private** sector that has shaped American opportunity -- and will continue to **bring** opportunity to the New Millennium. // Look at General Electric, which is spending $1.2 million ~~a year~~ commitment on minority science scholarships. And $20 million ~~annually~~ to involve more inner-city kids in engineering. // Or Mobil -- launching grant programs to help high-school students enhance America's technological capability.

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# # # #

Document No. 113193

WHITE HOUSE STAFFING MEMORANDUM

1156

DATE: 02/12/90 ACTION/CONCURRENCE/COMMENT DUE BY: 4:00 p.m. 02/13/90

SUBJECT: PRESIDENTIAL REMARKS: ENGINEERING AWARDS (02/12 5:00 p.m. draft)

	ACTION	FYI		ACTION	FYI
VICE PRESIDENT	☐	☑	MCCLURE	☑	☐
SUNUNU	☐	☑	NEWMAN	☐	☐
SCOWCROFT	☑	☐	PORTER	☑	☐
DARMAN	☑	☐	ROGICH	☑	☐
BATES	☑	☐	UNTERMEYER	☐	☐
CARD	☐	☑	ROGERS	☐	☑
CICCONI	☐	☑	PINKERTON	☑	☐
DEMAREST	☑	☐	BROMLEY	☑	☐
FITZWATER	☐	☑	WINSTON	☐	☑
GRAY	☑	☐		☐	☐
HAGIN	☐	☐		☐	☐

REMARKS:

Please provide any comments/recommendations directly to Chriss Winston by 4:00 p.m. on Tuesday 02/13, with a copy to my office. Thanks.

RESPONSE:

TO: CHRISS WINSTON February 14, 1990

NSC concurs with the Presidential remarks for the engineering awards to be given February 20, 1990.

90 FEB 14 P1:08

Brent Scowcroft

cc: James W. Cicconi

James W. Cicconi
Assistant to the President
and Deputy to the Chief of Staff
Ext. 2702

(Smith/Blessey)
5 P.M.
February 12, 1990
DRAPER

1990 FEB 12 PM 6:20

PRESIDENTIAL REMARKS: ENGINEERING AWARDS
TUESDAY, FEBRUARY 20, 1990
STATE DEPARTMENT

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# # # #

1156

Document No. 113193

WHITE HOUSE STAFFING MEMORANDUM

DATE: 02/16/90 ACTION/CONCURRENCE/COMMENT DUE BY: ----

SUBJECT: PRESIDENTIAL REMARKS: DRAPER ENGINEER AWARD (02/14 5:00 p.m. draft)

	ACTION	FYI		ACTION	FYI
VICE PRESIDENT	☐	☑	MCCLURE	☐	☑
SUNUNU	☐	☑	NEWMAN	☐	☐
SCOWCROFT	☐	☑	PORTER	☐	☑
DARMAN	☐	☑	ROGICH	☐	☑
BATES	☐	☑	UNTERMEYER	☐	☐
CARD	☐	☑	ROGERS	☐	☑
CICCONI	☐	☑	PINKERTON	☐	☑
DEMAREST	☐	☑	WINSTON	☐	☑
FITZWATER	☐	☑	BROMLEY	☐	☑
GRAY	☐	☑	_____	☐	☐
HAGIN	☐	☐	_____	☐	☐

REMARKS:

The attached has been forwarded to the President.

RESPONSE:

The [illegible] needs fixing. RD

James W. Cicconi
Assistant to the President
and Deputy to the Chief of Staff
Ext. 2702

THE WHITE HOUSE
WASHINGTON

1990 FEB 14 PM 6:05

February 14, 1990

INFORMATION

MEMORANDUM FOR THE PRESIDENT

THROUGH: CHRISS WINSTON cw

FROM: CURT SMITH CS

SUBJECT: REMARKS FOR DRAPER ENGINEER AWARD

I. SUMMARY

On Tuesday, February 20, at 8:45 p.m., you will address about 200 people at the first Charles Draper Prize ceremony. The two distinguished engineers, Jack Kilby and Robert Noyce, who independently co-invented the microchip will be honored with the Draper Prize. Dr. Bob White, President of The National Academy; Dr. Joseph Charyk, Chairman of the Draper Laboratory; Dr. Robert Seamans, Chairman of the Draper Prize Committee; and Mr. Jack Welch, Chairman of the National Academy and CEO of General Electric will each give brief introductory remarks. Also attending will be Mr. Stephen Bechtel, Honorary Chairman of National Engineering Week; Mr. Richard Morrow, Chairman of Amoco; Soviet Ambassador Yuri Dubinin; and the State Department host, Undersecretary Ivan Selin.

II. DISCUSSION

The attached remarks (8 minutes, speechcards) praise Jack Kilby and Robert Noyce for their remarkable invention. The creation of the microchip has changed the world and nurtured the information age, making our global village even smaller.

(Smith/Blessey)
5 P.M.
February 14, 1990
DRAPER

PRESIDENTIAL REMARKS: ENGINEERING AWARDS
TUESDAY, FEBRUARY 20, 1990
STATE DEPARTMENT
8:45 P.M.

Mr. Welch. Mr. Kilby and Dr. Noyce. Dr. White, Dr. Charyk [CHAIR-ik], Dr. Seamans, Mr. Bechtel, Mr. Morrow. Undersecretary Selin, Ambassador Dubinin. Members and Guests of the National Academy of Engineering. Ladies and gentlemen. Thank you, Jack, for that introduction, and for your warm reception.

((You know, as a boy I used to dream of being an engineer. In fact, when one of my grandkids heard I was addressing an audience of my heroes, he said, "Could you bring back one of those neat striped hats they wear?")) // Well, tonight let there be no confusion.

It is indeed a pleasure to be with you during National Engineers Week. And to salute the first two recipients of engineering's highest international award, the Charles Stark Draper Prize.

((Let me begin with a story which I think captures the spirit of this evening. It concerns three men scheduled to be executed on the same day of the French Revolution. One was a lawyer, another a politician, the third an engineer.

((First, came the lawyer. He put his head in the guilotine -- and the blade went two-thirds of the way down the track, then stopped. The man was set free. // Next, came the politician.

When the guilotine stopped short of his head, he, too, was spared. // Finally, came the third man -- and typically, the engineer focused on the **problem**, not himself. "That guilotine," he told the foreman, "I think I have the answer."))) //

As you can see, engineers just can't help themselves -- whatever the cost, they keep aiming for perfection. And they have helped make our century a time of extraordinary exploration. Opening doors into an age where mankind not only moved into the future -- but re-invented it.

Tonight, we honor Jack Kilby and Bob Noyce. // And their landmark work -- the microchip -- an invention which has already taken its place among the greatest of all time. // Not to date myself, but when I was growing up, PAC-Man was a hiker, not a video game. // The microchip has changed all that -- and helped America change the world.

Think, for example, of a computer the size of a room -- shrunk down to a size that fits on your lap. The microchip made it possible. Or a calculator slashed from the size of a refrigerator to the size of this watch. [HOLD UP ARM WITH WATCH]

Think, finally, of our planet. And how the microchip has stirred the new breeze of democracy. // Today, the President of Czechoslovakia, Vaclav Havel, visited the White House. And as we talked, I thought of how images of the past year have linked the peoples of Prague and Warsaw, Budapest and Berlin. Images of bravery and defiance -- of humanity's quest for freedom. And it was the **microchip** which carried them from one Nation to another

-- becoming an instrument of liberty and the symbol of the Information Age. // Integrated circuits have enabled us to do the unimaginable. Now, it is unimaginable to believe we could ever live without them.

Already, the microchip has helped America not to de-industrialize -- but re-industrialize. To paraphase Churchill, never has something so small done so much for so many. // Yet remember, too, that if we are to lead the world, we must provide that world with further breakthroughs. For engineering is "always a beginning, never a consummation." //

I know that the National Academy of Engineering shares this belief. So it has studied how America's engineering talent enhances our competitiveness. And is exploring new ways to protect the globe from environmental abuse. // You realize that truly informed decisions on issues like climate change require us to better integrate science, technology, and engineering into the public policy equation. //

Our Administration agrees -- and so supports research and development in all areas of science, technology, and engineering. We have asked for a record high 71 billion dollars for R&D in our budget for Fiscal Year 1991. // And to short-circuit the prediction that America will run short of engineers, we have introduced a National Science Scholars initiative to give kids a new incentive to excel in science, mathematics, and engineering. And I have announced an ambitious goal -- but one we can achieve -- that U.S. students will be Number One by the year 2000. //

You can tell that I respect people who have an understanding of science. My Chief of Staff, John Sununu, is such a man. As are Admiral Jim Watkins, our Energy Secretary, and Dr. Allan Bromley, my Science Advisor. Yet, ultimately, it is the **private** sector that has shaped American opportunity -- and will continue to **bring** opportunity to the New Millennium. // Look at General Electric, which is spending $1.2 million a year on minority science scholarships. And a $20 million commitment to involve more inner-city kids in engineering. // Or Mobil -- launching grant programs to help high-school students enhance America's technological capability.

These efforts -- both private and public -- will sustain the computer revolution. For they rely on the qualities of American drive and determination. Qualities that will contribute, as your Academy says, "To the advancement of engineering . . . and the well-being of all humanity." And that are **central** to the man for whom this evening's prize is named. //

Charles Draper was, first, an **idealist** pushing back the boundaries of mankind's technological future. Yet at the same time, a **practical** man. ((I'm reminded of a writer who was asked what he would take if his home were on fire and he could remove only one thing. // "I would take the fire," he replied.)) Dr. Draper knew that Yankee ingenuity revolves around what **works**.

Finally, he was **indomitable** -- a fighter who looked to **himself** for inspiration. He knew no government planner decided that Marconi would invent the wireless. And what might have

happened -- or worse, might **not** -- had Henry Ford been forced to wait for Washington's approval before testing his model-T? // If he had, Barbara and I might have come here on a bicycle built for two. //

Albert Einstein once spoke of this **genius** of engineering -- which explains, in turn, the **greatness** of Dr. Draper. He said: "Everything that is really great and inspiring is created by individuals who labor in freedom." Laboring in freedom, Charles Draper well **used** that freedom. Used it to create and to inspire -- and to make history move his way. //

This evening, we honor two men who **themselves** have made history -- and made each American proud. So let me now present to Jack Kilby and Bob Noyce engineering's highest award -- the Charles Stark Draper Prize. And say: Thank you, God bless you, and God bless the United States of America.

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THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release February 20, 1990

REMARKS BY THE PRESIDENT
UPON PRESENTATION OF THE
CHARLES STARK DRAPER PRIZE FOR ENGINEERING

The State Department
Washington, D.C.

8:50 P.M. EST

THE PRESIDENT: Thank you all. Thank you, Jack. I got worried there when Jack was saying when we want somebody that is well known to present the prize, I was thinking Barbara's not here. (Laughter.) But, Jack, thank you for those very kind remarks.

To our honorees, Kilby and Noyce; and to Ambassador Dubinin, our Soviet Ambassador here who's doing such a good job for his country; and Dr. White; Dr. Charyk; and my old friend, Dr. Seamans; also another old friend, Steve Bechtel; Mr. Morrow; and the Undersecretary Selin; and Don Atwood here from the Defense Department. And members and Guests of the National Academy of Engineering.

I'm reminded of the famous story of the guy that called the insurance company after it closed one evening. A voice answered and he said, "Sir, I'd like to talk to you about converting my 20 pay life into the cash value immediately. And further, I've heard more about your key man insurance that insures the very key people, and we'd like a little more information on that. And lastly, we have this family -- I have six kids and we want a family health plan." The voice on the other end said, "Look," he said, "I'm the janitor around here just cleaning up, and after I said hello that's all I know at all about insurance."

I feel the same way about engineering here tonight -- (laughter) -- surrounded by all this brain power. It's overwhelming. But I am pleased to be here. I deem it a very great pleasure to help honor and celebrate National Engineers Week. And, of course, it is an honor to salute the first two recipients of this, engineerings highest international award, the Charles Stark Draper Prize.

Let me begin with a story that will show you my understanding of engineering, that I see it. It concerns three men that were scheduled to be executed on the same day of the French Revolution. One was a lawyer, another a politician, the third an engineer. First, came the lawyer. He put his head in the guillotine and the blade went two-thirds of the way down the track and then stopped. The man was set free. Next, the politican. When the guillotine stopped short of his head, he, too, was spared. Finally, came the third man, the engineer, and he focused on the matter at hand. "I think that guillotine has a problem," he told the executioner, "but don't worry I think I have the solution." (Laughter.)

I say that with respect -- (laughter) -- but as you see, engineers just can't help themselves -- whatever the cost -- (laughter) -- they keep aiming for perfection. And they've helped make our century a time of extraordinary exploration, opening doors into an age where mankind not only moved into the future, but reinvented it.

Tonight, we honor Jack Kilby and Bob Noyce. And their landmark work, the microchip, an invention which has already taken its place among the greatest of all time. Not to date myself, but when I was growing up, PACMAN was a hiker, not a video game. The microchip came along and changed all of that and helped America change the world.

Think, for example, of a computer the size of a room shrunk down to the size that fits on your lap -- the microchip made all that possible. Or a calculator slashed from the size of a refrigerator to the size of a wristwatch. Think, finally, of our planet, and how the microchip has stirred the new breeze of democracy.

Maybe it's a good day to salute that because today the President of Czechoslavakia Vaclav Havel came over to the Oval Office and then was our guest at the White House for lunch. And what a stirring moment -- I'll just divert for one second -- I took him up to the Lincoln bedroom, which is not normally the thing when you have these official visits. But I wanted him to see the room in which Abraham Lincoln had signed the Emancipation Proclamation. And I think I detected tears in his eyes, this playwright who not so many month ago was in jail and here he is the President of a fine, new, burgeoning democratic country. It was a very moving experience.

As I talked with him, I thought of how images of the past year have linked the peoples of Prague and Warsaw and Budapest and Berlin. Images of bravery and defiance -- of humanity's quest for freedom. And it was the microchip which carried them from one nation to another, becoming an instrument of liberty, the symbol in this information age. Integrated circuits have enabled us to do the unimaginable. Now it is unimaginable to believe we could ever live without them.

Already, the microchip has helped America not to de-industrialize, but reindustrialize. To paraphrase Churchill, never has something so small done so much for so many. Yet remember, too, that if we are to lead the world, we must provide that world with further breakthroughs, for engineering is always a beginning, never a consummation.

I know that the National Academy of Engineering shares this belief. So it has studied how America's engineering talent enhances our competitiveness, and is exploring new ways to protect the globe from environmental abuse. You realize that truly informed decisions on issues like climate change require us to better integrate science, technology, and engineering into the public equation -- policy equation.

Our administration agrees, and so, supports research and development in all areas of science, technology, and engineering. We've asked for a record high $71 billion for R&D in our budget for Fiscal 1991. And to short-circuit the prediction that America will run short of engineers, we've introduced a National Science Scholars Initiative to give kids a new incentive to excel in science, math, and engineering. And I have announced an ambitious goal, one of our national goals reached after great consultation with the governors -- but one, a goal that we can achieve -- that U.S. students will be number one by the year 2000.

You can tell -- I hope you can tell from looking around, that I have great respect for people who have an understanding of science. Jim Watkins is a member of our Cabinet, Secretary of Energy; I'm pleased to see Dr. Bromley here; and Secretary Rice; and, of course, my own Chief of Staff John Sununu, such a man -- engineer. Yet, ultimately, I am convinced -- not that we duck our responsibility in the federal government -- but ultimately, I am convinced that it is the private sector that not only has shaped American opportunity, but will continue to bring opportunity to the new millennium.

Look at -- Jack, I don't want to embarrass you -- but

look at GE, spending $1.2 million a year on minority science scholarships. And a $20 million commitment to involve more inner-city kids in engineering. Or Mobil -- launching great programs -- grant programs to help students enhance America's technological ability. I know that I'm going to, just through omission, risk embarrassing others because so many in this room are responsible for programs of this nature.

These efforts, both private and public, will sustain the computer revolution, for they rely on the qualities of American drive and determination. Qualities that will contribute, as your Academy says, "to the advancement of engineering and the well-being of all humanity." And that are central to the man for whom this evening's prize is named.

Charles Draper was, first, an idealist pushing back the boundaries of mankind's technological future, and yet at the same time a practical man. I'm reminded of a writer who was asked what he would take if his home were on fire and he could remove only one thing. "I would take the fire," he replied. (Laughter.) Dr. Draper knew that Yankee ingenuity revolves around what works.

Finally, he was indomitable -- a fighter who looked to himself for inspiration. Albert Einstein once spoke of this genius of engineering, which explains in turn the greatness of Dr. Draper. He said, "Only men who are free create the inventions and intellectual works which make life worthwhile." Working in freedom, Charles Draper well used that freedom. Used it to create and to inspire -- to make history move his way.

This evening, we honor two men who themselves have made history and made each American proud. So let me now present to Jack Kilby and Bob Noyce engineering's highest award -- the Charles Stark Draper Prize. And say thank them, thanks to both of you for your inspirational leadership.

Thank you all, and God bless the United States of America.
Thank you very much. (Applause.)

END 8:54 P.M. EST