

**MIT SPEECH
BRIEFING BOOK**
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THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release

May 18, 1997

COMMENCEMENT ADDRESS BY THE PRESIDENT
AT MORGAN STATE UNIVERSITY

Hughes Field
Morgan State University
Baltimore, Maryland

10:30 A.M. EDT

THE PRESIDENT: Thank you. Dr. Richardson, Judge Cole, Governor Glendenning, Lieutenant Governor Kennedy-Townsend, Mr. Mayor, City Council President, other elected officials, Mr. Speaker, Senator Miller, Senator Sarbanes, Congressman Cardin and Congressman Cummings, my great partners, to the Board of Regents, to faculty, staff, to distinguished alumni, to the magnificent band and choir. I thought it was a great day when I got here, but I know it is now. Thank you very much. (Applause.)

To the members of the class of 1997, your family and your friends -- (applause) -- congratulations on this important day in your lives, the lives of your nation, and the life of this great institution.

Your diploma reflects a level of knowledge that will give you the chance to make the most of the rapidly unfolding new reality of the 21st century. It gives your country a better chance to lead the world toward a better place, and it reaffirms the historic mission of Morgan State and the other historically black colleges and universities of our great land.

When the doors of college were closed to all but white students, Morgan State and the nation's other historically black institutions of higher education gave young African Americans the education they deserved and the pride they needed to rise above cruelty and bigotry.

Today, these institutions still produce the lion's share of our black doctors and judges

and business people, and Morgan State graduates most of the black engineers and scientists in the great state of Maryland. (Applause.)

I am here today not because Morgan State is just a great historically black university, it is a great American university. (Applause.) You have produced some of our nation's finest leaders. Your grads like Parren Mitchell, Kweisi Mfume and Earl Graves. (Applause.) Judicial leaders like Judge Bell and Judge Cole; public servants like State Treasurer Dixon and on a very personal note, my fine assistant, Terry Edmonds, Class of 1972, the first African American ever to serve as a speechwriter for the President of the United States. (Applause.) There he is.

Now, you're getting too much applause now, Terry. (Laughter.)

You graduate today into a world brimming with promise, enriched with opportunity. Our economy is the strongest in a generation, our unemployment the lowest in 24 years, with the largest decline in income inequality since the 1960s.

On Friday we finalized the details of an historic agreement with the leaders of Congress to balance the federal budget for the first time in nearly three decades, in a way that will keep our economy going and in balance with our values, caring for those in need, extending health care to 5 million more children, cleaning and preserving and restoring our environment, helping people to move from welfare to work, and, most important, funding the largest investment in education in a generation and the largest increase in higher education since the G.I. bill in 1945, more than 50 years ago. (Applause.)

It will open the doors of college to all, with the largest increase in Pell Grant scholarships in three decades, \$35 billion in tax relief to help families pay for higher education, including tax deductions for the cost of all education after high school, and our HOPE Scholarship tuition tax credits to make the first two years of college as universal by the year 2000 as a high school diploma is today. (Applause.)

And this agreement contains a major investment in science and technology, inspired in our administration by the leadership of Vice President Gore, to keep America on the cutting edge of positive change, to create the best jobs of tomorrow, to advance the quality of life of all Americans.

This is a magic moment, but like all moments it will not last forever. We must make the most of it. In commencement addresses across the nation this year, I will focus our attention on what we must do to prepare our nation for the next century, including how we can make sure that our rich diversity brings us together rather than driving us apart, and how we must meet our continuing obligation to lead the world away from the wars and Cold War of the 20th century through the present threats of terrorism and ethnic hatred, weapons proliferation and drug smuggling, to a more peaceful and free and prosperous 21st century.

But today here, I ask you simply to imagine that new century, full of its promise, molded by science, shaped by technology, powered by knowledge. These potent transforming forces can give us lives fuller and richer than we have ever known. They can be used for good or ill.

If we are to make the most of this new century, we -- all of us, each and every one of us, regardless of our background -- must work to master these forces with vision and wisdom and determination. The past half-century has seen mankind split the atom, splice genes, create the microchip, explore the heavens. We enter the next century propelled by new and stunning developments.

Just in the past year we saw the cloning of Dolly the sheep, the Hubble telescope bringing into focus dark corners of the cosmos never seen before, innovations in computer technology and communications, creating what Bill Gates calls "the world's new digital nervous system," and now cures for our most dreaded diseases -- diabetes, cystic fibrosis, repair for spinal cord injuries. These miracles actually seem within reach.

The sweep of it is truly humbling. Why, just last week we saw a computer named Deep Blue defeat the world's reigning chess champion. I really think there ought to be a limit to this. No computer should be allowed to learn to play golf. (Laughter.) But, seriously, my friends, in science, if the last 50 years were the age of physics, the next 50 years will be the age of biology. (Applause.)

We are now embarking on our most daring explorations, unraveling the mysteries of our inner world and charting new routes to the conquest of disease. We have not and we must not shrink from exploring the frontiers of science. But as we consider how to use the fruits of discovery, we must also never retreat from our commitment to human values, the good of society, our basic sense of right and wrong.

Science must continue to serve humanity, never the other way around. The stakes are very high. America's future -- indeed, the world's future -- will be more powerfully influenced by science and technology than ever before. Where once nations measured their strength by the size of their armies and arsenals, in the world of the future knowledge will matter most. Fully half the growth in economic productivity over the last half-century can be traced to research and technology.

But science is about more than material wealth or the acquisition of knowledge. Fundamentally, it is about our dreams. America is a nation always becoming, always defined by the great goals we set, the great dreams we dream. We are restless, questing people. We have always believed, with President Thomas Jefferson, that "freedom is the first born daughter of science." With that belief and with willpower, resources and great national effort, we have always reached our far horizons and set out for new ones.

Thirty-six years ago, President Kennedy looked to the heavens and proclaimed that the

flag of peace and democracy, not war and tyranny, must be the first to be planted on the moon. He gave us a goal of reaching the moon, and we achieved it -- ahead of time.

Today, let us look within and step up to the challenge of our time, a challenge with consequences far more immediate for the life and death of millions around the world. AIDS will soon overtake tuberculosis and malaria as the leading infectious killer in the world. More than 29 million people have been infected, 3 million in the last year alone, 95 percent of them in the poorest parts of our globe.

Here at home, we are grateful that new and effective anti-HIV strategies are available and bringing longer and better lives to those who are infected, but we dare not be complacent. HIV is capable of mutating and becoming resistant to therapies, and could well become even more dangerous. Only a truly effective, preventive HIV vaccine can limit and eventually eliminate the threat of AIDS.

This year's budget contains increased funding of a third over two years ago to search for this vaccine. In the first four years, we have increased funding for AIDS research, prevention and care by 50 percent, but it is not enough. So let us today set a new national goal for science in the age of biology. Today, let us commit ourselves to developing an AIDS vaccine within the next decade. (Applause.) There are no guarantees. It will take energy and focus and demand great effort from our greatest minds. But with the strides of recent years it is not longer a question of whether we can develop an AIDS vaccine, it is simply a question of when. And it cannot come a day too soon.

If America commits to find an AIDS vaccine and we enlist others in our cause, we will do it. I am prepared to do all I can to make it happen. Our scientists at the National Institutes of Health and our research universities have been at the forefront of this battle.

Today, I'm pleased to announce the National Institutes of Health will establish a new AIDS vaccine research center dedicated to this crusade. And next month at the Summit of the Industrialized Nations in Denver, I will enlist other nations to join us in a worldwide effort to find a vaccine to stop one of the world's greatest killers. We will challenge America's pharmaceutical industry, which leads the world in innovative research and development to work with us and to make the successful development of an AIDS vaccine part of its basic mission.

My fellow Americans, if the 21st century is to be the century of biology, let us make an AIDS vaccine its first great triumph. (Applause.)

Let us resolve further to work with other nations to deal with great problems like global climate change, to break our reliance on energy use destructive of our environment, to make giant strides to free ourselves and future generations from the tyranny of disease and hunger and ignorance that today still enslaves too many millions around the world. And let us also pledge to redouble our vigilance to make sure that the knowledge of the 21st century serves our most

enduring human values.

Science often moves faster than our ability to understand its implications, leaving a maze of moral and ethical questions in its wake. The Internet can be a new town square or a new Tower of Babel. The same computer that can put the Library of Congress at our fingertips can also be used by purveyors of hate to spread blueprints for bombs. The same knowledge that is developing new life-saving drugs can be used to create poisons of mass destruction. Science can enable us to feed billions more people in comfort, in safety, and in harmony with our earth; or it can spark a war with weapons of mass destruction rooted in primitive hatreds.

Science has no soul of its own. It is up to us to determine whether it will be used as a force for good or evil. We must do nothing to stifle our basic quest for knowledge. After all, it has propelled from field to factory to cyberspace. But how we use the fruits of science and how we apply it to human endeavors is not properly the domain of science alone or of scientists alone. The answers to these questions require the application of ethical and moral principles that have guided our great democracy toward a more perfect union for more than 200 years now. As such, they are the province of every American citizen.

We must decide together how to apply these principles to the dazzling new discoveries of science. Here are four guideposts. First, science and its benefits must be directed toward making life better for all Americans -- never just a privileged few. Their opportunities and benefits should be available to all. Science must not create a new line of separation between the haves and the have-nots, those with and those without the tools and understanding to learn and use technology.

In the 21st century a child in a school that does not have a link to the Internet or the student who does not have access to a computer will be like the 19th century child without school books. That is why we are ensuring that every child in every school, not matter how rich or poor, will have access to the same technology by connecting every classroom and library to the Internet by the year 2000. (Applause.)

Science must always respect the dignity of every American. Here at one of America's great black universities let me underscore something I said just a few days ago at the White House. We must never allow our citizens to be unwitting guinea pigs in scientific experiments that put them at risk without their consent and full knowledge. (Applause.)

Whether it is withholding a syphilis treatment from the black men of Tuskegee or the Cold War experiments that subjected some of our citizens to dangerous doses of radiation, we must never go back to those awful days in modern disguise. We have now apologized for the mistakes of the past; we must not repeat them -- never again. (Applause.)

Second, none of our discoveries should be used to label or discriminate against any group or individual. Increasing knowledge about the great diversity within the human species

must not change the basic belief upon which our ethics, our government, our society are founded. All of us are created equal, entitled to equal treatment under the law. (Applause.)

With stunning speed, scientists are now moving to unlock the secrets of our genetic code. Genetic testing has the potential to identify hidden inherited tendencies toward disease and spur early treatment. But that information could also be used, for example, by insurance companies and others to discriminate against and stigmatize people.

We know that in the 1970s, some African Americans were denied health care coverage by insurers and jobs by employers because they were identified as sickle cell anemia carriers. We also know that one of the main reasons women refuse genetic testing for susceptibility to breast cancer is their fear that the insurance companies may either deny them coverage or raise their rates to unaffordable levels. No insurer should be able to use genetic data to underwrite or discriminate against any American seeking health insurance. This should not simply be a matter of principle, but a matter of law, period. (Applause.)

To that end, I urge the Congress to pass bipartisan legislation to prohibit insurance companies from using genetic screening information to determine the premium rates or eligibility of Americans for health insurance.

Third, technology should not be used to break down the wall of privacy and autonomy free citizens are guaranteed in a free society. The right to privacy is one of our most cherished freedoms. As society has grown more complex and people have become more interconnected in every way, we have had to work even harder to respect the privacy, the dignity, the autonomy of each individual.

Today, when marketers can follow every aspect of our lives, from the first phone call we make in the morning to the time our security system says we have left the house, to the video camera at the toll booth and the charge slip we have for lunch, we cannot afford to forget this most basic lesson.

As the Internet reaches to touch every business and every household and we face the frightening prospect that private information -- even medical records -- could be made instantly available to the world, we must develop new protections for privacy in the face of new technological reality. (Applause.)

Fourth, we must always remember that science is not God. (Applause.) Our deepest truths remain outside the realm of science. We must temper our euphoria over the recent breakthrough in animal cloning with sobering attention to our most cherished concepts of humanity and faith.

My own view is that each human life is unique, born of a miracle that reaches beyond laboratory science. I believe we should respect this profound gift. I believe we should resist the

temptation to replicate ourselves. But this is a decision no President should make alone. No President is qualified to understand all of the implications.

That is why I have asked our distinguished National Bioethics Advisory Commission, headed by President Harold Shapiro of Princeton, to conduct a thorough review of the legal and ethical issues raised by this new cloning discovery. They will give me their first recommendations within the next few weeks, and I can hardly wait.

These, then, are four guideposts, rooted in our traditional principles of ethics and morals, that must guide us if we are to master the powerful forces of change in the new century. One, science that produces a better life for all and not the few. Two, science that honors our tradition of equal treatment under the law. Three, science that respects the privacy and autonomy of the individual. Four, science that never confuses faith in technology with faith in God.

If we hold fast to these principles, we can make this time of change a moment of dazzling opportunity for all Americans.

Finally, let me say again: Science can serve the values and interests of all Americans, but only if all Americans are given a chance to participate in science. We cannot move forward without the voices and talents of everyone in this stadium, and especially those of you who are going on to pursue a career in science and technology.

African Americans have always been at the forefront of American science. This is nothing new. Nothing -- not slavery, not discrimination, not poverty -- nothing has ever been able to hold back their scientific urge or creative genius. (Applause.)

Benjamin Banneker was a self-taught mathematician, surveyor, astronomer, who published an annual almanac and helped to design the city of Washington. George Washington Carver was born a slave, but went on to become one of our nation's greatest agricultural scientists. Ernest Everett Just of Charleston, South Carolina, is recognized as one of our greatest biologists. Charles Drew lived through the darkest days of segregation to become a pioneer in blood preservation. And today you honor an African American doctor at Johns Hopkins University who is truly one of the outstanding physicians of our time. (Applause.)

All these people show us that we don't have a person to waste and our diversity is our greatest strength in the world of today and tomorrow. Now, members of the class of 1997, it is your time. It is up to you to honor their legacy, to live their dreams, to be the investigators, the doctors, and the scholars who will make and apply the discoveries of tomorrow, who will keep our science rooted in our values, who will fashion America's greatest days.

You can do it. Dream large. Work hard. And listen to your soul. Thank you and God bless you all. (Applause.)

END

10:57 A.M. EDT

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release

April 19, 1997

REMARKS BY THE PRESIDENT
AND THE VICE PRESIDENT
AT NETDAY EVENT

The Oval Office

10:40 A.M. EDT

THE PRESIDENT: Hi, students!

STUDENTS: Hi, Mr. President. (Laughter.)

THE PRESIDENT: Now, is that Mr. Contreras with you? Hello, Miguel, how are you?

MR. CONTRERAS: Buenos dias, Mr. President.

THE PRESIDENT: Buenos dias. Now, why don't you tell us why you're volunteering this weekend?

MR. CONTRERAS: Well, we've got quite a number of union members here in Los Angeles as part of the national AFL-CIO NetDay, that are coming together here to help wire 38 schools and empowerment zones in Los Angeles. And we're going to kick it off today. We think that educational opportunities is equivalent to civil rights here, and we want to make sure that all our students have the necessary tools to bring them into the 21st century.

So we're glad that you're supporting this effort. And the unions here -- in particular, the International Brotherhood of Electrical Workers, Local 11; we have the CWA -- Communication Workers of America, and the United Teachers of LA all have turned out today to ensure that the wiring is a success. So we're going to move forward today.

THE PRESIDENT: Thank you.

And, Ms. Robinson, what benefits do you expect to flow from this to the students at your school?

MS. ROBINSON: Well, we want to be prepared for the 21st century and we want our children to be familiar and to be competent and to be ready to use the Internet. So we expect a great deal, great many benefits from this. We want the Super Information Highway -- we know that is the way of the future and we want all of our students to be prepared for that.

We have a lot of our staff members here also -- my teachers, my parents, my superintendent. And so we're all very excited about the work that's going to take place today.

THE PRESIDENT: Well, thank you.

How many of the young people behind us know how to use a computer? Raise your hand if you can use a computer. (Laughter.)

MR. CONTRERAS: Quite a number of them.

THE PRESIDENT: Good for you. Well, good luck.

MR. CONTRERAS: Don't ask the adults. (Laughter.)

THE PRESIDENT: Well, don't ask the adults on this side of the screen, either. (Laughter.) The Vice President can raise his hand; I'm not so sure about me. (Laughter.)

Have a good day. Thank you.

STUDENTS: Thank you, Mr. President.

THE PRESIDENT: Now we want to go to Hartford. There's Hartford. Good morning.

STUDENTS: Good morning!

THE PRESIDENT: I want to thank all the young people who are there participating in the Youth Tech Corps. The Vice President and I just announced that Connecticut will be getting some more funds from the Department of Education to make sure that every child in Connecticut will have access to educational technology. So I want you to tell me about what the Youth Tech Corps is doing and how that relates to getting technology out to everybody.

STUDENT: The Youth Tech Corps, first of all, is a program that is designed to match students who have strong interests with technology with other students, and use businesses to enhance this program.

THE PRESIDENT: So those of you who have good skills are helping those who need it, right?

STUDENT: Or more interested.

THE PRESIDENT: Yes, well, maybe you could send me a volunteer. I need some help down here. (Laughter.)

STUDENT: No problem.

THE PRESIDENT: I see a couple of volunteers in the back of the room there. They're laughing. (Laughter.)

What have you done on NetDay? What does it mean for Connecticut and for you?

STUDENT: Well, basically the Youth Tech Corps is -- basically, we're trying to continue on the process of Connect '96 and just take it the next step to getting the schools, all the schools connected and make sure that they can use the computers once they have computers and they're connected to the Internet.

THE PRESIDENT: Do you find in your own experience that once the computers are there and they're hooked up to the Internet that they are widely used?

STUDENT: I think they're widely used if the people using them know how to. I know, like, a lot of students, there are some that probably don't know how to. But I think, I feel that they're widely used.

THE PRESIDENT: What about the teachers? Do all the teachers know how to make maximum use of it?

STUDENT: No. (Laughter.)

THE PRESIDENT: Some yes and some no, right? (Laughter.)

STUDENT: Yes. Some do and some don't, you know. Because some teachers actually put their grades on computer, not for -- but those who calculate it.

THE PRESIDENT: So it's important that we don't let the connecting of the schools and the classrooms get ahead of training the teachers and the students about how to use the computers.

STUDENT: Right.

STUDENT: Exactly.

THE PRESIDENT: Because otherwise they're useless just sitting there, right?

STUDENT: Right.

THE PRESIDENT: Now, is everybody in the room a member of the Tech Corps?

STUDENT: This is the Corps, this is the beginning of it. Hopefully, they will continue to be a part of the Youth Tech Corps.

THE PRESIDENT: Good for you.

Do you want to say anything, Al?

THE VICE PRESIDENT: Well, I just want to congratulate all of you. It's an exciting day. It makes you feel good to be a part of this, doesn't it?

STUDENT: Yes.

THE VICE PRESIDENT: Well, congratulations and keep up the wonderful work.

STUDENT: Thank you.

THE PRESIDENT: You've reminded us of something very important today about what you're doing, too, because we sometimes get so focused on making sure all the classrooms in the country are hooked up that we forget that the hookup is worthless unless the teachers and the students are trained to use it --

STUDENT: That's right.

THE PRESIDENT: -- and have the time and ability to use it.

So I thank all of you for what you're doing, and I hope that this conversation we're having today will lead to some greater publicity for your Tech Corps so that maybe every community in the country will have one to make sure that the students and the teachers can use the computers and the hookups that we're providing.

Thank you. God bless you and good luck. Hang in there.

STUDENTS: Thank you.

THE PRESIDENT: Bye-bye. Have a good day.

END 10:47 A.M. EDT

THE WHITE HOUSE

Office of the Press Secretary
(Knoxville, Tennessee)

For Immediate Release

October 10, 1996

REMARKS BY THE PRESIDENT
AND THE VICE PRESIDENT
TO THE PEOPLE OF KNOXVILLE

Knoxville Auditorium Coliseum
Knoxville, Tennessee

11:30 A.M. EDT

THE VICE PRESIDENT: Thank you. Thank you very much. Thank you, ladies and gentlemen. You don't know how that warms my heart. It's great to be home. It's great to receive that kind of rousing welcome. And I'm just so grateful to all of you for being here and being apart of it.

Last night, Jack Kemp and I debated -- (applause) -- last night, Jack Kemp and I debated the future. This morning, Bill Clinton and I are building the future. (Applause.) I am so proud and grateful to the President for coming here to Knoxville, to the University of Tennessee. Especially so soon before the Arkansas game. (Laughter and applause.)

He said for me to let you in on our conversation in the car on the way over here. I was bragging on how Arkansas did in the first half against Florida, and I allowed as how, really, the point spread between us ought to be fairly close to even on this game. (Laughter.) He's not buying it. (Laughter.) He's telling me about all the freshman on the team and what scrappers they are. We'll see. We'll work that out later.

But I'm so proud and excited that the President would come here to the University of Tennessee to make this exciting announcement that he is going to make today. This is really one of the most important steps that any President has ever taken to build a bridge to the 21st century. You are going to hear about an initiative that may sound a little technical, may sound like it is in the future.

But, believe me, as someone who started talking about the Information Superhighway 20 years ago, who passed the legislation to finance the development of the Internet as it exists today, someone who has had a chance to work with this President over the last four years on his pledge

to connect every classroom and library in America to that Information Superhighway -- I'm telling you, the step he is taking today will be looked back on in the next century as a true milestone on this road to the future. But more about that in just a moment.

Let me thank Lil Clinard for her kind words, and also Dr. Eugene Parker for his moving invocation and Mildred Buffler for the pledge. And I want to acknowledge two people here at the top, one of whom I will ask to come up here and speak in just a moment. And then when he concludes, I will return to the podium, say a couple more words in introducing the President. These two individuals are playing a key role in the President's announcement today, and he will spell that out. But I want to acknowledge them now because they have really decided to give so much of themselves to this effort: The CEO of Viacom, Sumner Redstone and the CEO of Netwave, Incorporated, Lynn Forester. And I'd like both of them to stand up, please. Sumner is here and where is Lynn? Is Lynn out in the audience there? I'd like to acknowledge both of them. Not now. Okay. (Applause.)

These others I want to thank profusely. I would like to suggest, since there are several of them, that you hold your applause until I complete the list. Al Trivelpiece, who is doing a fantastic job as Director of the Oak Ridge National Laboratories. And Oak Ridge is going to play a key role in the future of this country and in the development of this new initiative. Representative Joe Armstrong, Representative Wayne Ritchie, Representative Harry Tindell. Thomas Chumpert, Knox County Executive; District Attorney Randy Nichols; Knox County Court Clerk Mike Padgett, and most especially, Tennessee's House of Representatives Majority Leader, State Representative Bill Purcell. Let's give all of these individuals a hand. (Applause.)

Four candidates that I would like to acknowledge --and I'd like to begin with the candidate of the Democratic Party here in the Second Congressional District, Steve Smith. (Applause.) A candidate in the Third Congressional District of the Democratic Party, Chuck Jolly. (Applause.) Democratic candidate in the First Congressional District, Kay Smith. (Applause.) And candidate for State Senate, Mae Owenby. (Applause.)

I want to thank the students behind me from Jefferson Middle School and Halls High School. We appreciate them being here. (Applause.) This announcement really is all about them. I'm also mighty proud that my daughter, Karenna, is with me here today and I wanted to acknowledge her, too. (Applause.)

Twenty years ago, when I first had the opportunity to serve in the United States House of Representatives I dreamed of a time when a young school girl in Carthage, Tennessee -- my home town, 2000 people -- could come home after school and plug into the Library Congress and navigate through a whole universe of knowledge at her own pace, directed by her own curiosity. I dreamed of a time when the nation's children would be able to communicate daily with students in countries all over the world, to learn about other cultures, share experiences, broaden their horizons. I dreamed of a time when a doctor would have instant access to a patient's medical records instantly if an injury occurred and that patient's doctor needed to know the best course

of treatment.

Well, today that dream is fast becoming a reality. Two years ago, President Clinton and I challenged America to connect every classroom -- inner-city, rural, suburban -- to the Information Superhighway by the year 2000. We challenged the nation to ensure that all of our teachers and students have access to modern computers and engaging educational software. We challenged the nation to provide all teachers with the training and support they need in order to help students make the most of these wonderful new technologies. We challenged the nation to make sure that our children will never be separated by a digital divide.

And America has responded to that challenge. Last March, the President and I rolled up our sleeves and worked alongside 20,000 other volunteers in California to hook up one-fifth of California's schools to the Information Superhighway in a single day. So far, 10 other states have held similar electronic barn-raising with similar success stories. In fact, I'm awfully proud that our home state of Tennessee will soon hold its own Net Day, and I encourage all of you to sign up to help and be a part of it, pull that cable and make the connections. And it's amazing what community spirit comes out during a Net Day.

Well, none of this nation's technology initiatives would be possible without the tremendous support of volunteers, as well as hundreds of private businesses that have chosen to become involved. And today some of the angels of industry are going to ramp up their commitment to empowering every child in this whole country with our latest and best technologies. A select group of leaders from the information industries have stepped up to the President's challenge. I mentioned Sumner Redstone of Viacom and Lynn Forester of FirstMark Holdings and Netwave. They will be joined in this group by Gerry Levin of Time-Warner, Bob Allen of AT&T; Ray Smith of Bell Atlantic; Larry Ellison of Oracle; Brian Roberts of Comcast, and Steven Case of America OnLine.

This is a dream team of the information industry CEOs in America, and they are stepping up to the plate on behalf of America's children. We appreciate what they're doing. (Applause.) One key individual who has helped to make this possible is one of the finest men I've ever had a chance to work with, and I want you to give a special acknowledgement to the Secretary of Education, Dick Riley. We appreciate your leadership, Mr. Riley. (Applause.)

We're proud that Mr. Redstone, the chairman of this group and Lynn Forester, the vice-chair are with us today. In bringing Mr. Redstone to the podium, let me tell you that he's demonstrated a lifelong passion for education. When he was a student at Harvard he was so passionate, he completed his undergraduate degree in just two and a half years. More recently, despite his incredibly busy schedule, he has devoted a great deal of time to teaching courses at Boston University Law School, Harvard Law School, and Brandeis. How he does it, I don't know. But I do know that during World War II he was one of the key members of the team that broke the high-level military and diplomatic codes of wartime Japan.

Sumner Redstone knows what information technology can mean to a nation. He knows what information technology means for individual schoolchildren. And that's exactly why he is with us here today. So please help me welcome a great businessman and a great friend of American education, Sumner Redstone. (Applause.)

MR. REDSTONE: Thank you so much for those warm and generous remarks.

Among so much that all of us admire in our President and in our Vice President is their commitment to educate the children of America. And in that connection, to connect every school, classroom, and library in America to the Information Superhighway with computers, with software, and with well-trained teachers. And I really feel privileged to be able to assist the President and the Vice President in improving the education of our children and our grandchildren while making them technologically literate.

Sad as it is, we live in a world where economic realities mean that many students come from two-income households, leaving children with little parental supervision, parents with less time to read with their kids, let alone oversee their homework. And we live in a world where tens of thousands of students are struggling to learn to read English at the same time they're learning to speak English. And, sadly indeed, we live in a world where many students start the school day by walking through a metal detector, and school hallways are monitored by armed guards.

But technology can bring a child as many suitable, qualified, intelligent and competent teaching experiences as possible without regard to geography and without regard to socioeconomic status. The new technology can help teach a package of wealth of information in a compelling way -- to train young minds for the Information Age. Indeed, when the appropriate software and information are married to the new technologies, students can be motivated to embark on a world of self-discovery.

The global electronic network is beginning, just beginning to remake daily life. And today's generation must cope with a wholesale transformation of society that it brings. But nowhere could that transformation have more impact than on education. Properly used, the global network can increase access to education services, make teachers more effective, improve efficiency. And, most of all, motivate young learners.

The coming communications revolution about which you have heard is not about technology in the classroom, but is rather about using the tools of technology to redefine the classroom. For the first time, students can literally step out of the classroom and journey to places and speak to people around the globe in search of knowledge. The classroom of the future has no walls, just windows -- created through the use of television and satellites and computers.

Indeed, our children can travel across the globe electronically before we give them permission to cross the street. But with all of this, the role of the teacher cannot be

overestimated, because a commitment to excellence cannot be instilled by a computer. It takes teachers with vision to help mold students with vision.

Today, my associates and I, Robert Allen of AT&T, Lawrence Ellison of the Oracle Corporation, Lynn Forester of FirstMark Holdings, Gerald Levin of Time-Warner, Brian Roberts of Comcast, Raymond Smith of Bell Atlantic and more to come, are launching a major partnership between the private sector and the government to make certain -- absolutely certain -- that this initiative doesn't fail.

And now, I am really honored to reintroduce the Vice President of the United States, another man working hard to make sure that the administration's educational technology initiative does not fail. Last night, we all saw again what Al Gore is capable of. It was a knockout, right? (Applause.) But what he showed us was his commitment to issues of importance. And, of course, he has made Tennessee, his home state, so proud. So now, it's my great pleasure to introduce our Vice President, Al Gore. (Applause.)

THE VICE PRESIDENT: Thank you. Please. I didn't know that I was going to be reintroduced, but I'm very grateful for the honor. Thank you very much. And thank you for your kind words, Mr. Redstone, I appreciate it very much.

More than that, I want to thank Sumner Redstone for heading up this historic effort. Once again, he is doing a great service to this nation. And now, ladies and gentlemen, I want to express my personal thanks to President Bill Clinton, not only for his role in bringing these dramatic innovations to America's schoolchildren, but for all of his efforts to maintain this nation's proud position as the world leader in science and technology. Here in East Tennessee, so close to the Oak Ridge National Laboratory, we know the importance of science and technology to the future of the United States of America.

President Clinton knows that one of the most important bridges to the future will be built on discoveries in science and advancements in technology. This President is unequalled in his devotion to promoting science and technology as the engine of our economy and as a means to improving our quality of life.

Now, the President's opponent has taken a different approach. The cuts in science and technology funding that were proposed and almost implemented by the leaders of this last Congress would have amounted to unilateral disarmament in the face of growing world competition in research, development, science and technology. They wanted to cut America's science and technology budget by one-third. This would have crippled both our basic research and the critical applied research needed to protect our health and to protect our global environment.

President Clinton, in stark contrast, has increased this nation's investments in world-class basic research within a balanced budget plan. He has increased support for medical research at

the National Institutes of Health, helping them to find new cures for diseases. (Applause.)

He has stepped up our commitment to developing innovative environmental technologies for the growing world marketplace to clean up our environment. (Applause.) He has opened up trade markets around the world for our high-technology exports. And the President has helped to reorganize and revitalize our nation's research agencies and laboratories for the 21st century.

Government laboratories, such as the Oak Ridge National Laboratory, have played a vital role in catalyzing this nation's technological development. Now, we have heard from the President's opponent that he wishes to completely eliminate the Department of Energy. When asked for a clarification of what that would mean, he said, well, we will keep the military part of the budget, but the civilian part of the budget is really on the chopping block. Well, Oak Ridge gets three-quarters of all of its budget from the civilian part of the Department of Energy. When asked for further clarification, he said, the laboratories in New Mexico are off the table. That's nice. I think that's a wise decision. But what about Oak Ridge National Laboratory? Don't give us the mumbo-jumbo about "this will all magically work out somehow." We want a commitment to Oak Ridge National Laboratory. (Applause.)

So to those on the other side who have proposed measures that would clearly shut down the Oak Ridge National Laboratory, I have a message on behalf of the President and myself in words that you've heard before: We won't let them. (Applause.) Oak Ridge is engaging in missions that are absolutely central to our current economic, environmental, health and national security future. Closing the doors of Oak Ridge National Laboratory would be a sad step backward for the United States of America. President Clinton and I will not let that happen.

And ladies and gentlemen, that is only one of the reasons that it is now my great pleasure and personal privilege to present to you a leader who has made unprecedented commitments to this nation's science and technology; a leader who is making sure that every student and every family in America will have the opportunity to participate in our limitless technological future. My friend, our President, President Bill Clinton. (Applause.)

THE PRESIDENT: Thank you. Thank you very much. Thank you so much for that wonderful reception. It's nice for me to be in Knoxville, sort of riding along on Al Gore's coattails. I enjoy being here. (Laughter and applause.)

I want to thank everyone who has been a part of the program today. Dr. Parker, thank you. And Mildred Buffler, thank you. And I want to thank our great Secretary of Education, Dick Riley, my former colleague when we were governors together. And I think unquestionably history will record him as the most effective Secretary of Education our country has had to this point. (Applause.)

I thank the students who are behind this. I thank Dr. Clinard for her fine remarks and her

fine work; Dr. Al Trivelpiece from the Oak Ridge labs is here. I thank you for being here, sir. I want to say a special word of thanks to Sumner Redstone and to Lynn Forester. Thank you, Lynn, and to all the other business leaders who have agreed to help us on this truly monumental but terribly important project.

I'm very, very glad to be here. The Vice President, last night I called to congratulate him on his debate, and I said that Mr. Kemp found out something that I found out a long time ago: It's just as well not to be on the other side of an argument with Al Gore. (Applause.) Although I did think it was rather ungracious of him to mention our annual bet on the Arkansas-Tennessee football game here in the backyard of the University of Tennessee. (Laughter and applause.)

Actually, we have a lot to be grateful to the University of Tennessee for. One of the most important members of our administration, Nancy Anmen (phonetic), I believe was the first female president of the student body here. (Applause.) The band came out to the airport to play for us, which was a wonderful thing; it woke us both up this morning, got us off to a good start. (Laughter.)

But, anyway, we always come back around to this football game, you know. And the last few years have been pretty good for Tennessee and not so good for Arkansas, and so I figured that Al's hubris would get the better of him, and since we were in Knoxville I could get more points on the game today. (Laughter.) And I'm lobbying. So you're proud of your football team, aren't you? (Applause.)

So what am I entitled to? Twenty-eight points on the spread? I mean, what do you think? (Laughter) We got to talking about Tennessee football players and I pointed out that one of the greatest football players Tennessee ever produced still has ties here in Knoxville, is still playing very well -- Reggie White of the Green Bay Packers. He's a good man. (Applause.) I visited Reggie and the Packers not very long ago and they are truly impressive. But as good as Reggie is, last night it was Al Gore who sacked the quarterback. (Applause.)

Let me say to all of you that the Vice President and I have worked very closely together, we've been a good team, we've worked hard for four years to basically change not only the way the national government works, but the way our country is thinking about the future. We want everyone in America to have a vision of what America should be like in the 21st century.

And I ask all of you to think about it when you leave here and you go about your business today, just think about it -- if you had to sit down in a paragraph, sort of say what you think your country ought to be like as we start a new century and a new millennium, in a time where we have radical, breathtaking changes in the nature of work and communications and how we relate to each other in the rest of the world, what would that vision be for you if you were writing it down? I encourage you to do it tonight when you get home. It would be a good exercise. Talk to your spouses, your kids, your parents about it. And think about what do you want for your country when we start this new century.

For me, it's this: I want us to take advantage of these changes so that the American Dream will be alive and well for everyone who is willing to work for it. I want us to be a country that is coming together, respecting our diversity and clinging to our shared values instead of being torn apart by our differences, as so many countries all around the world are. (Applause.) Now, who would have thought 15 or 20 years ago at the height of the Cold War we could ever see the threat of communism fade from the world, that we would see the ugly rise of old racial and ethnic and religious hatreds consuming people all around the globe. We can beat that rap here and we're determined to do it, and I think we will do it. (Applause.)

The third thing I want is for the United States to continue to be the world's strongest force for peace and freedom and progress and prosperity in the entire world. I think that is important for other people in the world who have their aspirations and who need to have the chance to grow up strong and free, the chance to develop the minds that God gave them and the spirits of their children.

To do that, we have followed a simple strategy. We have tried to create as much opportunity as possible. We have tried to demand responsibility from all of our citizens and do things that would encourage more of that. And we've tried to build this American community and stand against those forces that would undermine it. We have tried to change the fundamental way the government works, and Al Gore has been our leader in that regard. We have downsized the government now by 240,000 people or so. It's the smallest it's been since President Kennedy was in office. But we have also tried to change the way it works, to make it less bureaucratic and more oriented toward working in partnerships with citizens to give people the tools they need to make the most of their own lives.

That is the context in which I ask you to see what I believe we should be doing with science and technology and basic research. It has to do with what I want America to look like when we start this new century, what I want it to look like when people like me, when our children are our age, and indeed when our grandchildren are our age.

If you have that vision, there is no better way to make it real than by continuing to preserve America's leadership in research and technology and science. Of course, as Al said, there could be a great digital divide. If we don't broadly share the knowledge and the technology that is developing, it could work to promote inequality, frictions, anxieties among people. But if we do it right, it can be a great force to help us meet our challenges and protect our values together.

Continuing to push back on the frontiers of knowledge has always been one of the measures of America's greatness. For the last half century, this state of Tennessee has been a living map of how those kinds of investments can produce growth and opportunity. Sixty years ago, the TVA lifted an entire region out of poverty. Today it is still shining its light, illuminating homes and communities. During the Cold War, the Oak Ridge Laboratory harnessed the power

of the atom in the service of our nation's defense. Today it's nuclear science is yielding the isotopes that help doctors trace heart disease. Our interstate highway system, built with the leadership of Senator Al Gore Sr., literally remade the landscape of America and connected us all more closely. And today it is still bringing Americans together.

Technology is clearly transforming our world, and it is creating a range of possibilities for the young people behind me and the young people in this audience that are literally unimaginable. Many of you people who are students at the University of Tennessee who are here and the younger students from high schools and the middle schools and the elementary schools, you will be doing work that has not been invented yet. Some of you will be doing things that have not even been imagined yet. And it is up to us to see that every one of you has the best possible chance to develop your talents and to live out your dreams.

That is what has been happening -- change at a rapid rate. Again, even if you look back on it, it's almost unimaginable. Consider this: There is today more computer power in a Ford Taurus you drive to the supermarket than there was in Apollo 11 when Neal Armstrong took it all the way to the Moon. Isn't that amazing? Cell phone, faxes, laptop computers, pagers -- they were the stuff of science fiction a few years ago. They're now everywhere, and if you don't have one, don't know how to work one, you're sort of out of step. These days you can take notes on a computer pad which converts it into a typed text and sends it to the Internet and transmits to a computer all across the world.

The young people today will live out their lives, in short, in a century that will change like this constantly. And that's why I say they will do work that not only has not been invented yet, but some of it has not been imagined yet.

Our cutting edge industries like microchips, biotechnology and aerospace once again lead the world. I'm proud of that, and that's good news for Americans. When it comes to these new technologies, our nation is on the right track, and that's one of the reasons we're the world's leading exporting country again, one of the reasons we have as many jobs as we do, one of the reasons that more than half of our new jobs are in higher-wage categories -- because we are on the cutting edge of positive change. (Applause.)

So let me say again, we must stay on the cutting edge of positive change. I am determined that we will continue to invest in science and technology. More research in America -- most research is conducted by businesses and universities, but we all know that government has an important role to play.

Of the 12 Americans who won the Nobel Prize last year, all 12 had received government support for their research. This year, the Nobel Prize winners have just been announced in physics and chemistry. Of the three who won this year in physics and two who won in chemistry, all five received federal funding from the National Science Foundation. Cutting back on research at the dawn of a new century where research is more important than it has been even for the last 50 years would be like cutting our defense budget at the height of the Cold War. We must not

do it and we will not do it. We must protect the future of the young people here in the audience. (Applause.)

One of the marvelous things we have learned about research is that it's not necessarily going to benefit just a particular category in which it was undertaken, that ideas don't stay in boxes anymore, that they all become more interrelated, the more you know and the more you learn.

For example, the Department of Defense has a dual applications program that makes military research available for commercial use. The Commerce Department has an advanced technology program that works with hundreds of high-tech firms to create jobs and new technologies, and let me just give you one example of this.

The research we've done in defense and intelligence and in our space program on imaging, which is very, very important, knowing exactly where you are and what you're seeing, is playing enormous benefits in the medical research area, and it may help us to identify incipient cancers before they develop to a problem stage in a way that may drastically improve the cure rate for cancer and almost get the identification down to the point where cure and prevention become merely indistinguishable in the moment. This is the sort of thing we have to be thinking about all of the time. (Applause.)

I tell this story all the time, but I think it's important. We just formed a partnership with IBM to produce a supercomputer over the next couple of years that will do more calculations in one second than you can do at home on your hand-held calculator in 30,000 years. Now, that should give you some indication of how quickly things are changing and how we will be rewarded if we stay on the cutting edge, and how we can be punished if we don't.

I just talked a little bit about health care, but technology is really making enormous strides there and research is. During the time the Vice President and I have been in office, we've increased research on breast cancer at the National Institutes of Health by almost 80 percent. (Applause.) And just last year, an NIH scientist discovered two of the genes that cause breast cancer, giving hope for treating and preventing the second leading cause of cancer deaths among women.

We've increased NIH research on AIDS by 39 percent. (Applause) And I'm convinced we're in the process of helping to turn a relentlessly fatal disease into a chronic, manageable illness. The life expectancy of those with HIV and AIDS has nearly doubled since I took office because of medical advances in research. (Applause.)

We've come up with the first-ever treatment for strokes, the third biggest killer in America, something no one ever thought we would ever be able to do very much on. And just the other day -- well, a lot of you were moved, I know, by Christopher Reeves' speech at the Democratic National Convention. And he called for a recommitment to research. At almost the

same time, either a couple of days before or a couple of days after Christopher Reeve gave that speech, for the first time ever, laboratory animals whose spine had been severed had movement in their lower limbs because of nerve transplants to the spine from other parts of the body. We can do things that we have never imagined if we continue to work and go forward. (Applause.)

Last week I signed budget legislation, increasing the NIH budget \$2.4 billion over what it was the day I took office. These investments will make possible further advances. They will lead to sophisticated computer imaging systems to help us treat cancer, to help us deal with Alzheimer's. They will enable us to continue certain extraordinary initiatives going on there. One of my favorites is the human genome project, which is literally on the verge of mapping out a genetic code of life. I think it won't be too many years before parents will be able to go home from the hospital with their newborn babies with a genetic map in their hands that will tell them, here's what your child's future will likely be like. Therefore, if you want your child to live as long and as well as possible, here is the diet you should follow, here is the exercise program you should follow, here is the medical treatment you should follow. It will be an incredible thing.

I know that all of you believe in this, but I think it's important that we have -- that ordinary citizens have at their fingertips three or four examples that people can identify with of why these investments of your money -- because, after all, this is all your money, these are just things that we do together as a people because we couldn't do them individually --and I think it's important that you have these at your fingertips so that you can talk to your friends and neighbors about why this matters. I know you can make a good speech about it here because you've got Oak Ridge up the road and it's a lot of good jobs. But it's important to understand why it matters to everyone wherever they live and how it can change our common future for the better.

We all know that changes in technology are transforming the way we work, too. For a long time people were worried about that; we all were. Everybody wondered: Well, there's so much computer technology, all of the big organizations, the big bureaucracies can downsize, will there be more people dislocated than we can create new jobs; even if we create new jobs, will the new jobs not be as good a jobs as the ones we're losing.

These are legitimate worries that have plagued people in the past and it still troubles individuals in our country, but we now know that we are creating jobs that on average are in the higher-wage categories. We know we can do it right.

But there is another thing that we ought to look at, which is how we can use technology to help people who have children at home succeed at home and at work. When I became President -- I think it's still true, we don't have any updated figures -- but when I became President, there was a study that came out that said that people were working harder in 1994, the second year I was in office, than they had been 25 years earlier in 1969. The average working person was actually spending more hours a week at work.

And, yet, there were a higher percentage of parents in the workforce in 1994 than there

were in 1969. That means that nearly every family, whether it's a family working for a very modest wage, a family with a solid, middle-class existence, even a lot of upper middle-class, better-off families are dealing with these competing pressures of trying to do a good job raising their children, which is our most important job, and trying to succeed in the workplace. (Applause.)

That's why the Vice President and I worked so hard for the Family and Medical Leave Act, why we believe it ought to be expanded, why we think there ought to be more flex time in the workplace. (Applause.) But, again, I think technology, if we keep working on it, we'll bring it back around to us, and a lot of people will be able to benefit from it. The number of Americans who are now working from their home at least part of the week and telecommuting has doubled over the last five years to 12.1 million.

The Small Business Job Protection Act that I signed this summer included an increase in the minimum wage for 10 million working Americans. (Applause) But it also did something else: It completed a job the Vice President and I started in 1993. We have, since 1993, increased the amount of capital a small business can expense from \$10,000 a year now to \$25,000 a year. And I believe more and more companies should use this expense to buy computers and other equipment for their employees to use at home, especially if the employees have young children. We have to work harder to make our businesses work well, our employees succeed, and people be able to be good parents. (Applause.)

Finally, let me say the explosion of information has changed everyone's life, nowhere more than on the Internet. Now, think about the Internet, how rapidly it's become part of our lives. In 1969 the government invested in a small computer network that eventually became the Internet. When I took office, only high energy physicists had ever heard of what is called the Worldwide Web -- when I took office, January of 1993, only high energy physicists had heard of it. Now even my cat has its own Web page. (Laughter and applause.)

The number of people on the Web has been doubling every eight months. Think about that. The number of people on the Web has been doubling every eight months. Today there are at least 25 million people on the Internet. By 1998 that number will reach 100 million. The day is coming when every home will be connected to it and it will be just as normal a part of our life as a telephone and a television. It is becoming our new town square, changing the way we relate to one another, the way we send mail, the way we hear news, the way we play.

Every citizen can now read the Congressional Record. If you have insomnia, I recommend it. (Laughter and applause.) Every citizen can get the text of what's in a new law the very day it passes. Art lovers can go to the Louvre. Baseball fans can pay an on-line visit to Cooperstown. Everyone can find a passage in the Bible or in Shakespeare with the click of a mouse. Most of all the Internet will be the most profoundly revolutionary tool for educating our children in generations.

I want to see the day when computers are as much a part of a classroom as blackboards and we put the future at the fingertips of every American child. (Applause.) That sounds great, but think about the implications for our American democracy. If you want to go into the 21st century with the American Dream alive and well for everyone, everybody has a chance to live up to the fullest of their abilities and, I might add, to be less shackled by whatever disabilities they have, if you believe we can create a community where everybody has a role to play, think about the implications for this.

What does this mean, hooking up every classroom? It means if you have the right computers and the right education equipment, software, the right educational software and properly trained teachers, and then all of these connections are made to the Internet and the World Wide Web and all of the other networks that will be exploding out there, think what this means. This means for the first time ever in history, children in the most rural schools, children in the poorest inner-city school districts, children in standard, middle-class communities, children in the wealthiest schools, public or private, up and down the line, will have access in real time to the same unlimited store of information. It will revolutionize and democratize education in a way that nothing ever has in the history of this country. Think about what it means. (Applause.)

In the State of the Union Address, I challenged the American people to make sure that all of the libraries and classrooms in the country were hooked up to the Information Superhighway by the year 2000. I am very, very grateful for the work that has already been done. Businesses, communities, governments, schools have worked all across this country, thousands of schools have been hooked up on net days from California to Florida, and today we are taking three more steps to make sure we achieve that critical goal.

First, the announcement that has been made by Mr. Redstone. The business community is committed to taking the lead in putting educational technology into our classrooms. CEOs from our top telecommunications firms are joining together to help us achieve that vision. Sumner Redstone, Lynn Forester, also Robert Allen of AT&T, Larry Ellison of Oracle, Gerry Levin of Time-Warner, Brian Roberts of Comcast, Steven Case of America OnLine and there will be many more -- they're going to make sure that we have the computers in the classrooms, that the teachers are properly trained, that the educational software is the best available, and that all these connections are made to democratize education. They will help to raise private sector contributions to match the technology literacy challenge fund that we have created.

And let me say again to Sumner, to Lynn, to all the others: We owe them our thanks, and we need more to follow their lead. This is the only way we can get this done in a short time. (Applause.) Thank you.

The second thing we have to do is to make sure that all of the schools and the libraries in the country can afford to hook up to the Internet. (Applause.) Today, the cost of using the Internet can price some schools out of cyberspace. Fees can be inconsistent with the highest rates, often hitting places with the fewest resources.

Soon, all this will change. Under the new telecommunications law I signed a few months ago, the Federal Communications Commission will require the telecommunications service providers give to schools and libraries affordable rates for Internet access. The FCC will vote on how to do this on November 8th -- how to provide what we call an "E-rate," an education rate.

Today, I call on the FCC when it votes to give every elementary, middle and high school and every library in the country the lowest possible E-rate free basic service to the Internet. (Applause.) More sophisticated services like teleconferencing, the FCC should require discounted rates with the deepest discounts going to the poorest schools and areas. (Applause.) I urge the FCC and the state regulators who have a say in this to make the E-rate a reality for our schools. And again, I want to thank the Vice President and Secretary Riley, Assistant Secretary of Commerce Larry Irving, who has worked with us on this, and there are a number of members of Congress. The Senators that I would like to mention are Dorgan, Exon, Kerry*, Rockefeller, and Senator Snow, and Congressman Markey. They have all helped us on this.

This is a big deal. Wouldn't it be a shame if we did all this work and there were schools that literally could not access the Internet, if there were libraries in little rural communities that couldn't do it. It is not necessary. This will pay for itself over and over again by increasing the users, the knowledge, it will explode, and we have to do this.

Finally, let me say, to keep going we have to keep the Internet itself up to speed. I know it's hard to imagine that the Internet could be getting too old. I find that about myself from time to time. (Laughter.) But believe it or not, everything ages, and the Internet is straining under its growing popularity. Like any other piece of critical infrastructure, it has to be repaired and upgraded to meet all our education, medical, and national security needs. It is now time to invest in the next generation of Internet. Today I am pleased to announce our commitment to a new \$100 million initiative in Fiscal Year 1998 to improve and expand the Internet, paid for under our balanced budget plan line by line, dime by dime.

America must have an Internet that keeps pace with our future. So let's give America Internet II, the next generation Internet. (Applause.) We have to keep it big enough and fast enough to connect all of our people. Now, this initiative will help universities and research institutions expand the amount of information that Internets can carry through ultra-fast fiber-optic networks. It will develop software to eliminate bottlenecks. It will expand the number of addresses on the Internet. It will create powerful new switching computers to create power -- to enable universities to communicate with each other 100 to 1,000 times faster than they can today.

It will develop the software to carry sound and video from one end of the world to another in real time. It will be capable of transmitting the entire Encyclopedia Britannica in less than a second.

These improvements will make the Internet a more important and remarkable part of our own lives. They will enable our Defense Department to send intelligence instantly to our troops on the ground anywhere in the world. They will let doctors in rural areas scan their patients for cancer by tapping into supercomputers at university hospitals a long way away. They will allow Americans to take any class anytime, anywhere, in any subject. They will expand the reach of education programs right here, like the Oak Ridge Education Network and Adventures in supercomputing.

So let us reach for a goal in the 21st century of every home connected to the Internet, and let us be brought closer together as a community through that connection. (Applause.)

Let me close with a word of caution that I know I don't need for anybody in this audience in East Tennessee. We cannot idealize technology. Technology is only and always the reflection of our own imagination, and its uses must be conditioned by our own values. Technology can help cure diseases, but we can prevent a lot of diseases by old-fashioned changes in behavior. And we know that as well. (Applause.)

Technology can give us a lot of information about why we should act rationally in certain cases. But continuing to hate our friends and neighbors because of their religious, racial, tribal, or ethnic differences, that is an affair of the human heart. And we know that as well. (Applause.)

So today let us resolve to keep faith with our future by passing on to our children an Information Superhighway that will help them to live out their dreams. But let us also resolve to make sure that their dreams are the right dreams so that when we get to this great, brand-new century and this remarkable age of possibility, the vision we all share for our future can become real.

Thank you, and God bless you all. (Applause.)

END

12:30 P.M. EDT

Materials Added to Binder
April 28, 1998

B. Speeches of Vice President Gore

“MIT Commencement,” Cambridge, MA June 7, 1996

Press Release: “Announcing Giant Steps Towards Next Generation Internet,” April 14, 1998

C. Speeches of Past Presidents

Abraham Lincoln, “Lecture on Discoveries and Inventions,” Jacksonville, Illinois February 11, 1859.

F. Civil Society and Government in the Information Age
B) Society and Technology

Harold Varmus (NIH Director) “Harvard University Commencement Address,” June 6, 1996

H. The Problem of Inequality in the Information Age

Donna L. Hoffman and Thomas P. Novak, “Bridging the Racial Divide on the Internet,” *Science*, April 17, 1998

ETS Policy Information Center, “Computers and Classrooms: The Status of Technology in U.S. Schools,” 1996

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2. Electronic Commerce Initiative, East Room, July 1, 1997
3. Commencement Address, Morgan State, May 18, 1997
4. NetDay '97, Oval Office, April 19, 1997
5. Internet w/ VP, Knoxville, October 10, 1996
6. Commencement Address, Princeton, June 4, 1996
7. NetDay '96, Concord, California, March 9, 1996
8. Education Technology Discussion, Union City, NJ, February 15, 1996

B. Speeches of Vice President Gore

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C. Speeches of Past Presidents

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 - a) AP Wire, "Government Reports on 'Digital Economy'"
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2. Presidential Directive on Electronic Commerce, July 1997
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7. Michael Mandel, "Zap! How the Year 2000 Bug will Hurt the Economy," *Business Week*, March 2, 1998
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9. Heather Green, "The Virtual Mall Gets Real," *Business Week*, January 26, 1998

10. Daniel Bennett, "Getting to Know Your Audience," *National Journal's Cloakroom*, April 16, 1998

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THE WHITE HOUSE

Office of the Press Secretary
(Concord, California)

For Immediate Release

March 9, 1996

REMARKS BY THE PRESIDENT
TO THE CONCORD COMMUNITY ON NETDAY

Ygnacio Valley High School
Concord, California

10:04 A.M. PST

THE PRESIDENT: Thank you so very much. I want to say again how much I appreciate the wonderful welcome we have received today. I thank your principal, Sheila Walker; Superintendent Allen; your fine Superintendent of Public Instruction Delaine Eastin; and Lt. Governor Davis; my good friend, Senator Boxer; and Representative Miller. I want to say again what a good job I thought -- I want to join the Vice President -- I thought Brian DeGrassi did a good job up here. We didn't even need to speak after he talked. (Applause.)

I want to thank John Gage and Michael Kaufman for originating the idea of NetDay. The country will long be in their debt. They have come up with something truly remarkable. (Applause.) And I want to thank the Merrills and all the wonderful volunteers here. And because of my own past I don't want to leave here without acknowledging your award-winning band and flag team. I thank them for being here as well. (Applause.) Thank you very much.

And I want to thank Vice President Al Gore, who 20 years ago -- 20 years ago -- coined the term Information Superhighway, and is now helping every American child to become a part of it. I thank you for that. (Applause.)

The Vice President and I have looked forward to coming back for this day ever since last September, when we came to California and met with leaders of the communications industry. That day we challenged Californians to connect at least 20 percent of your schools to the Information Superhighway by the end of this school year. You didn't fret about it, you're simply doing it.

Think about it. On this day, March 9th, 20,000 of your fellow citizens are meeting this challenge. I am honored to be here with you.

Today, one out of five California schools will be wired to the future. Within four years, every school in the state will be wired to the future. We are putting the future at the fingertips of your children, and we are doing it together in the best American tradition.

We are living through a moment of absolutely astonishing transformation; a moment of great possibility. All of you know that the information and technology explosion will offer to you and to the young people of the future more opportunities and challenges than any generation of Americans has ever seen.

Our country is changing just as profoundly as it did when we moved from farm to factory, from the country to the cities and towns 100 years ago. The microchip and the global marketplace are opening up undreamed-of prospects, but real challenges. If we want to keep the American Dream alive for every single person who is willing to work for it, we know that more than ever before, we have to give all Americans the skills, the education they need to be winners in this time of change. We must not send our children into a 21st century unprepared for the world they will inhabit and the jobs they will have to fill.

(Applause.)

All of us are here today because we know, purely and simply, that every single child must have access to a computer, must understand it, must have access to good software and good teachers and, yes, to the Internet, so that every person will have the opportunity to make the most of his or her own life. (Applause.)

I have spent a great deal of the last three years trying to open up educational opportunity and help educators and parents raise educational standards in America. There is more that we must do. Of course, we need high standards and high expectations. Of course, we should open the doors of college education to every single American who needs to go. (Applause.)

That's what the new student loan program is about, which cuts costs and makes repayments easier. That's what the national service program is about, promoting this kind of community service in return for funds to go to college. (Applause.) That's why I believe the most important tax cut we could give in passing a balanced budget is to give every American family the opportunity to deduct up to \$10,000 a year of the costs of college tuition. (Applause.)

But whatever else we do, we must bring the information and technology revolution to every -- every -- classroom in America. Every child in America sees a computer at work in a grocery store, in a video arcade, many at home. One of the few rooms that you can't enter in America today and know for sure that you will see a computer and to see computer technology is a classroom.

We are changing this today, in the same way our nation has always changed for the better -- by working together, united as one America. We understand there is no generation gap

between old-fashioned American values of hard work, teamwork and optimism in our forward march into the technological world of the 21st century. (Applause.)

In a way, NetDay is a modern version of an old-fashioned barn-raising. Government is not doing this alone; nor is business, nor can schools do it alone. All of us are joining together -- students, scientists, business leaders, engineers, parents and old-fashioned American citizens who have not other interest other than a love for their country, a love for their children, and a belief in the future of America. What you are doing today is America at its very best, and it is guaranteeing America's future. (Applause.)

Just think about it. Today, in California, we are installing 6 million feet -- 6 million feet -- of computer cables and plugs. That's a message that all America will hear tonight and tomorrow, and be proud of, and I hope will emulate.

I want to say a special word of thanks, as the Vice President did, to the business leaders all across the state, from Sun Microsystems to AT&T, MCI, Netcom, America Online, the Scholastic Network, Apple, which is donating computers, Netscape and Microsoft giving free software. We're having trouble with these speakers. Just pretend you hear it even if you don't. (Laughter and applause.) I want to ask every one of you to stop and give a special applause to every single business in California that is supporting this endeavor today. This is corporate citizenship at its best. (Applause.) I thank the IBEW and all the labor organizations that are helping today. (Applause.)

There are some truly impressive things being done by students today. In San Diego, one class sold cupcakes to pay for the cost of their NetDay kit. All across the state, teenagers today will be able to teach their parents a thing or two about the Net. In Palo Alto, one school which was wired a short time ago, this NetDay is providing the first time many parents will see their child's classroom. But after the classroom is wired, the parents are painting the classrooms and repairing a decayed building.

I say that to make this point. One of the most probing comments I have seen in reading the press out here in California in preparing to come is that some have said, well, should the President and the Vice President, should the state be emphasizing computers in all the classrooms when some of our school buildings are falling down, some of our play yards in disrepair. My answer to you is, yes. If everybody has those skills, our school districts will be wealthier and better. But we do not have to choose; the same volunteers that are wiring the schools can also fix them up. And I hope people will do it all across California. (Applause.)

I also want to thank the teachers that are working today. And what I think is a real picture of what is so special today -- the teachers on strike in Oakland are putting their pickets down and participating in NetDay. (Applause.)

We are trying to do our part. In the Telecommunications Bill I signed a few weeks ago,

thanks to the long efforts of the Vice President and many in the Congress, there is a guarantee that schools and libraries and hospitals will all be able to be hooked up at affordable rates. And last month, I announced a \$2-billion technology literacy challenge to help communities all across this country get the right kind of computers in every classroom and every library by the end of the century.

But more than anything else, we need volunteers, trained teachers, good software. That is what we are celebrating today as well. I cannot think of a single endeavor which has involved so many different Americans from so many different walks of life to do something that is so clearly in the interest of every single American citizen. And, again, let me say to all of you who are here, thank you. Thank you for the enthusiasm. Thank you for the numbers. Thank you for your commitment. (Applause.)

I want to make just one more point, and I want to emphasize something the Vice President said. The other question which has been raised is whether or not somehow this advance of technology will divide our people more; whether or not the poor children or the poor school districts will be left behind; whether or not this will inevitably give greater advantages to those who already enjoy them. Let me just give you one story that will refute that, I hope, forever.

Last month, I had the opportunity, with the Vice President to visit the Christopher Columbus Middle School in Union City, New Jersey. Just a few years ago, the schools there were so bad the state was on the verge of taking them over and taking them away from the local school board and the parents. But it was a revitalized community effort, involving Bell Atlantic and all the local citizens we celebrate here in California today, that put computers in every 7th-grade classroom and in every student's home in a school district that had a low per capita income where most of the families are first-generation immigrant families.

New Jersey is one of the wealthiest states in America, and in a matter of just a couple of years in this far-from-wealthy school district with first generation immigrants, the children have an attendance record, a graduation rate, and most important of all, test scores that are above the state average. Technology is going to liberate Americans and bring them together, not hold them back. (Applause.)

And that's what I want to happen to California. Look at this sea of faces here. You are America's present and America's future. Now, the children will not only be able to access the Magna Carta and the Declaration of Independence, they will be able to, how uncomfortably it might be, follow how Congressman Miller and Senator Boxer vote -- (laughter) -- and send e-mail to me and the Vice President, telling us what mistake we have made that day. (Applause.)

To the younger people in this audience, I hope you will never forget this day. Someday your children will marvel at the idea that there ever was a classroom without a computer. You can tell them you were a pioneer. Just as our parents and grandparents built our schools and libraries and highways for their children, you will leave your children a legacy of opportunity

along the Information Superhighway.

The 21st century is America's for the taking -- if we are bold enough and strong enough and confident enough to go forward together. We will make the best of this new technology together. We will educate our children with it, improve our businesses with it, make our government more democratic with it, and build a brighter, freer, more prosperous future with it. That is the American way.

Let the future begin. Thank you, and God bless you all. (Applause.)

END

10:20 A.M. PST

THE WHITE HOUSE

Office of the Press Secretary
(New York, New York)

For Immediate Release

February 15, 1996

REMARKS BY THE PRESIDENT
IN EDUCATION TECHNOLOGY DISCUSSION
WITH STUDENTS, TEACHERS AND BUSINESS LEADERS

Christopher Columbus School
Union City, New Jersey

10:45 A.M. EST

THE PRESIDENT: Thank you very much, Carol. Good morning, Secretary Riley. You look great long distance there -- (laughter) -- glad you're in the Cabinet. Good Morning, Bob Fazio, and thank you again for what you said and for the remarkable work you have done here.

I want to say hello to Senator Lautenberg and Congressman Menendez, who had so much to do with starting this technology effort in this school system; and to Jim Cullen at Bell Atlantic, and the others who are here from the private sector; and the teachers, the parents and especially the students who are here; and the students from the 65 schools in Hudson, Bergen and Morris Counties who are with us today. Thanks to technology, I want to say hello to all of you.

I have been looking forward to this for some time. And the Vice President and I have had some very exciting conversations about what we would see here and what all of you have done here. And I want to just begin by thanking all of you for making this kind of partnership work and by proving what I said in the State of the Union -- that we have an obligation if we want all Americans to have the opportunities that this new information and technology age offers; we have an obligation to make sure that all of our children have access to world-class education through the finest technology. And you are doing that. And I'm very, very proud of you and I'm very excited to listen to all of you and what you have to say today.

But I would like to talk a little bit about what we are trying to do. What we are trying to do from the White House is to work in partnership with everybody in America who is concerned about this to see that by the year 2000 every classroom and every library in the entire United

States is hooked up to the Information Superhighway, that all our children have access to computers and the finest educational software, and all of our teachers have the kind of training and support that, obviously, you have provided here, and that there is a kind of connection that we see here.

I am very excited about the prospects that young people like those here at this table in this room will be able to learn things that I could never have even dreamed of as a child. And while I want districts like yours to be able to stand out and be proud, I think all of you want every child to have the opportunities that your children have.

And that's why I wanted to come here to announce what our next steps are. As I said in the State of the Union, when I outlined the importance of meeting the challenge of providing all of our children an education for the 21st century, one of the primary goals I set was making sure every classroom was hooked up to the Information Superhighway by the year 2000.

Today, I am proposing and will include in my budget to the Congress a \$2-billion Technology Literacy Challenge that will put the future at the fingertips of every child in every classroom in the United States. Let me explain just briefly how it will work.

We'll basically do what you have done here in Union City on a national level. We will use the resources of state and local governments and school districts of the private sector, the schools, the students, the parents and the teachers. The proposal is part of the balanced budget plan, as I said I sent to Congress, and we will use these funds basically as Challenge grants to try to make sure that no school district, no matter how poor, no matter how urban or rural, will be denied the opportunity to do what your children have been able to do because of your vision and work.

I ask for all the people in this country who will support this effort to get active, to get involved. Companies like Bell Atlantic can do a great deal, but they can also use a lot more help. And, obviously, none of this will happen unless the schools and the parents support the endeavor.

So we're going to try to do our part. We want to support you. And we look forward to the day when we can have a conversation like this and every school child in America can be a part of it.

Now, I'd like to turn this over to our high-tech Vice President who has educated me -- between the Vice President and my daughter, I'm about to figure out this modern age. (Laughter.) And I want to thank them both, and introduce the Vice President and thank him for all the work he has done in this important area.

THE VICE PRESIDENT: Well, thank you, Mr. President, and to all the distinguished guests that you've already acknowledged here at Christopher Columbus and at the Bergen Academy hooked up by this video link.

You know, Frank Lautenberg and Bob Menendez can remember, as I do, what it felt like

in the 1960s when President John Kennedy said, our nation will send someone to the moon and return him safely before the end of the decade. Once that goal was set, everybody who could play a part in reaching that goal did his or her part. And it all came together. And we watched the early launches and steady progress of the initiative. And then, as is often the case when America has leadership and a clear goal, we reached that goal. But I remember what it felt like.

Well, now, President Clinton has given our nation a goal of connecting every classroom and every library to the Information Superhighway by the end of this decade, by the end of this century. And we see here at Christopher Columbus some of the early experiments to demonstrate how it works, not just to make the connection electronically, but to the curiosity of these children. And you see a student body that was struggling now having the highest attendance and scores 10 percent above the state average, because your leaders here paid attention to the basics and then used this new capacity, the Information Superhighway, to rethink the way the classroom operates, to rethink the relationship between the teachers and the parents and the student. And the results are here to see.

President Clinton instructed his staff to make certain that this national initiative he's launching here today is modern in every respect according to reinvented principles, with flexibility to the states and local governments. It's an exciting departure. And it feels to me the same way it did when President Kennedy announced that goal of going to the moon and back. And because of the nuts and bolts details of this \$2-billion Challenge initiative that the President is announcing here today, we are actually going to meet this goal.

Next month the President and I will be in California on what's called "Net Day." Twenty percent of the schools there will be hooked up to the Information Superhighway on one day. There will be other announcements, just as there were in the early years of the space program, one right after another, each taking us closer to the goal. But that goal again is not only the electronic link, it is the link to the students and their parents and the teachers. And that's what we want to hear about now.

THE PRESIDENT: Thank you.

Let me just say one other word and then we'll go back to the planned rotation. Bob Fazio said something that sparked a warm response in me and reminded me that technology is only as good as the people who are using it. And in the service of education, it's only as good as the educators who are committed to educating our children. And he introduced himself as the instructional leader of this school.

Having worked now for almost 20 years in the field of education reform and having had the opportunity as a governor to travel all across America, to go into many of our country's finest schools, it wasn't so many years ago that there were almost no principals in America who would have introduced themselves as the instructional leaders of their schools. They thought of themselves as managers, people who kept order and make sure the books balanced and did all kinds of things that were unrelated, almost, to what was going on in the classroom. And the reason this technology initiative is working here is because, from the principal to the teachers,

people understand what the mission is. And I wanted to thank you.

That was a statement that people that haven't spent a lot of time in classrooms might not have even paid any attention to, but, to me, it meant more than anything else you said. And I thank you for that because it's important for all us who are trying to put this equipment at the fingertips of our educators to remember that what happens then is the magic between the teachers, the children and the parents. And I thank you for what you said.

Q Thank you, Mr. President.

THE PRESIDENT: Mr. Vice President, who is going to go next?

Q I'd like to call upon Ela Mesguer, who is a teacher, to tell us why technology is so important to us here at Columbus School. You can add the technology, but if you don't have the curriculum to go along with the technology and you don't have the support, we know that it can't work.

So, Ela Mesguer.

Q I think we have the successful formula at Christopher Columbus School, starting with a strong leader like Mr. Bob Fazio, where an open mind and the future vision is helping where we are going with curriculums that really connect and can be equally connected to the Internet and to CD ROMs and to interactive television, working with centers of science and museums.

We have the element of creativity and dedication on the part of the faculty. And our goal is our students. We want them to learn. And what is unique about our school is that our school is a school for all students, not a school for a select few. It is normal kids, multi -- (inaudible) -- from all socioeconomic backgrounds. And we have proven that with this formula of technology, creativity, dedication and allowing our students to be self-learners and self-researchers, it works. And that's what I'm most excited about. We are a school -- an urban school. I am so proud that we have you here. I am honestly nervous, and I'm not usually nervous. (Laughter.)

THE PRESIDENT: You're doing great.

Q But I just want to say, hearing your plan is so exciting because it means a lot to Union City and the children here because they don't have the economic situation that other districts might have, so they can be connected at home with their own computers. So this will provide us an opportunity to continue on our quest to navigate beyond the -- (inaudible.) So I thank you so much for this opportunity.

THE PRESIDENT: Thank you.

VICE PRESIDENT GORE: Erika, did you want to add something to this?

Q Well, the need for technology -- (inaudible)
-- you need a door to the mind. It prepares you for your future, because now colleges are urging people to be computer literate, and by starting in the grammar schools like this you're getting a further head start in high school right now. I think technology has come a long way and it's going to take us very far.

THE PRESIDENT: Let me ask you something. Why do you think that students here are doing better now -- like on test scores and things like that -- than they would have done if there had been no technology here? What do you think the most important thing is about technology?

Q Well, I think the most important part about it is that it's, like you said before, right at your fingertips. You know that something will be there for somebody -- sometimes the information needs to get updated on the computer, it's always being updated and being changed. So I think by using computers everybody has more time to study and it's quicker and they're doing better. It has nothing to do with high class and lower class and things like that.

THE PRESIDENT: That's right. Do you think that having access to the computer makes all children believe that they're equal, that they can have equal aspirations because it's an equalizer across income, isn't it?

Q Yes, it is.

THE PRESIDENT: Is it also more fun?

Q Yes.

THE PRESIDENT: Do you think that something to do with why people learn more, because it's more fun? (Laughter.)

Q Yes, I do.

THE PRESIDENT: That's not bad, that's okay. You can say that. (Laughter.) It doesn't have to be hard, it can be fun.

VICE PRESIDENT GORE: Mr. President, George Gonzalez has come here from Bergen Academy.

And what difference does it make in your work as a teacher?

Q Okay, like everybody answered before, it has been a process. It's a process that has lasted since 1982, starting in 1982. And somebody with a vision like Dr. Greco -- (phonetic) -- over there, he told us, we're going to create a high knowledge school of the future.

So that was the vision. And then he created a plan, and he said the plan is to create

partnerships, number one, with corporations. We supply tools, technological tools like Bell Atlantic, Citicorp. Then, number two, the second partnership would be corporation, more businesses, more institutions that supply the context of where we're going to use that technology. Number three, educational institutions to share the resources. And number four would be the professional community in our area, to keep them up-to-date with the technological changes.

So I would say today, 1996, I think his dream became reality. And I don't think you have better opportunity than this one to congratulate Dr. Greco and thank him for the opportunity that he gave me.

Now, to answer your question how I feel as a teacher, the knowledge as a teacher, that's I think is one -- (inaudible) -- they want to be more excited and it changes every day. No one day is the same. I wake up every morning not knowing what's going to happen. (Laughter.)

THE PRESIDENT: It is like our job. (Laughter.)

Q I'm competing with maybe hundreds of thousands of developers, and they're developing something new every day, and I have to come out with the -- (inaudible.) So I gave up being a teacher about 10 years ago and said, I can't handle it anymore. So instead of being a teacher, I became a facilitator, a team mate. So we face the challenge, we're all going to work together, let's solve the problem. So for me, it has been the greatest thing that ever happened. And later on we're going to take you for a tour to the most amazing classroom that you're going to find in this country. I can guarantee you that.

And for this tour, it's created a great opportunity to, what you said, to bring to the service our best role is being able to display the work and compare with peers across the planet. So not only the classrooms here, it's everywhere on the planet. So I think that's one of the best things that ever happened to us.

THE VICE PRESIDENT: Now, is Andrew one of your students?

Q We have two -- we have Kathy and Kathy, maybe you want to say some words on how we use --

Q At the Academy we stress the connection to -- and at each grade level we have a -- project. And that project usually has an -- so in 9th grade, all the students -- (inaudible) -- where we simulate corporations. We divide up into different groups and we do research and we produce a product, and we take it from the manufacturing state to finally to the advertisement and selling our product.

And after we do all that research, using now the Internet, we can think that the entire world -- because we like to present our work to each other, to our own Academy and the community. But now with the Internet we can share our work globally, and that kind of connection with other students across the world is helping us to get more information and kind of share what we've done.

Q Just to almost break the walls of our school, instead of being enclosed in the building, with the Internet we can almost go out into the community. And as Mr. Gonzales said, one of the goals of Dr. Greco was to allow institutions to come to our school and ask us for the -- content. One thing that students in our school can do is we can work with corporations, and we are presently working with corporations to solve real-life problems, giving the students a very unique experience.

Presently, a group, including myself, are working with scientists and engineers at the Smithsonian Institute to develop a biovisualization and 3-D gallery to display on the Internet. What these galleries will include are --

THE VICE PRESIDENT: Did you say biovisualization and 3-D gallery?

Q Yes. (Laughter.)

THE VICE PRESIDENT: Okay, just checking. (Laughter.)

THE PRESIDENT: Tell us what biovisualization is. For all of us mere mortals, we'd like to know what that means. (Laughter.)

Q Well, basically, what they include are specimens from the Smithsonian Archives that would be reproduced by the students in additional formats. And including all their background information, where the fossils may have been found, what the model may have been -- this information will be displayed in the Internet to be accessible throughout the world. And this allows the Smithsonian to sort of open up their whole entire archives which is more than a million specimens, instead of the minute percent that is presently on display. And all this is possible by the -- facilities in our school.

Q So that is what we -- we're going to take you for a tour. Before I make a mistake, I have to thank every one of my coworkers there for all the effort. And here is my colleague who is going to take you for a tour.

Q Thank you, Mr. Gonzalez. It's my pleasure to take you all on a virtual tour over here at the Academy. I'm standing beside students, Erika and Josh, who are currently part of the information technology class. They're creating pages that will be placed on-line on the Internet dedicated to SIC Kids, a special interest group for students interested in computer graphics and their applications.

In the back of all that, we have a 3-D laser digitizer. This machine allows us to digitize complex 3-dimensional surfaces and generate data points from them. These data points can then be imported into a CAD, or computer-aided design program, and edited and manipulated in 3-D space. The CAD model can then be imported into our stereo lithography machine where we can generate a prototype or it can print out 3-dimensional copy.

Our data can also be imported into our computer animation software that runs on our -- graphics machine. Here the student can apply materials and textures and also motion characteristics to enhance the 3-D visualization process.

Our data can also be imported into our virtual reality suite. Here our student is taking a virtual tour in a gallery in space. This is a project that was designed by another Academy student, Lester Vexy (phonetic), and it includes models, information and images to educate the user about the history of space travel.

Meredith Carr is currently analyzing a Smithsonian CAD model that was imported from our 3-D laser digitizer.

Meredith, can you explain a little bit about your project?

Q Good morning, Mr. President, Mr. Vice President. I've been working, along with Andy and some other students here, with researchers at the Smithsonian Institute. We've taken jaw fragments from monkey skulls that have never been found whole, and we're able to digitize them and bring them into programs where we can edit them and try to assemble the entire skull as it has never been seen before. Once that's done, we can take them into rendering programs and animate them so they can be visualized properly so anyone could really see it as if it were an actual model.

After that, as Andy mentioned, we can put it on the Internet, so that researchers and scientists and students all over the world have access to this information.

Q Thank you, Meredith.

We can collaborate directly with the Smithsonian Institute and other entities using our video-teleconferencing software. The benefit of this is that our students can communicate directly with other researchers and scientists around the world. Chris Greeley is hard at work providing contents on our Web Server dedicating a series of pages to environmental studies.

Chris, could you please explain a little bit about your project.

Q Good morning, everyone. Environmental studies is an interdisciplinary project that we're running here at the Academy, developed by the junior class. Basically, the purpose of this project is to allow students to gain an in-depth knowledge of the environmental issues concerning such topics as beach erosion and pollution, animal overpopulation, and the Superfund policy.

Students gain insight into their topics by going out into the local community and by talking with experts in their chosen field. Through this project we hope to be able to share everything we've learned with students everywhere all across the world.

Q Thank you, Chris.

Mr. President, Mr. Vice President, we hope this virtual tour has given you some insight as to the technological capabilities we have here at the Academy for the Advancement of Science and Technology. I'm going to turn it over to you now at the Christopher Columbus School.

Q Mr. President, piggy-backing off the Bergen Academy, I'd like to show you a live demonstration -- one of our students, Danny, who is sitting at the roundtable, will show you a demonstration.

(A demonstration is given.)

THE PRESIDENT: That's great.

Q Well, as you can see, Mr. President, things have changed since you were last in the classroom, and three years ago when I walked into Christopher Columbus School, I didn't know how to turn a computer on. And I think it's important for us to talk a little bit about how technology has changed us all as professionals.

THE VICE PRESIDENT: Luciano, what about from a parent's perspective? Is it true that this has enabled you to communicate with teachers about the students?

Q First of all, I want to make sure I am breathing, I want to make sure -- (laughter). It is true I want to thank you, Mr. President and Mr. Vice President, and all of you from coming to Union City -- the town that I love like I love my country.

When I came in 1990 from El Salvador, we never expected, my wife and I, that our kid could have the benefits of high technology in education. (Inaudible.) It is a privilege for me to be with the President of the strongest nation around the world. I want to thank all the ones who made possible the -- Explore, especially Bell Atlantic, the Board of Education of Union City, the Mayor Mr. Menendez -- and everyone who made -- Explore possible.

With this program, we see education through -- light. We the parents, for us, the most difficult thing is how to motivate our kids to go to school. And this program is not only helping to improve education, but this program also brought the motivation and the possible change to the life -- (inaudible.)

As you continue, Mr. President, as our president into the new century as a bridge between this century into the next century, we are sure that we can count on your support to make this technology available for all the kids of our great nation. Thank you.

THE PRESIDENT: Thank you very much.

THE VICE PRESIDENT: Thank you very much. I think there's a parent, Mr. President, from Bergen Academy, Louis Clements. Would you share your perspective as a parent on how it's changed the way the school there operates?

Q Good morning, Mr. President, Mr. Vice President.

THE PRESIDENT: Good morning.

Q The Academy here has offered things to students, my son included, which I have never dreamed possible in a public high school. The technologies that they offer here are far-reaching in all disciplines. The students use computers in their daily life to perform homework tasks, to explore new avenues. The very rich technical and academic program here at the academy is unparalleled in other schools due to technology, largely due to technology, that is, and the dedication of the staff here.

The parents work very closely with the Academy. Parents organization, we have probably 75 to 80 percent regular participation with parents and faculty and administration of the school trying to help supplement their program here with another dimension, if you will, in providing outside programs. But we work very closely with the faculty and administration to, again, bring additional programs for the students.

THE PRESIDENT: Thank you very much, Lou, and thank you, Mr. Calles. I want to just comment very briefly. I think if every school in America had 75 to 80 percent parental participation, we wouldn't have half the problems we've got and we'd have a lot more computers in the schools a lot faster. I thank you for that.

And I wanted to say to you, Mr. Calles, one of the things that you said that meant a great deal to me personally was that you thought it had helped at home, too -- the atmosphere of education. I mean, I gather you feel that you have a higher level of security about your child's education and you feel more involved in it because of this technology project.

Q That's right because sometimes they start their homework in the school and then finish it at home. We can share the computer. They teach us, also, because I haven't had -- computer. And now I have a computer also, and my wife also, and my brother also. So it's a change in the family.

THE VICE PRESIDENT: What do you use it for?

Q Well, my wife, sometimes she types some letters on it. And sometimes I want to type something -- and communicate with -- through the e-mail. So we are in touch.

THE PRESIDENT: Do you have a lot of parents who communicate through e-mail now?

Q Yes, Mr. President. It's really forged -- it's broken down the walls, and now it gives me the opportunity to go into their home. A lot of our parents work -- single-parent families -- they don't have time to come to school during the day. Now I'm able to go into their home at nighttime and say, guess what, Jose was a problem in school today and I want it to stop. (Laughter.)

THE PRESIDENT: I'd like to call on Jim Cohen, the Vice Chairman of Bell Atlantic. Bell Atlantic has been an indispensable part in this project here at Christopher Columbus in Union City. I want to thank you, but I'd like for you to talk about your role, why you did it, and what you think the future holds.

Q Thanks, Mr. President, Mr. Vice President. I'm absolutely delighted and very proud to be here representing the hundreds of Bell Atlantic people who have worked directly on this project and the thousands in our nation's capitol on up to Northern New Jersey who have worked on these technologies.

I think what we have heard so far today and what we've seen is actually the product of four or five very important elements that form a strong partnership, an enduring partnership that in the end has a singular objective -- delivering improved education to our children.

From my perspective, it does indeed begin with a vision of people like Dr. John Greco from the Bergen Academy; people like Congressman Bob Menendez with whom we worked on the state level back in 1991 and 1992 for fiber optics investment; Tom Highton, superintendent; Bob Fazio, obviously, the education leader of this building; and hundreds and thousands of others. Step one, a genuine vision.

Step two, a plan. Now this is not a plan developed by Bell Atlantic or anyone else in the private sector. It's a plan developed by the community as a product of that vision.

Three, the plan and its implementation and all the commitment, the support and the participation of the community itself, of the education community here in Union City, and of the parents that we've heard from, and many others.

Fourth, as you've seen quite clearly this morning, it also involves as an absolutely key element, the energy and enthusiasm of the students who in fact do see the walls broken down, do see connections throughout the globe, are able to communicate, are able to compare their work, are able to access not just the text and the voice examples that we've seen here so far, but ultimately will be able to access live video, digital video and will be able to converse with one another, not just by voice or data or e-mail, but in fact by video. The -- suddenly becoming reality.

And, finally, in exactly this sequence the private sector is part of the partnership. The private sector, obviously, in the case of Bell Atlantic here, and as you suggested earlier, Mr. President, has provided some of the funding. We have provided some of the training. But I think most importantly we have provided a very committed group of Bell Atlantic people here in the local and state community who have been part of their community in a long-term commitment and partnership to the success of this particular application.

And then, obviously, we have provided the technologies to make these connections so that students can be connected to data bases, to the kinds of applications that we saw earlier. And I would emphasize from a parental point of view, as Mr. Calles suggested, we've provided

connections at home. And with everything that we're doing, it seems to me that connection through a high-capacity ISDN line to individual homes allows the kind of communication.

We're not only breaking through physical walls, we're breaking through the walls of time that say education ends at 3:00 p.m. and parents are not involved. This is a very, very important connection. And, of course, we've maintained that connection for three years so that the students who were originally in 7th grade now in 9th grade have the connections, have the computers and continue this education process.

So, finally, I guess I would just point out that the obvious, that while this is a wonderful and striking example of improvement in education, it is literally just the beginning. And you have not mentioned this, but in the Communications Act that you signed last week, under the direction of Reed Hunt and the FCC there is a very promising new initiative to provide these kinds of services to achieve the objective that you outlined, provide services to education institutions and to libraries, and in the final analysis creating, I think, wonderful successes in education and the bottom line, as someone pointed out earlier, allowing students to learn, teachers to coach and facilitate, principals to be the education leaders, and allowing students to actually have fun learning.

VICE PRESIDENT GORE: I just wanted to add a point here, because the President insisted that that language be added to the bill and be a part of the final bill, or else he would veto it.

THE PRESIDENT: Explain to everybody what is in it, though, so that --

VICE PRESIDENT GORE: The telecommunications bill, as Mr. Cullen just described, will complete the Information Superhighway much sooner than anyone thought was possible. And the President insisted on a provision in that legislation that allows for discounts to schools and libraries to connect to the Information Superhighway, and allows for rate-based designs that make it possible to connect schools very cheaply.

Now, this is really a one-two punch by the President. The first punch -- well, the goal -- outlining the goal was the main thing. But the first punch was getting the telecommunications bill enacted and signed into law after a long, long struggle. The second punch is here today. These Challenge grants make it possible, with \$2 billion from the federal government already in the budget, to build the kind of public-private partnerships that Bell Atlantic has entered into with local government and others -- the school district here in New Jersey -- and to take this model that's produced this spectacular result here, the Bergen Academy, and take it nationwide.

Now, Jim, don't you think that your counterparts in the communications industry, and Bell Atlantic, itself, are going to be interested in rushing to form these partnerships, to get these schools connected one by one?

Q Absolutely. I think it's fair to say that we have been doing a great deal of that. I'm a New Jerseyan and former president here in New Jersey, and I can assure that we've done

a lot of that here in New Jersey. But getting that into the communications law that was signed is a great additional stimulus.

And in addition to everything that you've mentioned, Mr. Vice President, it also brings more private participants in, because in order to create rates that are attractive for schools and libraries, it gets funding from all telecommunications providers in this marketplace. So with everyone in, and relatively small funding from each, this is a tremendous stimulus to achieving the objectives.

THE PRESIDENT: Jim, I want to hear from Congressman Menendez and Senator Lautenberg and the Mayor and Secretary Riley about their perspectives on this and their involvement with it, because they all have been involved. But just before I do, I'd like to ask you to just touch once more on something that has come up several times today that comes up in other places where I've been.

I was in Concord, New Hampshire, several days ago, two days after they connected all the schools in their community -- and that is the challenge of making sure that children have access and their parents have access, to computers and to being hooked in when they're at home. How important do you think that is? Could you say again very briefly what steps you took to do that, just to emphasize that for the people that are listening here because this is one thing that's going to require an extra amount of effort in several places in the United States to get this done. And so if you could just -- and maybe, Bob, you might want to comment a little bit -- but if you could just talk briefly about it and then we'll go to our public officials.

Q In a few words, Mr. President, the vision of the Information Superhighway is much broader and much bigger than what we see here today, but it is suggested by the involvement and the connection of parents. And the vision of the Information Superhighway is to do all of the things that we've just talked about -- targeting the schools, K to 12; targeting the libraries -- and, in addition, provide a reasonable set of long-term ground rules and incentives for companies like Bell Atlantic and others in the communications industry to invest in this country, in our networks, in fiber, in software platforms; and deliver it not only to the schools, as we're seeing today, but most importantly, as you're suggesting, deliver it very rapidly to homes, to small businesses.

Large businesses have this capability today. Obviously, we need it to homes, we need it to businesses, as well and, I would just point out, the benefits extend well beyond education. The benefits extend to health care services and many other things, as well. So that this, in the final analysis, will be bigger than we're suggesting here; will involve parents and will, in effect, leave people literally on-line for voice data and video 24 hours a day.

Mr. Fazio may have problems from midnight to 6:00 a.m. with some of that, but it is technically possible. (Laughter.)

THE PRESIDENT: But it's important to hammer that home. I mean, the ultimate vision of this is that the reach of the Information Superhighway will equal the reach of telephones and

television here. It will be in every house.

Q Mr. President, our good Mayor Walter is in the process right now of giving us the public library next door to where you'll be visiting in a few minutes. In our vision here, to piggy-back off and replicate this school throughout our district, is to take that public library and give it accessibility to parents. We need to get computers in that library, keep it open until midnight, get these children off the street, working on-line, having a safe haven, a place where they can go and work in a safe environment. And that's our goal and we're in the process right now of putting that plan together.

THE PRESIDENT: Congressman and Senator and Mayor?

CONGRESSMAN MENENDEZ: Well, Mr. President, Mr. Vice President, we welcome you here not only today, but we welcome your challenge and your vision for the next millennium. And that's what this discussion is all about. And we've only seen the tip of the iceberg of what is possible. The possibilities are only limited by our imagination.

And so the vision that you present for us today, and that the Vice President has worked so ably with you, is a vision understanding that we can make our students today be competitive in the global economy of tomorrow. The new millennium sounds so far away, but we are four short years away from it. And the fact of the matter is, is that a vision unmatched by action remains only a dream. Today we've seen some of the possibility. And here in New Jersey, Mr. President, Mr. Vice President, at the Christopher Columbus School, at the Bergen Academy, we're not only willing to take a ride with you on the Superhighway, we're already on the way and we're willing to work with you to make sure that the rest of the country joins us.

THE PRESIDENT: Great. Senator?

SENATOR LAUTENBERG: Mr. President, Mr. Vice President, obviously, you've enforced your view of what America ought to look like in terms of education over many, many occasions. And your being here today confirms that belief that we ought to continue to expand our -- for our young people now.

I come out of the computer business. Few in New Jersey realize that in the United States Senate we have two Hall of Famers: Bill Bradley, of course, is well known; but I'm a member of the information processing hall of fame -- (laughter.)

Mr. President, I don't have a lot of young people chasing me for autographs, but maybe some day.

But what I saw in my first days in the United States Senate -- this was 1983 -- persuaded me to write a bill called the Computer Education Bill, that assured that every classroom would have screens and computers available for the student. Now, we're talking about something way beyond that, as this point. But I went to a school in Newark, New Jersey, where there was a terrible deficiency between the number of students and computer availability. And I saw one youngster who was a difficult behavioral problem in class, and this boy became engaged with the

computer, able to move at his own pace, not feel left out because he was behind, able to accelerate past some of the other students in his particular specialty. And they said it changed his whole mode of being.

And it told me something, that the young people that we have today in America are as fine a group as this country has ever seen. They think, they're alert, they're way ahead of their counterparts at a period of time that I remember. The fact of the matter is, given the tools, the computer availability, the expanse of information will propel these young people into leadership roles, Mr. President. I can feel them almost breathing down my back for my job -- (laughter) -- I assume Congressman Menendez may even feel it there. But we have so much talent and so much ability.

Mr. President and Mr. Vice President, I want to thank both of you for your initiatives, for your vision about what America can be as we approach the next century. This Challenge grant tells it all in my view, because you've talked about Goals 2000 and other programs that enhance the educational opportunity in America, and that's where we're going to win out. It's more powerful than oil or mineral resources. It's the minds of our young people, and if we can continue as we have to provide the stimulation nutrition to develop those minds, Mr. President, you're going to be remembered for many things, but this will be among your crowning achievements. And thank you for being here.

THE PRESIDENT: Mayor, I'd like to let you speak last, so let me interject here and call on Secretary Riley out there in cyberspace to ask if he has any comments.

SECRETARY RILEY: Thank you, Mr. President. Let me say just a word about the role of government. I think government clearly has an important role in what we're talking about. One is a role of leadership, and then a role of support, and then a role of getting out of the way. I think it's so important for government to challenge this country as you're doing Mr. President, Mr. Vice President, just by this conference and other things, to share the vision that if we're going to have real education in the future it's going to have to involve technology, literacy and then some.

The other thing in terms of support, I think it's so important for government to play a role in pulling partners together. Other levels of government, private industry, as you discussed there, all of the other factors of the community with education, pulling those factors together and then providing what support we can. And then, as I say, getting out of the way. I'm pleased that all of the programs that have been started under your administration -- Goals 2000, School-To-Work, all of the reauthorizations of Title I, Safe and Drug Free Schools, challenge grants, whatever -- all of them have plenty of room for local people to use those funds for technology. I think that's very important.

THE PRESIDENT: Thank you very much. And thank you for your leadership to make sure that's exactly what we did.

Mr. Mayor?

MAYOR WALTER: Mr. President, Mr. Vice President, welcome to Union City. I want to thank you for the initiative of talking about government getting involved in our Informational Highway. We in Union City a long time ago decided that a large corporation that needs to be tapped is local government. Local government has a major role in working with school boards. And you who travel our country need to remind every mayor that it is their job and their obligation to work along with the heads of the school board, like I did with Dave Anton, our president of our school board -- working together to meet the challenges to help get it going, and then pull away, because sometimes we in government find reasons why things don't work and don't spend as much time making it work.

Mr. Fazio just recently spoke about an initiative we hope to get going with our libraries. We talked about it with the president of the school board. We envision changing our libraries to a different concept, a concept open on a regular basis, as we've done with our schools, and letting everything from our youngest of children to our senior citizens to come and to enjoy that highway.

And how about the job creativity of having some of our students who obviously talk about teaching their parents, help teach our senior citizens and help other residents -- help me learn about what's out there on the computer? So I think if we start to work with our libraries and local government and see them as areas where we can bring in all of our people and tie everyone in -- and remember, we learn an awful lot from our children. And I thank you and the Vice President for caring about our children.

THE PRESIDENT: Thank you.

Mr. Vice President?

THE VICE PRESIDENT: Well, it's an exciting demonstration that we've had here today, and it's a sign of things to come in the near-term future. And as the President said, not too long from now every school, every classroom, every library will be hooked up to the Information Superhighway. And then, not too long after that, every home will be.

We've been dedicated to a principle called "universal service" since the beginning of the telephone era. And almost all homes have telephone service. But that definition of universal service has changed over the years from a party line to a single line. And it's about to change again. Universal service in the future has to mean a connection that will make it possible to send pictures like the ones we've been seeing from Bergen Academy, and e-mail and the communication that makes possible parent-teacher conferences over the computer connection line.

The President made possible the legislation, signed it, that is going to lead this vision into reality. And today, with these challenge grants, he's facilitating the formation of these public-private partnerships in every state and in every community to hasten the day when every school can have the kind of exciting additions to their curriculum that we've seen from these students here at Christopher Columbus and Bergen Academy.

So, for my part, I just want to thank everybody for showing us firsthand the future.

Q Mr. President, Mr. Vice President, our friends from Bergen Academy would like for you to come join us in our auditorium across the street to continue on with this wonderful conversation.

THE PRESIDENT: We will do that. But before we get up from this table I want to leave you with one final thought to muse about, and I hope not only all of you, but all the people who will read or see about this -- as President, I have said repeatedly, I believe -- when it comes to the American people I have to great objectives, and that is to do everything that we can do to make the American Dream available to every person who is willing to work for it; and secondly, to do it in a way that brings the American people together instead of divide them.

Technology has been a big part of this debate. Technology clearly here is uniting us and moving us forward. Erika said it -- it doesn't matter where you come from, doesn't matter who your family is -- and Luciano said it -- you can be an immigrant family, you can bring a computer there, you can have access to the information. People, all people can have high expectations for themselves, no matter what their income background, no matter what their roots are, they can do that. This is bringing us together and moving us forward.

If you look beyond the schooling years, there are lot of people who are afraid that technology is doing the reverse. In our economy, where we have global information and global markets and breath-taking changes in productivity, you read every day -- and I have talked about it in my State of the Union address -- we have almost eight million new jobs, but half the country hasn't gotten a raise and a lot of people are wondering what will happen to them if their big company becomes a smaller company because of information productivity.

What I want the American people to see about this is that when we complete the work of bringing the Information Superhighway to all education and to all of our people. It will empower everybody and it will close the circle and it will enable us to use these great new forces of the modern world to bring all of America together and to move all of America forward.

You can't turn around and go back. This will carry us forward. And I think it's a very, very great thing for our country. And some day, when Erika is about our age thinking about her children and her grandchildren, we will look upon what you are doing as the beginning of great new era of American society that goes even far beyond education and proves that we can make this technology our friend and reinforce the American Dream and give everybody a chance to live up to their own dreams.

And you are real pioneers, and I'm very grateful to you. Thank you, everybody.
(Applause.)

END

11:45 A.M. EST

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Remarks and a Question-and-Answer Session With the Students and Faculty at Moscow State University May 31, 1988

The President. Thank you, Rector Logunov, and I want to thank all of you very much for a very warm welcome. It's a great pleasure to be here at Moscow State University, and I want to thank you all for turning out. I know you must be very busy this week, studying and taking your final examinations. So, let me just say *zhelayu vam uspekha* [I wish you success]. Nancy couldn't make it today because she's visiting Leningrad, which she tells me is a very beautiful city, but she, too, says hello and wishes you all good luck.

Let me say it's also a great pleasure to once again have this opportunity to speak directly to the people of the Soviet Union. Before I left Washington, I received many heartfelt letters and telegrams asking me to carry here a simple message, perhaps, but also some of the most important business of this summit: It is a message of peace and good will and hope for a growing friendship and closeness between our two peoples.

As you know, I've come to Moscow to meet with one of your most distinguished graduates. In this, our fourth summit, General Secretary Gorbachev and I have spent many hours together, and I feel that we're getting to know each other well. Our discussions, of course, have been focused primarily on many of the important issues of the day, issues I want to touch on with you in a few moments. But first I want to take a little time to talk to you much as I would to any group of university students in the United States. I want to talk not just of the realities of today but of the possibilities of tomorrow.

Standing here before a mural of your revolution, I want to talk about a very different revolution that is taking place right now, quietly sweeping the globe without bloodshed or conflict. Its effects are peaceful, but they will fundamentally alter our world, shatter old assumptions, and reshape our lives. It's easy to underestimate because it's not accompanied by banners or fanfare. It's been called the technological or informa-

tion revolution, and as its emblem, one might take the tiny silicon chip, no bigger than a fingerprint. One of these chips has more computing power than a roomful of old-style computers.

As part of an exchange program, we now have an exhibition touring your country that shows how information technology is transforming our lives—replacing manual labor with robots, forecasting weather for farmers, or mapping the genetic code of DNA for medical researchers. These microcomputers today aid the design of everything from houses to cars to spacecraft; they even design better and faster computers. They can translate English into Russian or enable the blind to read or help Michael Jackson produce on one synthesizer the sounds of a whole orchestra. Linked by a network of satellites and fiber-optic cables, one individual with a desktop computer and a telephone commands resources unavailable to the largest governments just a few years ago.

Like a chrysalis, we're emerging from the economy of the Industrial Revolution—an economy confined to and limited by the Earth's physical resources—into, as one economist titled his book, "The Economy in Mind," in which there are no bounds on human imagination and the freedom to create is the most precious natural resource. Think of that little computer chip. Its value isn't in the sand from which it is made but in the microscopic architecture designed into it by ingenious human minds. Or take the example of the satellite relaying this broadcast around the world, which replaces thousands of tons of copper mined from the Earth and molded into wire. In the new economy, human invention increasingly makes physical resources obsolete. We're breaking through the material conditions of existence to a world where man creates his own destiny. Even as we explore the most advanced reaches of science, we're returning to the age-old wisdom of our culture, a wisdom contained in the book of Genesis in

the Bible: In the beginning was the spirit, and it was from this spirit that the material abundance of creation issued forth.

But progress is not foreordained. The key is freedom—freedom of thought, freedom of information, freedom of communication. The renowned scientist, scholar, and founding father of this university, Mikhail Lomonosov, knew that. "It is common knowledge," he said, "that the achievements of science are considerable and rapid, particularly once the yoke of slavery is cast off and replaced by the freedom of philosophy." You know, one of the first contacts between your country and mine took place between Russian and American explorers. The Americans were members of Cook's last voyage on an expedition searching for an Arctic passage; on the island of Unalaska, they came upon the Russians, who took them in, and together with the native inhabitants, held a prayer service on the ice.

The explorers of the modern era are the entrepreneurs, men with vision, with the courage to take risks and faith enough to brave the unknown. These entrepreneurs and their small enterprises are responsible for almost all the economic growth in the United States. They are the prime movers of the technological revolution. In fact, one of the largest personal computer firms in the United States was started by two college students, no older than you, in the garage behind their home. Some people, even in my own country, look at the riot of experiment that is the free market and see only waste. What of all the entrepreneurs that fail? Well, many do, particularly the successful ones; often several times. And if you ask them the secret of their success, they'll tell you it's all that they learned in their struggles along the way; yes, it's what they learned from failing. Like an athlete in competition or a scholar in pursuit of the truth, experience is the greatest teacher.

And that's why it's so hard for government planners, no matter how sophisticated, to ever substitute for millions of individuals working night and day to make their dreams come true. The fact is, bureaucracies are a problem around the world. There's an old story about a town—it could be anywhere—with a bureaucrat who is known to be a good-for-nothing, but he

somehow had always hung on to power. So one day, in a town meeting, an old woman got up and said to him: "There is a folk legend here where I come from that when a baby is born, an angel comes down from heaven and kisses it on one part of its body. If the angel kisses him on his hand, he becomes a handyman. If he kisses him on his forehead, he becomes bright and clever. And I've been trying to figure out where the angel kissed you so that you should sit there for so long and do nothing." [Laughter]

We are seeing the power of economic freedom spreading around the world. Places such as the Republic of Korea, Singapore, Taiwan have vaulted into the technological era, barely pausing in the industrial age along the way. Low-tax agricultural policies in the subcontinent mean that in some years India is now a net exporter of food. Perhaps most exciting are the winds of change that are blowing over the People's Republic of China, where one-quarter of the world's population is now getting its first taste of economic freedom. At the same time, the growth of democracy has become one of the most powerful political movements of our age. In Latin America in the 1970's, only a third of the population lived under democratic government; today over 90 percent does. In the Philippines, in the Republic of Korea, free, contested, democratic elections are the order of the day. Throughout the world, free markets are the model for growth. Democracy is the standard by which governments are measured.

We Americans make no secret of our belief in freedom. In fact, it's something of a national pastime. Every 4 years the American people choose a new President, and 1988 is one of those years. At one point there were 13 major candidates running in the two major parties, not to mention all the others, including the Socialist and Libertarian candidates—all trying to get my job. About 1,000 local television stations, 8,500 radio stations, and 1,700 daily newspapers—each one an independent, private enterprise, fiercely independent of the Government—report on the candidates, grill them in interviews, and bring them togeth-

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for debates. In the end, the people vote; they decide who will be the next President. But freedom doesn't begin or end with elections.

Go to any American town, to take just an example, and you'll see dozens of churches, representing many different beliefs—in many places, synagogues and mosques—and you'll see families of every conceivable nationality worshipping together. Go into any schoolroom, and there you will see children being taught the Declaration of Independence, that they are endowed by their Creator with certain unalienable rights—among them life, liberty, and the pursuit of happiness—that no government can justly deny; the guarantees in their Constitution for freedom of speech, freedom of assembly, and freedom of religion. Go into any courtroom, and there will preside an independent judge, beholden to no government power. There every defendant has the right to a trial by a jury of his peers, usually 12 men and women—common citizens; they are the ones, the only ones, who weigh the evidence and decide on guilt or innocence. In that court, the accused is innocent until proven guilty, and the word of a policeman or any official has no greater legal standing than the word of the accused. Go to any university campus, and there you'll find an on, sometimes heated discussion of the problems in American society and what can be done to correct them. Turn on the television, and you'll see the legislature conducting the business of government right there before the camera, debating and voting on the legislation that will become the law of the land. March in any demonstration, and there are many of them; the people's right of assembly is guaranteed in the Constitution and protected by the police. Go into any union hall, where the members know their right to strike is protected by law. As a matter of fact, one of the many jobs I had before this one was being president of a union, the Screen Actors Guild. I led my union out on strike, and I'm proud to say we won.

But freedom is more even than this. Freedom is the right to question and change the established way of doing things. It is the continuing revolution of the marketplace. It is the understanding that allows

us to recognize shortcomings and seek solutions. It is the right to put forth an idea, scoffed at by the experts, and watch it catch fire among the people. It is the right to dream—to follow your dream or stick to your conscience, even if you're the only one in a sea of doubters. Freedom is the recognition that no single person, no single authority or government has a monopoly on the truth, but that every individual life is infinitely precious, that every one of us put on this world has been put there for a reason and has something to offer.

America is a nation made up of hundreds of nationalities. Our ties to you are more than ones of good feeling; they're ties of kinship. In America, you'll find Russians, Armenians, Ukrainians, peoples from Eastern Europe and Central Asia. They come from every part of this vast continent, from every continent, to live in harmony, seeking a place where each cultural heritage is respected, each is valued for its diverse strengths and beauties and the richness it brings to our lives. Recently, a few individuals and families have been allowed to visit relatives in the West. We can only hope that it won't be long before all are allowed to do so and Ukrainian-Americans, Baltic-Americans, Armenian-Americans can freely visit their homelands, just as this Irish-American visits his.

Freedom, it has been said, makes people selfish and materialistic, but Americans are one of the most religious peoples on Earth. Because they know that liberty, just as life itself, is not earned but a gift from God, they seek to share that gift with the world. "Reason and experience," said George Washington in his Farewell Address, "both forbid us to expect that national morality can prevail in exclusion of religious principle. And it is substantially true, that virtue or morality is a necessary spring of popular government." Democracy is less a system of government than it is a system to keep government limited, unintrusive; a system of constraints on power to keep politics and government secondary to the important things in life, the true sources of value found only in family and faith.

But I hope you know I go on about these things not simply to extol the virtues of my

own country but to speak to the true greatness of the heart and soul of your land. Who, after all, needs to tell the land of Dostoyevski about the quest for truth, the home of Kandinski and Scriabin about imagination, the rich and noble culture of the Uzbek man of letters Alisher Navoi about beauty and heart? The great culture of your diverse land speaks with a glowing passion to all humanity. Let me cite one of the most eloquent contemporary passages on human freedom. It comes, not from the literature of America, but from this country, from one of the greatest writers of the 20th century, Boris Pasternak, in the novel "Dr. Zhivago." He writes: "I think that if the beast who sleeps in man could be held down by threats—any kind of threat, whether of jail or of retribution after death—then the highest emblem of humanity would be the lion tamer in the circus with his whip, not the prophet who sacrificed himself. But this is just the point—what has for centuries raised man above the beast is not the cudgel, but an inward music—the irresistible power of unarmed truth."

The irresistible power of unarmed truth. Today the world looks expectantly to signs of change, steps toward greater freedom in the Soviet Union. We watch and we hope as we see positive changes taking place. There are some, I know, in your society who fear that change will bring only disruption and discontinuity, who fear to embrace the hope of the future—sometimes it takes faith. It's like that scene in the cowboy movie "Butch Cassidy and the Sundance Kid," which some here in Moscow recently had a chance to see. The posse is closing in on the two outlaws, Butch and Sundance, who find themselves trapped on the edge of a cliff, with a sheer drop of hundreds of feet to the raging rapids below. Butch turns to Sundance and says their only hope is to jump into the river below, but Sundance refuses. He says he'd rather fight it out with the posse, even though they're hopelessly outnumbered. Butch says that's suicide and urges him to jump, but Sundance still refuses and finally admits, "I can't swim." Butch breaks up laughing and says, "You crazy fool, the fall will probably kill you." And, by the way, both Butch and Sundance

made it, in case you didn't see the movie. I think what I've just been talking about is *perestroika* and what its goals are.

But change would not mean rejection of the past. Like a tree growing strong through the seasons, rooted in the Earth and drawing life from the Sun, so, too, positive change must be rooted in traditional values—in the land, in culture, in family and community—and it must take its life from the eternal things, from the source of all life, which is faith. Such change will lead to new understandings, new opportunities, to a broader future in which the tradition is not supplanted but finds its full flowering. That is the future beckoning to your generation.

At the same time, we should remember that reform that is not institutionalized will always be insecure. Such freedom will always be looking over its shoulder. A bird on a tether, no matter how long the rope, can always be pulled back. And that is why, in my conversation with General Secretary Gorbachev, I have spoken of how important it is to institutionalize change—to put guarantees on reform. And we've been talking together about one sad reminder of a divided world: the Berlin Wall. It's time to remove the barriers that keep people apart.

I'm proposing an increased exchange program of high school students between our countries. General Secretary Gorbachev mentioned on Sunday a wonderful phrase you have in Russian for this: "Better to see something once than to hear about it a hundred times." Mr. Gorbachev and I first began working on this in 1985. In our discussion today, we agreed on working up to several thousand exchanges a year from each country in the near future. But not everyone can travel across the continents and oceans. Words travel lighter, and that's why we'd like to make available to this country more of our 11,000 magazines and periodicals and our television and radio shows that can be beamed off a satellite in seconds. Nothing would please us more than for the Soviet people to get to know us better and to understand our way of life.

Just a few years ago, few would have imagined the progress our two nations have made together. The INF treaty, which Gen-

eral Secretary Gorbachev and I signed last December in Washington and whose instruments of ratification we will exchange tomorrow—the first true nuclear arms reduction treaty in history, calling for the elimination of an entire class of U.S. and Soviet nuclear missiles. And just 16 days ago, we saw the beginning of your withdrawal from Afghanistan, which gives us hope that soon the fighting may end and the healing may begin and that that suffering country may find self-determination, unity, and peace at long last.

It's my fervent hope that our constructive cooperation on these issues will be carried on to address the continuing destruction and conflicts in many regions of the globe and that the serious discussions that led to the Geneva accords on Afghanistan will help lead to solutions in southern Africa, Ethiopia, Cambodia, the Persian Gulf, and Central America. I have often said: Nations do not distrust each other because they are armed; they are armed because they distrust each other. If this globe is to live in peace and prosper, if it is to embrace all the possibilities of the technological revolution, then nations must renounce, once and for all, the right to an expansionist foreign policy. Peace between nations must be an enduring goal, not a tactical stage in a continuing conflict.

I've been told that there's a popular song in your country—perhaps you know it—whose evocative refrain asks the question, "Do the Russians want a war?" In answer it says: "Go ask that silence lingering in the air, above the birch and poplar there; beneath those trees the soldiers lie. Go ask my mother, ask my wife; then you will have to ask no more, 'Do the Russians want a war?'" But what of your one-time allies? What of those who embraced you on the Elbe? What if we were to ask the watery graves of the Pacific or the European battlefields where America's fallen were buried far from home? What if we were to ask their mothers, sisters, and sons, do Americans want war? Ask us, too, and you'll find the same answer, the same longing in every heart. People do not make wars; governments do. And no mother would ever willingly sacrifice her sons for territorial gain, for economic advantage, for ideology.

A people free to choose will always choose peace.

Americans seek always to make friends of old antagonists. After a colonial revolution with Britain, we have cemented for all ages the ties of kinship between our nations. After a terrible Civil War between North and South, we healed our wounds and found true unity as a nation. We fought two world wars in my lifetime against Germany and one with Japan, but now the Federal Republic of Germany and Japan are two of our closest allies and friends.

Some people point to the trade disputes between us as a sign of strain, but they're the frictions of all families, and the family of free nations is a big and vital and sometimes boisterous one. I can tell you that nothing would please my heart more than in my lifetime to see American and Soviet diplomats grappling with the problem of trade disputes between America and a growing, exuberant, exporting Soviet Union that had opened up to economic freedom and growth.

And as important as these official people-to-people exchanges are, nothing would please me more than for them to become unnecessary, to see travel between East and West become so routine that university students in the Soviet Union could take a month off in the summer and, just like students in the West do now, put packs on their backs and travel from country to country in Europe with barely a passport check in between. Nothing would please me more than to see the day that a concert promoter in, say, England could call up a Soviet rock group, without going through any government agency, and have them playing in Liverpool the next night. Is this just a dream? Perhaps, but it is a dream that is our responsibility to have come true.

Your generation is living in one of the most exciting, hopeful times in Soviet history. It is a time when the first breath of freedom stirs the air and the heart beats to the accelerated rhythm of hope, when the accumulated spiritual energies of a long silence yearn to break free. I am reminded of the famous passage near the end of Gogol's "Dead Souls." Comparing his nation to a speeding troika, Gogol asks what will be its

destination. But he writes, "There was no answer save the bell pouring forth marvelous sound."

We do not know what the conclusion will be of this journey, but we're hopeful that the promise of reform will be fulfilled. In this Moscow spring, this May 1988, we may be allowed that hope: that freedom, like the fresh green sapling planted over Tolstoy's grave, will blossom forth at last in the rich fertile soil of your people and culture. We may be allowed to hope that the marvelous sound of a new openness will keep rising through, ringing through, leading to a new world of reconciliation, friendship, and peace.

Thank you all very much, and *da blagoslovit vas gospod*—God bless you.

Mr. Logunov. Dear friends, Mr. President has kindly agreed to answer your questions. But since he doesn't have too much time, only 15 minutes—so, those who have questions, please ask them.

Strategic Arms Reductions

Q. And this is a student from the history faculty, and he says that he's happy to welcome you on behalf of the students of the university. And the first question is that the improvement in the relations between the two countries has come about during your tenure as President, and in this regard he would like to ask the following question. It is very important to get a handle on the question of arms control and, specifically, the limitation of strategic arms. Do you think that it will be possible for you and the General Secretary to get a treaty on the limitation of strategic arms during the time that you are still President?

The President. Well, the arms treaty that is being negotiated now is the so-called START treaty, and it is based on taking the intercontinental ballistic missiles and reducing them by half, down to parity between our two countries. Now, this is a much more complicated treaty than the INF treaty, the intermediate-range treaty, which we have signed and which our two governments have ratified and is now in effect. So, there are many things still to be settled. You and we have had negotiators in Geneva for months working on various points of this treaty. Once we had hoped that maybe, like

the INF treaty, we would have been able to sign it here at this summit meeting. It is not completed; there are still some points that are being debated. We are both hopeful that it can be finished before I leave office, which is in the coming January, but I assure you that if it isn't—I assure you that I will have impressed on my successor that we must carry on until it is signed. My dream has always been that once we've started down this road, we can look forward to a day—you can look forward to a day—when there will be no more nuclear weapons in the world at all.

Young People

Q. The question is: The universities influence public opinion, and the student wonders how the youths have changed since the days when you were a student up until now?

The President. Well, wait a minute. How you have changed since the era of my own youth?

Q. How just students have changed, the youth have changed. You were a student. [Laughter] At your time there were one type. How they have changed?

The President. Well, I know there was a period in our country when there was a very great change for the worse. When I was Governor of California, I could start a riot just by going to a campus. But that has all changed, and I could be looking out at an American student body as well as I'm looking out here and would not be able to tell the difference between you.

I think that back in our day—I did happen to go to school, get my college education in a unique time; it was the time of the Great Depression, when, in a country like our own, there was 25-percent unemployment and the bottom seemed to have fallen out of everything. But we had—I think what maybe I should be telling you from my point here, because I graduated in 1932, that I should tell you that when you get to be my age, you're going to be surprised how much you recall the feelings you had in these days here and that—how easy it is to understand the young people because of your own having been young once. You know an awful lot more about being

young than I do.

And I think there is a people here with a awareness of what you want the world to be. As I said the world were half had held and then them just couldn't tell which way they were going. I know each other well that of dressed in

And of young things that illustrate after I get me back ordinary decomposition for 25 years degree [Laughter]

Regional

Q. Mr. President mentioned the threat of differences between the conflicts

The President. Africa, its independence African of a civil there, and one side troops over the with one. When the colony a tion seized

young than you do about being old. [Laughter]

And I think there is a seriousness, I think there is a sense of responsibility that young people have, and I think that there is an awareness on the part of most of you about what you want your adulthood to be and what the country you live in—you want it to be. And I have a great deal of faith. I said the other day to 76 students—they were half American and half Russian. They had held a conference here and in Finland and then in the United States, and I faced them just the other day, and I had to say—I couldn't tell the difference looking at them, which were which, but I said one line to them. I said I believe that if all the young people of the world today could get to know each other, there would never be another war. And I think that of you. I think that of the other students that I've addressed in other places.

And of course, I know also that you're young and, therefore, there are certain things that at times take precedence. I'll illustrate one myself. Twenty-five years after I graduated, my alma mater brought me back to the school and gave me an honorary degree. And I had to tell them they compounded a sense of guilt I had nursed for 25 years because I always felt the first degree they gave me was honorary. [Laughter] You're great! Carry on.

Regional Conflicts

Q. Mr. President, you have just mentioned that you welcome the efforts—settlement of the Afghanistan question and the difference of other regional conflicts. What conflicts do you mean? Central America conflicts, Southeast Asian, or South African?

The President. Well, for example, in South Africa, where Namibia has been promised its independence as a nation—another new African nation. But it is impossible because of a civil war going on in another country there, and that civil war is being fought on one side by some 30,000 to 40,000 Cuban troops who have gone from the Americas over there and are fighting on one side with one kind of authoritative government. When that country was freed from being a colony and given its independence, one faction seized power and made itself the gov-

ernment of that nation. And leaders of another—seeming the majority of the people had wanted, simply, the people to have the right to choose the government that they wanted, and that is the civil war that is going on. But what we believe is that those foreign soldiers should get out and let them settle it, let the citizens of that nation settle their problems.

And the same is true in Nicaragua. Nicaragua has been—Nicaragua made a promise. They had a dictator. There was a revolution, there was an organization that—and was aided by others in the revolution, and they appealed to the Organization of American States for help in getting the dictator to step down and stop the killing. And he did. But the Organization of American States had asked, what are the goals of the revolution? And they were given in writing, and they were the goals of pluralistic society, of the right of unions and freedom of speech and press and so forth and free elections—a pluralistic society. And then the one group that was the best organized among the revolutionaries seized power, exiled many of the other leaders, and has its own government, which violated every one of the promises that had been made. And here again, we want—we're trying to encourage the getting back those—or making those promises come true and letting the people of that particular country decide their fate.

Soviet MIA's in Afghanistan

Q. Esteemed Mr. President, I'm very much anxious and concerned about the destiny of 310 Soviet soldiers being missing in Afghanistan. Are you willing to help in their search and their return to the motherland?

The President. Very much so. We would like nothing better than that.

U.S. Constitution

Q. The reservation of the inalienable rights of citizens guaranteed by the Constitution faces certain problems; for example, the right of people to have arms, or for example, the problem appears, an evil appears whether spread of pornography or narcotics is compatible with these rights. Do you believe that these problems are just

unavoidable problems connected with democracy, or they could be avoided?

The President. Well, if I understand you correctly, this is a question about the inalienable rights of the people—does that include the right to do criminal acts—for example, in the use of drugs and so forth? No. No, we have a set of laws. I think what is significant and different about our system is that every country has a constitution, and most constitutions or practically all of the constitutions in the world are documents in which the government tells the people what the people can do. Our Constitution is different, and the difference is in three words; it almost escapes everyone. The three words are, "We the people." Our Constitution is a document in which we the people tell the Government what its powers are. And it can have no powers other than those listed in that document. But very carefully, at the same time, the people give the government the power with regard to those things which they think would be destructive to society, to the family, to the individual and so forth—infringements on their rights. And thus, the government can enforce the laws. But that has all been dictated by the people.

President's Retirement Plans

Q. Mr. President, from history I know that people who have been connected with great power, with big posts, say goodbye, leave these posts with great difficulty. Since your term of office is coming to an end, what sentiments do you experience and whether you feel like, if, hypothetically, you can just stay for another term? *[Laughter]*

The President. Well, I'll tell you something. I think it was a kind of revenge against Franklin Delano Roosevelt, who was elected four times—the only President. There had kind of grown a tradition in our country about two terms. That tradition was started by Washington, our first President, only because there was great talk at the formation of our country that we might become a monarchy, and we had just freed ourselves from a monarchy. So, when the second term was over, George Washington stepped down and said he would do it—stepping down—so that there would not get to be the kind of idea of an inherited aris-

tocracy. Well, succeeding Presidents—many of them didn't get a chance at a second term; they did one term and were gone. But that tradition kind of remained, but it was just a tradition. And then Roosevelt ran the four times—died very early in his fourth term. And suddenly, in the atmosphere at that time, they added an amendment to the Constitution that Presidents could only serve two terms.

When I get out of office—I can't do this while I'm in office, because it will look as I'm selfishly doing it for myself—when I get out of office, I'm going to travel around what I call the mashed-potato circuit—that is the after-dinner speaking and the speaking to luncheon groups and so forth—I'm going to travel around and try to convince the people of our country that they should wipe out that amendment to the Constitution because it was an interference with the democratic rights of the people. The people should be allowed to vote for who they wanted to vote for, for as many times as they want to vote for him; and that it is they who are being denied a right. But you see, I will no longer be President then, so I can do that and talk for that.

There are a few other things I'm going to try to convince the people to impress upon our Congress, the things that should be done. I've always described it that if—in Hollywood, when I was there, if you didn't sing or dance, you wound up as an after-dinner speaker. And I didn't sing or dance. *[Laughter]* So, I have a hunch that I will be out on the speaking circuit, telling about a few things that I didn't get done in government, but urging the people to tell the Congress they wanted them done.

American Indians

Q. Mr. President, I've heard that a group of American Indians have come here because they couldn't meet you in the United States of America. If you fail to meet them here, will you be able to correct it and to meet them back in the United States?

The President. I didn't know that they had asked to see me. If they've come here or whether to see them there—*[laughter]*—I'd be very happy to see them.

Let me tell you just a little something

about the American Indian in our land. We have provided millions of acres of land for what are called *preservations*—or *reservations*, I should say. They, from the beginning, announced that they wanted to maintain their way of life, as they had always lived there in the desert and the plains and so forth. And we set up these reservations so they could, and have a Bureau of Indian Affairs to help take care of them. At the same time, we provide education for them—schools on the reservations. And they're free also to leave the reservations and be American citizens among the rest of us, and many do. Some still prefer, however, that way—that early way of life. And we've done everything we can to meet their demands as to how they want to live. Maybe we made a mistake. Maybe we should not have humored them in that wanting to stay in that kind of primitive lifestyle. Maybe we should have said, no, come join us; be citizens along with the rest of us. As I say, many have; many have been very successful.

And I'm very pleased to meet with them, talk with them at any time and see what their grievances are or what they feel they might be. And you'd be surprised: Some of them became very wealthy because some of those reservations were overlaying great pools of oil, and you can get very rich pumping oil. And so, I don't know what their complaint might be.

Soviet Dissidents

Q. Mr. President, I'm very much tantalized since yesterday evening by the question, why did you receive yesterday—did you receive and when you invite yesterday—refuseniks or dissidents? And for the second part of the question is, just what are your impressions from Soviet people? And among these dissidents, you have invited a former collaborator with a Fascist, who was a policeman serving for Fascist.

The President. Well, that's one I don't know about, or maybe the information hasn't been all given out on that. But you have to understand that Americans come from every corner of the world. I received a letter from a man that called something to my attention recently. He said, you can go to live in France, but you cannot

become a Frenchman; you can go to live in Germany, you cannot become a German—or a Turk, or a Greek, or whatever. But he said anyone, from any corner of the world, can come to live in America and become an American.

You have to realize that we are a people that are made up of every strain, nationality, and race of the world. And the result is that when people in our country think someone is being mistreated or treated unjustly in another country, these are people who still feel that kinship to that country because that is their heritage. In America, whenever you meet someone new and become friends, one of the first things you tell each other is what your bloodline is. For example, when I'm asked, I have to say Irish, English, and Scotch—English and Scotch on my mother's side, Irish on my father's side. But all of them have that.

Well, when you take on to yourself a wife, you do not stop loving your mother. So, Americans all feel a kind of a kinship to that country that their parents or their grandparents or even some great-grandparents came from; you don't lose that contact. So, what I have come and what I have brought to the General Secretary—and I must say he has been very cooperative about it—I have brought lists of names that have been brought to me from people that are relatives or friends that know that—or that believe that this individual is being mistreated here in this country, and they want him to be allowed to emigrate to our country—some are separated families.

One that I met in this, the other day, was born the same time I was. He was born of Russian parents who had moved to America, oh, way back in the early 1900's, and he was born in 1911. And then sometime later, the family moved back to Russia. Now he's grown, has a son. He's an American citizen. But they wanted to go back to America and being denied on the grounds that, well, they can go back to America, but his son married a Russian young lady, and they want to keep her from going back. Well, the whole family said, no, we're not going to leave her alone here. She's a member of the family now. Well, that kind of a case is brought to me personally, so I bring it to

the General Secretary. And as I say, I must say, he has been most helpful and most agreeable about correcting these things.

Now, I'm not blaming you; I'm blaming bureaucracy. We have the same type of thing happen in our own country. And every once in a while, somebody has to get the bureaucracy by the neck and shake it loose and say, Stop doing what you're doing! And this is the type of thing and the names that we have brought. And it is a list of names, all of which have been brought to me personally by either relatives or close friends and associates. [Applause]

Thank you very much. You're all very kind. I thank you very much. And I hope I answered the questions correctly. Nobody asked me what it was going to feel like to

not be President anymore. I have some understanding, because after I'd been Governor for 8 years and then stepped down, I want to tell you what it's like. We'd only been home a few days, and someone invited us out to dinner. Nancy and I both went out, got in the back seat of the car, and waited for somebody to get in front and drive us. [Laughter]

[At this point, Rector Logunov gave the President a gift.]

That is beautiful. Thank you very much.

Note: The President spoke at 4:10 p.m. in the Lecture Hall at Moscow State University. Anatoliy A. Logunov was rector of the university.

Toasts at a State Dinner Hosted by the President at Spaso House in Moscow

May 31, 1988

The President. Mr. General Secretary, Mrs. Gorbachev, distinguished guests and friends, it's a pleasure to host all of you tonight and to reciprocate, in a small way, the hospitality you lavished upon us yesterday evening. While the General Secretary and I had already held three meetings before this one began here in Moscow, each of those earlier encounters took place in the autumn. The days were growing short, the weather ever grayer and colder. It makes for a bracing, delightful change to have this meeting take place at the high point of spring, a time of long, light-filled days.

I know that Nancy found her springtime visit to Leningrad earlier today both magnificent and moving. The play of light upon the rivers and canals added the special splendor of the season to a city splendid in any season. And everywhere, Nancy has told me, there was a sense of history, especially of Leningrad's immense courage and sacrifice during the Second World War, surely one of the most stirring epics in the whole human story.

Here in Moscow, I've been reminded a number of times during this springtime visit

of a passage in a book about your country by Laurens Van der Post. Especially struck by the city's churches, Van der Post wrote that when he caught his first sight of the Moscow skyline he saw "the light of an unusually pure evening upon it. That light was alchemical, and it transformed Moscow into a city of gold. The tops of the spires and pinnacles drawing the rigid forms of the skyscrapers after them into arrows of gold aimed at the arched and timeless blue." So, we, too, have found Moscow a city of beauties. A city, especially, whose pinnacles and spires reminded one at virtually every turn of man's ancient capacity for aspiration, for reaching out toward the light.

It's a particular pleasure to be able to welcome you to Spaso House—a house of considerable beauty in its own right—the residence of our Ambassadors to the Soviet Union. During the 55 years of diplomatic relations between our two nations, Spaso House has served as one of the principal settings for exchanges between us—exchanges formal and informal alike. There have been some splendid moments within these walls. Prokofiev once conducted his

357 Remarks at the University of Michigan.

May 22, 1964

President Hatcher, Governor Romney, Senators McNumara and Hart, Congressmen Meader and Staebler, and other members of the fine Michigan delegation, members of the graduating class, my fellow Americans:

It is a great pleasure to be here today. This university has been coeducational since 1870, but I do not believe it was on the basis of your accomplishments that a Detroit high school girl said, "In choosing a college, you first have to decide whether you want a coeducational school or an educational school."

Well, we can find both here at Michigan, although perhaps at different hours.

I came out here today very anxious to meet the Michigan student whose father told a friend of mine that his son's education had been a real value. It stopped his mother from bragging about him.

I have come today from the turmoil of your Capital to the tranquility of your campus to speak about the future of your country.

The purpose of protecting the life of our Nation and preserving the liberty of our citizens is to pursue the happiness of our people. Our success in that pursuit is the test of our success as a Nation.

For a century we labored to settle and to subdue a continent. For half a century we called upon unbounded invention and untiring industry to create an order of plenty for all of our people.

The challenge of the next half century is whether we have the wisdom to use that wealth to enrich and elevate our national life, and to advance the quality of our American civilization.

Your imagination, your initiative, and your indignation will determine whether we

build a society where progress is the servant of our needs, or a society where old values and new visions are buried under unbridled growth. For in your time we have the opportunity to move not only toward the rich society and the powerful society, but upward to the Great Society.

The Great Society rests on abundance and liberty for all. It demands an end to poverty and racial injustice, to which we are totally committed in our time. But that is just the beginning.

The Great Society is a place where every child can find knowledge to enrich his mind and to enlarge his talents. It is a place where leisure is a welcome chance to build and reflect, not a feared cause of boredom and restlessness. It is a place where the city of man serves not only the needs of the body and the demands of commerce but the desire for beauty and the hunger for community.

It is a place where man can renew contact with nature. It is a place which honors creation for its own sake and for what it adds to the understanding of the race. It is a place where men are more concerned with the quality of their goals than the quantity of their goods.

But most of all, the Great Society is not a safe harbor, a resting place, a final objective, a finished work. It is a challenge constantly renewed, beckoning us toward a destiny where the meaning of our lives matches the marvelous products of our labor.

So I want to talk to you today about three places where we begin to build the Great Society—in our cities, in our countryside, and in our classrooms.

Many of you will live to see the day, perhaps 50 years from now, when there will be 400 million Americans—four-fifths of them

in urban areas. In the remainder of this century urban population will double, city land will double, and we will have to build homes, highways, and facilities equal to all those built since this country was first settled. So in the next 40 years we must rebuild the entire urban United States.

Aristotle said: "Men come together in cities in order to live, but they remain together in order to live the good life." It is harder and harder to live the good life in American cities today.

The catalog of ills is long: there is the decay of the centers and the despoiling of the suburbs. There is not enough housing for our people or transportation for our traffic. Open land is vanishing and old landmarks are violated.

Worst of all expansion is eroding the precious and time honored values of community with neighbors and communion with nature. The loss of these values breeds loneliness and boredom and indifference.

Our society will never be great until our cities are great. Today the frontier of imagination and innovation is inside those cities and not beyond their borders.

New experiments are already going on. It will be the task of your generation to make the American city a place where future generations will come, not only to live but to live the good life.

I understand that if I stayed here tonight I would see that Michigan students are really doing their best to live the good life.

This is the place where the Peace Corps was started. It is inspiring to see how all of you, while you are in this country, are trying so hard to live at the level of the people.

A second place where we begin to build the Great Society is in our countryside. We have always prided ourselves on being not only America the strong and America the

free, but America the beautiful. Today that beauty is in danger. The water we drink, the food we eat, the very air that we breathe, are threatened with pollution. Our parks are overcrowded, our seashores overburdened. Green fields and dense forests are disappearing.

A few years ago we were greatly concerned about the "Ugly American." Today we must act to prevent an ugly America.

For once the battle is lost, once our natural splendor is destroyed, it can never be recaptured. And once man can no longer walk with beauty or wonder at nature his spirit will wither and his sustenance be wasted.

A third place to build the Great Society is in the classrooms of America. There your children's lives will be shaped. Our society will not be great until every young mind is set free to scan the farthest reaches of thought and imagination. We are still far from that goal.

Today, 8 million adult Americans, more than the entire population of Michigan, have not finished 5 years of school. Nearly 20 million have not finished 8 years of school. Nearly 54 million—more than one-quarter of all America—have not even finished high school.

Each year more than 100,000 high school graduates, with proved ability, do not enter college because they cannot afford it. And if we cannot educate today's youth, what will we do in 1970 when elementary school enrollment will be 5 million greater than 1960? And high school enrollment will rise by 5 million. College enrollment will increase by more than 3 million.

In many places, classrooms are overcrowded and curricula are outdated. Most of our qualified teachers are underpaid, and many of our paid teachers are unqualified. So we must give every child a place to sit

and a teacher to learn from. Poverty must not be a bar to learning, and learning must offer an escape from poverty.

But more classrooms and more teachers are not enough. We must seek an educational system which grows in excellence as it grows in size. This means better training for our teachers. It means preparing youth to enjoy their hours of leisure as well as their hours of labor. It means exploring new techniques of teaching, to find new ways to stimulate the love of learning and the capacity for creation.

These are three of the central issues of the Great Society. While our Government has many programs directed at those issues, I do not pretend that we have the full answer to those problems.

But I do promise this: We are going to assemble the best thought and the broadest knowledge from all over the world to find those answers for America. I intend to establish working groups to prepare a series of White House conferences and meetings—on the cities, on natural beauty, on the quality of education, and on other emerging challenges. And from these meetings and from this inspiration and from these studies we will begin to set our course toward the Great Society.

The solution to these problems does not rest on a massive program in Washington, nor can it rely solely on the strained resources of local authority. They require us to create new concepts of cooperation, a creative federalism, between the National Capital and the leaders of local communities.

Woodrow Wilson once wrote: "Every man sent out from his university should be a man of his Nation as well as a man of his time."

Within your lifetime powerful forces, already loosed, will take us toward a way of life beyond the realm of our experience, almost beyond the bounds of our imagination.

For better or for worse, your generation has been appointed by history to deal with those problems and to lead America toward a new age. You have the chance never before afforded to any people in any age. You can help build a society where the demands of morality, and the needs of the spirit, can be realized in the life of the Nation.

So, will you join in the battle to give every citizen the full equality which God enjoins and the law requires, whatever his belief, or race, or the color of his skin?

Will you join in the battle to give every citizen an escape from the crushing weight of poverty?

Will you join in the battle to make it possible for all nations to live in enduring peace—as neighbors and not as mortal enemies?

Will you join in the battle to build the Great Society, to prove that our material progress is only the foundation on which we will build a richer life of mind and spirit?

There are those timid souls who say this battle cannot be won; that we are condemned to a soulless wealth. I do not agree. We have the power to shape the civilization that we want. But we need your will, your labor, your hearts, if we are to build that kind of society.

Those who came to this land sought to build more than just a new country. They sought a new world. So I have come here today to your campus to say that you can make their vision our reality. So let us from this moment begin our work so that

in the future men will look back and say: It was then, after a long and weary way, that man turned the exploits of his genius to the full enrichment of his life.

Thank you. Goodby.

NOTE: The President spoke at the graduation exercises at the University of Michigan at Ann Arbor after receiving an honorary degree of Doctor of Civil Law. His opening words referred to Harlan H. Hatcher, President of the University, Governor George Romney, Senators Pat McNamara and Philip A. Hart, and Representatives George Meader and Neil Stabler, all of Michigan.

358 Remarks Upon Arrival at the Airport, Roanoke, Virginia. May 23, 1964

Ladies and gentlemen, boys and girls, Senator Byrd:

I am very thankful to you for the courtesy that you have extended us in coming out here and meeting us. Senator Byrd and I were flying down talking with each other and we concluded that there were a good many things we agreed upon, particularly two things: one, he agreed with me that we ought to cut the lights out at the White House, keep down our light bill; and he also agreed that the people of Roanoke were a wonderful group. So we have no dispute on those two questions.

This is a delightful day for us. We are coming to Virginia to celebrate the achievements of a great man, and to honor a former Secretary of State and Secretary of Defense who has provided great leadership to liberty-loving people throughout the world, General George Marshall. We are going over to see this historic and wonderful school, VMI, and we are pleased that we have a chance to stop here and look you in the face and shake your hand.

I should like for you to meet some other members of my party. First, I want you to know Mrs. Johnson, Lady Bird.

[After brief remarks by Mrs. Johnson the President resumed speaking.]

I know he is bashful and modest, but I know he will appreciate having a chance to at least wave his hand at you. I want you

to know one of the great men of our time, the senior Senator from Virginia, my old longtime friend, Harry Byrd.

And next, the distinguished Secretary of State, Mr. Dean Rusk; the distinguished former Secretary of State, Mr. Dean Acheson; my friend the Secretary of Agriculture, Mr. Orville Freeman; the distinguished Secretary of Commerce, my friend Luther Hodges; the very able Under Secretary of State, Mr. Averell Harriman.

And now I want to present the Congressmen—Congressman Everett, Congressman Downing, Congressman Fulton, Congressman Jennings, and Congressman Marsh. Then Mrs. Hodges, Mrs. Freeman, Mrs. Acheson, and Mrs. Harriman; and Senator and Mrs. Monroney from the great State of Oklahoma.

Thank you so much for coming out. We will have a chance to come by the fence and say hello to you. We appreciate your friendship so very much.

NOTE: The President spoke at Woodrum Field, Roanoke, Va. In his opening words he referred to Senator Harry F. Byrd of Virginia. Later he referred to Secretary of State Dean Rusk, former Secretary of State and Mrs. Dean Acheson, Secretary of Agriculture and Mrs. Orville Freeman, Secretary of Commerce and Mrs. Luther H. Hodges, Under Secretary of State and Mrs. W. Averell Harriman, Representatives Robert A. Everett and Richard H. Fulton of Tennessee, Thomas N. Downing, W. Pat Jennings, and John O. Marsh of Virginia, and Senator and Mrs. A. S. Monroney of Oklahoma.

Center can really remake the industrial life of the southwest United States as we reach towards the moon.

I think it's most appropriate that this Space Center should be located here in Houston, here at Rice University—a city which has been identified with progress in this State and county.

So we come here today to see what is being planned for the future, because from this place in America are going to be laid the plans and the designs which will reach out in this decade and put Americans on

the moon and bring them back again. And for the time being, I'm glad to be here in Houston to take part in this activity.

NOTE: The President spoke as he arrived for an inspection tour of the Manned Spacecraft Center in Houston, Tex. His opening words referred to Lewis Cutrer, Mayor of Houston, Vice President Lyndon B. Johnson, Representative Albert Thomas of Texas, James E. Webb, Administrator, National Aeronautics and Space Administration, and Representative George P. Miller of California, Chairman of the Science and Astronautics Committee of the House of Representatives.

373 Address at Rice University in Houston on the Nation's Space Effort. September 12, 1962

President Pitzer, Mr. Vice President, Governor, Congressman Thomas, Senator Wiley, and Congressman Miller, Mr. Webb. Mr. Bell, scientists, distinguished guests, and ladies and gentlemen:

I appreciate your president having made me an honorary visiting professor, and I will assure you that my first lecture will be very brief.

I am delighted to be here and I'm particularly delighted to be here on this occasion.

We meet at a college noted for knowledge, in a city noted for progress, in a State noted for strength, and we stand in need of all three, for we meet in an hour of change and challenge, in a decade of hope and fear, in an age of both knowledge and ignorance. The greater our knowledge increases, the greater our ignorance unfolds.

Despite the striking fact that most of the scientists that the world has ever known are alive and working today, despite the fact that this Nation's own scientific manpower is doubling every 12 years in a rate of growth more than three times that of our population as a whole, despite that, the vast stretches of the unknown and the unanswered and the unfinished still far out-

strip our collective comprehension.

No man can fully grasp how far and how fast we have come, but condense, if you will, the 50,000 years of man's recorded history in a time span of but a half-century. Stated in these terms, we know very little about the first 40 years, except at the end of them advanced man had learned to use the skins of animals to cover them. Then about 10 years ago, under this standard, man emerged from his caves to construct other kinds of shelter. Only 5 years ago man learned to write and use a cart with wheels. Christianity began less than 2 years ago. The printing press came this year, and then less than 2 months ago, during this whole 50-year span of human history, the steam engine provided a new source of power.

Newton explored the meaning of gravity. Last month electric lights and telephones and automobiles and airplanes became available. Only last week did we develop penicillin and television and nuclear power, and now if America's new spacecraft succeeds in reaching Venus, we will have literally reached the stars before midnight tonight.

This is a breathtaking pace, and such a pace cannot help but create new ills as it dispels old, new ignorance, new problems,

new dangers. Surely the opening vistas of space promise high costs and hardships, as well as high reward.

So it is not surprising that some would have us stay where we are a little longer to rest, to wait. But this city of Houston, this State of Texas, this country of the United States was not built by those who waited and rested and wished to look behind them. This country was conquered by those who moved forward—and so will space.

William Bradford, speaking in 1630 of the founding of the Plymouth Bay Colony, said that all great and honorable actions are accompanied with great difficulties, and both must be enterprised and overcome with answerable courage.

If this capsule history of our progress teaches us anything, it is that man, in his quest for knowledge and progress, is determined and cannot be deterred. The exploration of space will go ahead, whether we join in it or not, and it is one of the great adventures of all time, and no nation which expects to be the leader of other nations can expect to stay behind in this race for space.

Those who came before us made certain that this country rode the first waves of the industrial revolutions, the first waves of modern invention, and the first wave of nuclear power, and this generation does not intend to founder in the backwash of the coming age of space. We mean to be a part of it—we mean to lead it. For the eyes of the world now look into space, to the moon and to the planets beyond, and we have vowed that we shall not see it governed by a hostile flag of conquest, but by a banner of freedom and peace. We have vowed that we shall not see space filled with weapons of mass destruction, but with instruments of knowledge and understanding.

Yet the vows of this Nation can only be fulfilled if we in this Nation are first, and, therefore, we intend to be first. In short, our leadership in science and in industry, our hopes for peace and security, our obligations to ourselves as well as others, all require us

to make this effort, to solve these mysteries, to solve them for the good of all men, and to become the world's leading space-faring nation.

We set sail on this new sea because there is new knowledge to be gained, and new rights to be won, and they must be won and used for the progress of all people. For space science, like nuclear science and all technology, has no conscience of its own. Whether it will become a force for good or ill depends on man, and only if the United States occupies a position of pre-eminence can we help decide whether this new ocean will be a sea of peace or a new terrifying theater of war. I do not say that we should or will go unprotected against the hostile misuse of space any more than we go unprotected against the hostile use of land or sea, but I do say that space can be explored and mastered without feeding the fires of war, without repeating the mistakes that man has made in extending his writ around this globe of ours.

There is no strife, no prejudice, no national conflict in outer space as yet. Its hazards are hostile to us all. Its conquest deserves the best of all mankind, and its opportunity for peaceful cooperation may never come again. But why, some say, the moon? Why choose this as our goal? And they may well ask why climb the highest mountain. Why, 35 years ago, fly the Atlantic? Why does Rice play Texas?

We choose to go to the moon. We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win, and the others, too.

It is for these reasons that I regard the decision last year to shift our efforts in space from low to high gear as among the most important decisions that will be made during my incumbency in the Office of the Presidency.

In the last 24 hours we have seen facilities now being created for the greatest and most complex exploration in man's history. We have felt the ground shake and the air shattered by the testing of a Saturn C-1 booster rocket, many times as powerful as the Atlas which launched John Glenn, generating power equivalent to 10,000 automobiles with their accelerators on the floor. We have seen the site where five F-1 rocket engines, each one as powerful as all eight engines of the Saturn combined, will be clustered together to make the advanced Saturn missile, assembled in a new building to be built at Cape Canaveral as tall as a 48-story structure, as wide as a city block, and as long as two lengths of this field.

Within these last 19 months at least 45 satellites have circled the earth. Some 40 of them were "made in the United States of America" and they were far more sophisticated and supplied far more knowledge to the people of the world than those of the Soviet Union.

The Mariner spacecraft now on its way to Venus is the most intricate instrument in the history of space science. The accuracy of that shot is comparable to firing a missile from Cape Canaveral and dropping it in this stadium between the 40-yard lines.

Transit satellites are helping our ships at sea to steer a safer course. Tiros satellites have given us unprecedented warnings of hurricanes and storms, and will do the same for forest fires and icebergs.

We have had our failures, but so have others, even if they do not admit them. And they may be less public.

To be sure, we are behind, and will be behind for some time in manned flight. But we do not intend to stay behind, and in this decade we shall make up and move ahead.

The growth of our science and education will be enriched by new knowledge of our universe and environment, by new techniques of learning and mapping and observation, by new tools and computers for industry, medicine, the home as well as the school. Technical institutions, such as Rice,

will reap the harvest of these gains.

And finally, the space effort itself, while still in its infancy, has already created a great number of new companies, and tens of thousands of new jobs. Space and related industries are generating new demands in investment and skilled personnel, and this city and this State, and this region, will share greatly in this growth. What was once the furthest outpost on the old frontier of the West will be the furthest outpost on the new frontier of science and space. Houston, your City of Houston, with its Manned Spacecraft Center, will become the heart of a large scientific and engineering community. During the next 5 years the National Aeronautics and Space Administration expects to double the number of scientists and engineers in this area, to increase its outlays for salaries and expenses to \$60 million a year; to invest some \$200 million in plant and laboratory facilities; and to direct or contract for new space efforts over \$1 billion from this Center in this City.

To be sure, all this costs us all a good deal of money. This year's space budget is three times what it was in January 1961, and it is greater than the space budget of the previous 8 years combined. That budget now stands at \$5,400 million a year—a staggering sum, though somewhat less than we pay for cigarettes and cigars every year. Space expenditures will soon rise some more, from 40 cents per person per week to more than 50 cents a week for every man, woman, and child in the United States, for we have given this program a high national priority—even though I realize that this is in some measure an act of faith and vision, for we do not now know what benefits await us. But if I were to say, my fellow citizens, that we shall send to the moon, 240,000 miles away from the control station in Houston, a giant rocket more than 300 feet tall, the length of this football field, made of new metal alloys, some of which have not yet been invented, capable of standing heat and stresses several times more than have ever been experienced,

together with a precision better than the best watch, carrying all the equipment needed for propulsion, guidance, control, communications, food and survival, on an untried mission, to an unknown celestial body, and then return it safely to earth, re-entering the atmosphere at speeds of over 25,000 miles per hour, causing heat about half that of the temperature of the sun—almost as hot as it is here today—and do all this, and do it right, and do it first before this decade is out, then we must be bold.

I'm the one who is doing all the work, so we just want you to stay cool for a minute. [Laughter]

However, I think we're going to do it, and I think that we must pay what needs to be paid. I don't think we ought to waste any money, but I think we ought to do the job. And this will be done in the decade of the sixties. It may be done while some of you are still here at school at this college and university. It will be done during the terms of office of some of the people who sit here on this platform. But it will be done. And it will be done before the end of this decade.

I am delighted that this university is playing a part in putting a man on the moon as part of a great national effort of the United States of America.

Many years ago the great British explorer George Mallory, who was to die on Mount Everest, was asked why did he want to climb it. He said, "Because it is there."

Well, space is there, and we're going to climb it, and the moon and the planets are there, and new hopes for knowledge and peace are there. And, therefore, as we set sail we ask God's blessing on the most hazardous and dangerous and greatest adventure on which man has ever embarked.

Thank you.

NOTE: The President spoke in the Rice University Stadium at 10 a.m. In his opening words he referred to Dr. K. S. Pitzer, President of the University, Vice President Lyndon B. Johnson, Governor Price Daniel of Texas, Representative Albert Thomas of Texas, Senator Alexander Wiley of Wisconsin, Representative George P. Miller of California, James E. Webb, Administrator, National Aeronautics and Space Administration, and David E. Bell, Director of the Bureau of the Budget.

374 Remarks at the NASA Manned Spacecraft Center in Houston. *September 12, 1962*

Doctor, Mr. Vice President, Mr. Webb:

I want to express my thanks to you for this model which I will take back to the White House, and which will remind us of this most extraordinary effort which is being made by all the men here and their companions scattered across the country in NASA, in private industry, in universities, all of whom are united in this extraordinary enterprise.

To talk of placing a tremendous rocket outside the orbit of the earth, to send it to the moon to rendezvous, to go to the moon's surface, to put men on the moon, to take them off, to rendezvous again, and bring them back to earth safely, and to talk about doing that in the next 5 or 6 years indicates

how far and how fast we have come and how far and how fast we must go. And back of all the extraordinary scientific and technical accomplishments which must be made to make this possible, of course, are the men who are involved, and particularly those who are at the point of the sphere, those who must fly this mission into the most unknown sea.

So we commend them and all who are associated in putting them there. Thank you.

NOTE: The President spoke in the Rich Building. His opening words referred to Dr. Robert R. Gilruth, Director of the Manned Spacecraft Center, Vice President Lyndon B. Johnson, and James E. Webb, Administrator, National Aeronautics and Space Administration.

for making it—first, because the points are so just and well put; and next, because it is so well timed. We needed, from some one who can get the public attention, just such a speech just at this time. His objection to the Oregon constitution because it excludes free negroes, is the only thing I wish he had omitted. Your friend as ever

To Lyman Trumbull

Hon. L. Trumbull Springfield, Feb. 3. 1859

My dear Sir Yours of the 29th. is received. The article mentioned by you, prepared for the Chicago Journal, I have not seen; nor do I wish to see it, though I heard of it a month, or more, ago. Any effort to put enmity between you and me, is as idle as the wind. I do not for a moment doubt that you, Judd, Cook, Palmer, and the republicans generally, coming from the old democratic ranks, were as sincerely anxious for my success in the late contest, as I myself, and the old whig republicans were. And I beg to assure you, beyond all possible cavil, that you can scarcely be more anxious to be sustained two years hence than I am that you shall be so sustained. I can not conceive it possible for me to be a rival of yours, or to take sides against you in favor of any rival. Nor do I think there is much danger of the old democratic and whig elements of our party breaking into opposing factions. They certainly shall not, if I can prevent it.

I do not perceive that there is any feeling here about Cuba; and so I think, you can safely venture to act upon your own judgment upon any phase of it which may be presented.

The H.R. passed an apportionment bill yesterday—slightly better for us than the present in the Senate districts; but perfectly outrageous in the H.R. districts. It can be defeated without any revolutionary movement, unless the session be prolonged. Yours as ever

Lecture on Discoveries and Inventions, Jacksonville, Illinois

We have all heard of Young America. He is the most *current* youth of the age. Some think him conceited, and arrogant; but has he not reason to entertain a rather extensive opinion of himself? Is he not the inventor and owner of the *present*, and sole hope of the *future*? Men, and things, everywhere, are ministering unto him. Look at his apparel, and you shall see cotton fabrics from Manchester and Lowell; flax-linen from Ireland; wool-cloth from Spain; silk from France; furs from the Arctic regions, with a buffalo-robe from the Rocky Mountains, as a general out-sider. At his table, besides plain bread and meat made at home, are sugar from Louisiana; coffee and fruits from the tropics; salt from Turk's Island; fish from New-foundland; tea from China, and spices from the Indies. The whale of the Pacific furnishes his candle-light; he has a diamond-ring from Brazil; a gold-watch from California, and a spanish cigar from Havanna. He not only has a present supply of all these, and much more; but thousands of hands are engaged in producing fresh supplies, and other thousands, in bringing them to him. The iron horse is panting, and impatient, to carry him everywhere, in no time; and the lightening stands ready harnessed to take and bring his tidings in a trifle less than no time. He owns a large part of the world, by right of possessing it; and all the rest by right of *wanting* it, and *intending* to have it. As Plato had for the immortality of the soul, so Young America has "a pleasing hope—a fond desire—a longing after" territory. He has a great passion—a perfect rage—for the "*new*"; particularly new men for office, and the new earth mentioned in the revelations, in which, being no more sea, there must be about three times as much land as in the present. He is a great friend of humanity; and his desire for land is not selfish, but merely an impulse to extend the area of freedom. He is very anxious to fight for the liberation of enslaved nations and colonies, provided, always, they *have* land, and have *not* any liking for his interference. As to those who have no land, and would be glad of help from any quarter, he considers

they can afford to wait a few hundred years longer. In knowledge he is particularly rich. He knows all that can possibly be known; inclines to believe in spiritual rappings, and is the unquestioned inventor of "*Manifest Destiny*." His horror is for all that is old, particularly "Old Foggy"; and if there be any thing old which he can endure, it is only old whiskey and old tobacco.

If the said Young America really is, as he claims to be, the owner of all present, it must be admitted that he has considerable advantage of Old Foggy. Take, for instance, the first of all fogies, father Adam. There he stood, a very perfect physical man, as poets and painters inform us; but he must have been very ignorant, and simple in his habits. He had had no sufficient time to learn much by observation; and he had no near neighbors to teach him anything. No part of his breakfast had been brought from the other side of the world; and it is quite probable, he had no conception of the world having any other side. In all of these things, it is very plain, he was no equal of Young America; the most that can be said is, that *according to his chance* he may have been quite as much of a man as his very self-complaisant descendant. Little as was what he knew, let the Youngster discard all he has learned from others, and then show, if he can, any advantage on his side. In the way of *land*, and *live stock*, Adam was quite in the ascendant. He had dominion over all the earth, and all the living things upon, and round about it. The land has been sadly divided out since; but never fret, Young America will *re-annex* it.

The great difference between Young America and Old Foggy, is the result of *Discoveries*, *Inventions*, and *Improvements*. These, in turn, are the result of *observation*, *reflection* and *experiment*. For instance, it is quite certain that ever since water has been boiled in covered vessels; men have seen the lids of the vessels rise and fall a little, with a sort of fluttering motion, by force of the steam; but so long as this was not specially observed, and reflected and experimented upon, it came to nothing. At length however, after many thousand years, some man observes this long-known effect of hot water lifting a pot-lid, and begins a train of reflection upon it. He says: "Why, to be sure, the force that lifts the pot-lid, will lift any thing else;

which is no heavier than the pot-lid." "And, as man has much hard lifting to do, can not this hot-water power be made to help him?" He has become a little excited on the subject, and he fancies he hears a voice answering "Try me" He does try it; and the *observation*, *reflection*, and *trial* gives to the world the control of that tremendous, and now well known agent, called steam-power. This is not the actual history in detail, but the general principle.

But was this first inventor of the application of steam, wiser or more ingenious than those who had gone before him? Not at all. Had he not learned much of them, he never would have succeeded—probably, never would have thought of making the attempt. To be fruitful in invention, it is indispensable to have a *habit* of observation and reflection; and this *habit*, our steam friend acquired, no doubt, from those who, to him, were old fogies. But for the difference in *habit* of observation, why did yankees, almost instantly, discover gold in California, which had been trodden upon, and overlooked by indians and Mexican greasers, for centuries? Gold-mines are not the only mines overlooked in the same way. There are more mines above the Earth's surface than below it. All nature—the whole world, material, moral, and intellectual,—is a mine; and, in Adam's day, it was a wholly unexplored mine. Now, it was the destined work of Adam's race to develop, by discoveries, inventions, and improvements, the hidden treasures of this mine. But Adam had nothing to turn his attention to the work. If he should do anything in the way of invention, he had first to invent the art of invention—the *instance* at least, if not the *habit* of observation and reflection. As might be expected he seems not to have been a very observing man at first; for it appears he went about naked a considerable length of time, before he even noticed that obvious fact. But when he did observe it, the observation was not lost upon him; for it immediately led to the first of all inventions, of which we have any direct account—the *fig-leaf apron*.

The inclination to exchange thoughts with one another is probably an original impulse of our nature. If I be in pain I wish to let you know it, and to ask your sympathy and assistance; and my pleasurable emotions also, I wish to com-

municate to, and share with you. But to carry on such communication, some *instrumentality* is indispensable. Accordingly speech—articulate sounds rattled off from the tongue—was used by our first parents, and even by Adam, before the creation of Eve. He gave names to the animals while she was still a bone in his side; and he broke out quite volubly when she first stood before him, the best present of his maker. From this it would appear that speech was not an invention of man, but rather the direct gift of his Creator. But whether Divine gift, or invention, it is still plain that if a mode of communication had been left to invention, *speech* must have been the first, from the superior adaptation to the end, of the organs of speech, over every other means within the whole range of nature. Of the organs of speech the tongue is the principal; and if we shall test it, we shall find the capacities of the tongue, in the utterance of articulate sounds, absolutely wonderful. You can count from one to one hundred, quite distinctly in about forty seconds. In doing this two hundred and eighty three distinct sounds or syllables are uttered, being seven to each second; and yet there shall be enough difference between every two, to be easily recognized by the ear of the hearer. What other *signs* to represent *things* could possibly be produced so rapidly? or, even, if ready made, could be *arranged* so rapidly to express the sense? *Motions* with the hands, are no adequate substitute. *Marks* for the recognition of the eye—*writing*—although a wonderful auxiliary for speech, is no worthy substitute for it. In addition to the more slow and laborious process of getting up a communication in writing, the materials—pen, ink, and paper—are not always at hand. But one always has his tongue with him, and the breath of his life is the ever-ready material with which it works. Speech, then, by enabling different individuals to interchange thoughts, and thereby to combine their powers of observation and reflection, greatly facilitates useful discoveries and inventions. What one observes, and would himself infer nothing from, he tells to another, and that other at once sees a valuable hint in it. A result is thus reached which neither *alone* would have arrived at.

And this reminds me of what I passed unnoticed before, that the very first invention was a joint operation, Eve having

shared with Adam in the getting up of the apron. And, indeed, judging from the fact that sewing has come down to our times as "woman's work" it is very probable she took the leading part; he, perhaps, doing no more than to stand by and thread the needle. That proceeding may be reckoned as the mother of all "Sewing societies"; and the first and most perfect "world's fair" all inventions and all inventors then in the world, being on the spot.

But speech alone, valuable as it ever has been, and is, has not advanced the condition of the world much. This is abundantly evident when we look at the degraded condition of all those tribes of human creatures who have no considerable additional means of communicating thoughts. *Writing*—the art of communicating thoughts to the mind, through the eye—is the great invention of the world. Great in the astonishing range of analysis and combination which necessarily underlies the most crude and general conception of it—great, very great in enabling us to converse with the dead, the absent, and the unborn, at all distances of time and of space; and great, not only in its direct benefits, but greatest help, to all other inventions. Suppose the art, with all conception of it, were this day lost to the world, how long, think you, would it be, before even Young America could get up the letter A. with any adequate notion of using it to advantage? The precise period at which writing was invented, is not known; but it certainly was as early as the time of Moses; from which we may safely infer that it's inventors were very old fogies.

Webster, at the time of writing his Dictionary, speaks of the English Language as then consisting of seventy or eighty thousand words. If so, the language in which the five books of Moses were written must, at that time, now thirtythree or four hundred years ago, have consisted of at least one quarter as many, or, twenty thousand. When we remember that words are *sounds* merely, we shall conclude that the idea of representing those sounds by *marks*, so that whoever should at any time after see the marks, would understand what sounds they meant, was a bold and ingenious conception, not likely to occur to one man of a million, in the run of a thousand years. And, when it did occur, a distinct mark for each word, giving twenty thousand different marks first to be

learned, and afterwards remembered, would follow as the second thought, and would present such a difficulty as would lead to the conclusion that the whole thing was impracticable. But the *necessity* still would exist; and we may readily suppose that the idea was conceived, and lost, and reproduced, and dropped, and taken up again and again, until at last, the thought of dividing sounds into parts, and making a mark, not to represent a whole sound, but only a part of one, and then of combining these marks, not very many in number, upon the principles of permutation, so as to represent any and all of the whole twenty thousand words, and even any additional number was somehow conceived and pushed into practice. This was the invention of *phoenetic* writing, as distinguished from the clumsy picture writing of some of the nations. That it was difficult of conception and execution, is apparant, as well by the foregoing reflections, as by the fact that so many tribes of men have come down from Adam's time to ours without ever having possessed it. Its utility may be conceived, by the reflection that, to *it* we owe everything which distinguishes us from savages. Take it from us, and the Bible, all history, all science, all government, all commerce, and nearly all social intercourse go with it.

The great activity of the tongue, in articulating sounds, has already been mentioned; and it may be of some passing interest to notice the wonderful powers of the *eye*, in conveying ideas to the mind from writing. Take the same example of the numbers from *one* to *one hundred*, written down, and you can run your eye over the list, and be assured that every number is in it, in about one half the time it would require to pronounce the words with the voice; and not only so, but you can, in the same short time, determine whether every word is spelled correctly, by which it is evident that every separate letter, amounting to eight hundred and sixty four, has been recognized, and reported to the mind, within the incredibly short space of twenty seconds, or one third of a minute.

I have already intimated my opinion that in the world's history, certain inventions and discoveries occurred, of peculiar value, on account of their great efficiency in facilitating all other inventions and discoveries. Of these were the arts of writing and of printing—the discovery of America, and the

introduction of Patent-laws. The date of the first, as already stated, is unknown; but it certainly was as much as fifteen hundred years before the Christian era; the second—printing—came in 1436, or nearly three thousand years after the first. The others followed more rapidly—the discovery of America in 1492, and the first patent laws in 1624. Though not apposite to my present purpose, it is but justice to the fruitfulness of that period, to mention two other important events—the Lutheran Reformation in 1517, and, still earlier, the invention of negroes, or, of the present mode of using them, in 1434. But, to return to the consideration of printing, it is plain that it is but the *other* half—and in real utility, the *better* half—of writing; and that both together are but the assistants of speech in the communication of thoughts between man and man. When man was possessed of speech alone, the chances of invention, discovery, and improvement, were very limited; but by the introduction of each of these, they were greatly multiplied. When writing was invented, any important observation, likely to lead to a discovery, had at least a chance of being written down, and consequently, a better chance of never being forgotten; and of being seen, and reflected upon, by a much greater number of persons; and thereby the chances of a valuable hint being caught, proportionably augmented. By this means the observation of a single individual might lead to an important invention, years, and even centuries after he was dead. In one word, by means of writing, the seeds of invention were more permanently preserved, and more widely sown. And yet, for the three thousand years during which printing remained undiscovered after writing was in use, it was only a small portion of the people who could write, or read writing; and consequently the field of invention, though much extended, still continued very limited. At length printing came. It gave ten thousand copies of any written matter, quite as cheaply as ten were given before; and consequently a thousand minds were brought into the field where there was but one before. This was a great *gain*; and history shows a great *change* corresponding to it, in point of time. I will venture to consider *it*, the true termination of that period called "the dark ages." Discoveries, inventions, and improvements followed rapidly, and have been increasing

their rapidity ever since. The effects could not come, all at once. It required time to bring them out; and they are still coming. The *capacity* to read, could not be multiplied as fast as the *means* of reading. Spelling-books just began to go into the hands of the children; but the teachers were not very numerous, or very competent; so that it is safe to infer they did not advance so speedily as they do now-a-days. It is very probable—almost certain—that the great mass of men, at that time, were utterly unconscious, that their *conditions*, or their *minds* were capable of improvement. They not only looked upon the educated few as superior beings; but they supposed themselves to be naturally incapable of rising to equality. To immancipate the mind from this false and under estimate of itself, is the great task which printing came into the world to perform. It is difficult for us, *now* and *here*, to conceive how strong this slavery of the mind was; and how long it did, of necessity, take, to break it's shackles, and to get a habit of freedom of thought, established. It is, in this connection, a curious fact that a new country is most favorable—almost necessary—to the immancipation of thought, and the consequent advancement of civilization and the arts. The human family originated as is thought, somewhere in Asia, and have worked their way principally Westward. Just now, in civilization, and the arts, the people of Asia are entirely behind those of Europe; those of the East of Europe behind those of the West of it; while we, here in America, *think* we discover, and invent, and improve, faster than any of them. *They* may think this is arrogance; but they can not deny that Russia has called on us to show her how to build steam-boats and railroads—while in the older parts of Asia, they scarcely know that such things as S.Bs & R.R.s. exist. In anciently inhabited countries, the dust of ages—a real downright old-fogyism—seems to settle upon, and smother the intellects and energies of man. It is in this view that I have mentioned the discovery of America as an event greatly favoring and facilitating useful discoveries and inventions.

Next came the Patent laws. These began in England in 1624; and, in this country, with the adoption of our constitution. Before then, any man might instantly use what another had invented; so that the inventor had no special advantage

from his own invention. The patent system changed this; secured to the inventor, for a limited time, the exclusive use of his invention; and thereby added the fuel of *interest* to the *fire* of genius, in the discovery and production of new and useful things.

February 11, 1859

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Presidential Directive on Electronic Commerce

July 1, 1997

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

The invention of the steam engine two centuries ago and the subsequent harnessing of electricity for communications ushered in an industrial revolution that fundamentally altered the way we work, brought the world's people closer together in time and space, changed the way we organize our economies, and brought us greater prosperity.

Today, we are on the verge of another revolution. Inventions like the integrated circuit, the computer, fiber optic cable, and the Internet are changing the way we work, learn, and communicate with each other.

Students and teachers can have immediate access to the world's information from their classrooms; doctors can administer diagnoses to patients in remote parts of the globe from their offices; and citizens of many nations are finding additional outlets for personal and political expression.

As the Internet empowers citizens and democratizes societies, it is also changing the way business is conducted: entrepreneurs are able to start new businesses more easily by accessing the Internet's worldwide network of customers; world trade involving computer software, entertainment products, information services, professional consulting, financial services, education businesses, medical diagnostics, advertising, and technical services is increasing rapidly as the Internet dramatically lowers costs and facilitates new types of commercial transactions; engineers, product developers, and managers thousands of miles apart can collaborate to design and manufacture new products more efficiently; businesses can work more efficiently with their suppliers and customers; consumers have greater choice and can shop in their homes for a wide variety of products from manufacturers and retailers all over the world, and they will be able to view these products on their computers or televisions--visions, access information about the products, and order and pay for their choices, all from their living rooms.

According to several estimates, commerce on the Internet will total tens of billions of dollars by the turn of the century and could expand rapidly after that, helping fuel economic growth well into the 21st century.

For this potential to be realized, governments must adopt a market-oriented approach to electronic commerce, one that facilitates the emergence of a global, transparent, and predictable environment to support business and commerce.

Government officials must respect the unique nature of the medium and recognize that widespread competition and increased consumer choice should be the defining features of the new digital marketplace.

Many businesses and consumers are still wary of conducting extensive business over the Internet because of the lack of a predictable legal environment governing transactions. This is particularly true for international commercial activity where concerns about enforcement of contracts, liability, intellectual property protection, privacy, security, and other matters have caused businesses and consumers to be cautious.

Many companies and Internet users are also concerned that domestic or foreign governments will impose extensive regulations on the Internet and electronic commerce including taxes and tariffs, restrictions on the type of information transmitted, control over standards development, licensing requirements, and extensive regulation of Internet service providers. Indeed, signs of these types of commerce-inhibiting actions already are appearing in many nations.

Governments can have a profound effect on the growth of electronic commerce. By their actions, they can facilitate electronic trade or inhibit it. Knowing when to act and -- at least as important -- when not to act, will be crucial to the development of electronic commerce.

Today I have approved and released a report -- "A Framework For Global Electronic Commerce" -- outlining the principles that will guide my Administration's actions as we move forward into the new electronic age of commerce. This report articulates my Administration's vision for the emerging digital marketplace by declaring a set of principles, presenting a series of policies, and establishing an agenda for international discussions and agreements to facilitate the growth of electronic commerce. I expect all executive departments and agencies to review carefully the principles in this framework and implement appropriate policies.

Accordingly, I am hereby directing that executive department and agency heads should be guided in any future actions they take related to electronic commerce by the following principles:

-- For electronic commerce to flourish, the private sector must lead. Therefore, the Federal Government should encourage industry self-regulation wherever appropriate and support private sector efforts to develop technology and practices that facilitate the growth and success of the Internet.

-- Parties should be able to enter into legitimate agreements to buy and sell products and services across the Internet with minimal government involvement or intervention. Therefore, the Federal Government should refrain from imposing new and unnecessary regulations, bureaucratic procedures, or taxes and tariffs on commercial activities that take place on the Internet.

-- In some areas, government involvement may prove necessary to facilitate electronic commerce and protect consumers. Where governmental involvement is necessary, its aim should be to support and enforce a predictable, consistent, and simple legal environment for commerce.

-- The Federal Government should recognize the unique qualities of the Internet including its decentralized nature and its tradition of bottom-up governance. Existing laws and regulations that may hinder electronic commerce should be revised or eliminated consistent with the unique nature of the Internet.

-- The Internet is emerging as a global marketplace. The legal framework supporting commercial transactions on the Internet should be governed by consistent principles across State, national, and international borders that lead to predictable results regardless of the jurisdiction in which a particular buyer or seller resides.

I also direct the relevant agencies as identified in "A Framework For Global Electronic Commerce" to pursue the following policies:

1. I direct the U.S. Trade Representative to work with foreign governments to secure agreement within the next 12 months that all products and services delivered across the Internet will not be subject to tariffs and that all equipment from which the Internet is built will also not be subject to tariffs.

2. I direct the U.S. Trade Representative to work with foreign governments to enforce existing agreements and secure new agreements to make electronic commerce a seamless global marketplace. This will include enforcing provisions of the recently concluded World Trade Organization (WTO) Telecommunications Services Agreement; ensuring that product testing, certification, and approval processes do not unnecessarily restrict trade; ensuring that service providers have nondiscriminatory access to customers worldwide; and other measures that ensure a free flow of commerce.

3. I direct the Secretary of Commerce to seek the protection of copyright in the digital environment by working to achieve ratification in the United States and overseas within the next 12 months of the World Intellectual Property Organization (WIPO) Copyright Treaty and the WIPO Performances and Phonograms Treaty.

4. I direct the Secretary of Commerce to update and make more efficient our system for protecting patentable innovations to meet the needs of the fast-moving electronic age and to seek agreements with other governments to protect patentable innovations worldwide.

5. I direct the Secretary of Commerce to support efforts to make the governance of the domain name system private and competitive and to create a contractually based self-regulatory regime that deals with potential conflicts between domain name usage and trademark laws on a global basis.

6. I direct the Secretary of the Treasury to work with State and local governments and with

foreign governments to achieve agreements that will ensure that no new taxes are imposed that discriminate against Internet commerce; that existing taxes should be applied in ways that avoid inconsistent national tax jurisdictions and double taxation; and that tax systems treat economically similar transactions equally, regardless of whether such transactions occur through electronic means or through more conventional channels of commerce.

7. I direct the Secretary of Commerce to work with the private sector, State and local governments, and foreign governments to support the development, both domestically and internationally, of a uniform commercial legal framework that recognizes, facilitates, and enforces electronic transactions worldwide. I further direct the Secretary of Commerce within the next 12 months to seek to gain agreement with the private sector, State and local govern-governments, and foreign governments, both domestically and inter-nationally, on common approaches for authentication- of electronic transactions through technologies such as digital signatures.

8. I direct the Secretary of Commerce and the Director of the Office of Management and Budget to encourage private industry and privacy advocacy groups to develop and adopt within the next 12 months effective codes of conduct, industry developed rules, and technological solutions to protect privacy on the Internet consistent with the Privacy Principles issued by the Information Infrastructure Task Force (IITF) Privacy Working Group. I further direct the Director of the OMB to develop recommendations on the appropriate role of government consistent with "A Framework For Global Electronic Commerce." I further direct the Secretary and the Director to ensure that means are developed to protect the privacy of children.

9. I direct the Secretary of Commerce to encourage the development and adoption within the next 12 months by industry of easy to use and effective rating systems and filtering technologies that empower parents, teachers, and other Internet users to block content that is inappropriate for children.

10. I direct the Secretary of Commerce to support private sector development of technical standards for the Internet and the U.S. Trade Representative to oppose efforts by foreign governments to impose standards or to use standards for electronic commerce as non-tariff trade barriers.

11. I direct the Secretary of the Treasury to cooperate with foreign governments to monitor newly developing experiments in electronic payment systems; to oppose attempts by governments to establish inflexible and highly prescriptive regulations and rules that might inhibit the development of new systems for electronic payment; and as electronic payment systems develop, to work closely with the private sector in order to keep apprised about policy development and ensure that governmental activities flexibly accommodate the needs of the emerging marketplace.

12. I direct all executive departments and agencies to promote efforts domestically and internationally to make the Internet a secure environment for commerce. This includes ensuring secure and reliable telecommunications networks; ensuring an effective means for protecting the information systems attached to those networks; ensuring an effective means for authenticating and guaranteeing confidentiality of electronic information to protect data from unauthorized use; and providing information so that Internet users become well-trained and understand how to protect their systems and their data.

13. I direct the Administrator of General Services to move the Federal Government into the age of electronic commerce by expanding "GSA Advantage," its online shopping service for the Federal community to cover four million items by 12 months from now.

I am asking the Vice President to lead an interagency group coordinating the U.S. Government's electronic commerce strategy. Further, I am directing that executive department and agency heads report back to the Vice President and me through this interagency group every 6 months on their progress in meeting the terms of this directive.

WILLIAM J. CLINTON

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U.S. Department of Commerce
Wednesday, April 15, 1998
Contact: Mary F. Hanley
202-482-4883

Remarks by U.S. Secretary of Commerce William M. Daley--"The Emerging Digital Economy"

Good morning. And welcome. I am delighted all of you could be here. And I especially want to thank the Information Technology Policy Council for helping to organize this.

For several months, we have looked at the economic impact of information technologies. And I told my staff on this day, April 15th -- of all days -- I want to release the study.

As you know, this year when American taxpayers pay up, we will spend less than they send in. The last time that happened, IBM was not yet a member of the Dow; and there were no Microsofts, or Worldcoms, or Yahoos. In fact, as I look around, I think half of your companies weren't around 30 years ago.

Obviously, we arrived at this day because President Clinton and Congress took the hard medicine of downsizing and cutting programs. But the President would be the first to say that the natural strength of America -- our entrepreneurs, all of you -- also brought us here.

So, the symbolism is clear: American technologies have strengthened our economy to the point that this tax day, we are in the black.

Let me say one more thing, before I go through the numbers. This is about more than e-commerce, or e-mail, or e-trades, or e-files. It is about the "e" in economic opportunity. It is about the "e" in empowering businesses, workers, and consumers in ways that have never been done. It is about making sure this works to the benefit of all our businesses -- large and small, old and new, service or manufacturing.

This is about whether we can give workers the skills to be a part of this. And whether this is what American consumers want, because in the end, they have all the votes. You can hook them up, but consumers have to like it, or the technology loses this election!

When I read papers, I see articles about the Internet focused on negative issues. Things like pornography, identity theft, or electronic pirating. You and I know these are only by-products of something much larger, and with a much more positive impact on people's lives.

The report I am releasing today, called the Emerging Digital Economy, documents the importance of information technologies to our economy, to our businesses, and to our consumers. This is a work in progress. It will help us make better policy decisions; and you in business make better business decisions. And, the American people need to hear this side of the Internet, too.

So, with this in mind, look at some charts.

I am pleased to announce that in the last five years, information technologies have been responsible for more than one-quarter of real economic growth.

During a time when 15 million new jobs have been created, unemployment is the lowest in 24 years, inflation is the lowest in 30 years -- let me say this again: more than one-quarter of the growth comes from information technologies.

You have demonstrated this is the best time in America to be in business, and I, personally, thank you for that.

Next, as you can see, this industry now makes up more than 8 percent of our economy. And in our review, we found computer and communications industries growing at more than double the rate of the economy.

Next, these investments in information technologies account for over 45 percent of all business equipment investment -- up from 3 percent in the 1960s.

Our report shows companies are investing in these technologies to boost productivity and efficiency. Already, in industries like communications, insurance, and brokerage houses, they constitute over three-quarters of all equipment investments.

Next, you can see that declining prices of information technology products have lowered overall inflation by one full percentage point.

Finally, and this is important, these jobs pay well -- very well. There are 7.4 million people working in this field. They earn close to \$46,000 annually -- 64 percent more than the private sector average.

And even with the big paychecks, there are more jobs than people with the skills to fill them. We will require 1.3 million new information technology workers over 10 years. That is more people than build cars and trucks at the Big Three.

The President asked me to see what we can do to expand the pool. But, to be honest, in this economy, where new industries emerge overnight, and new talents are needed, I feel businesses have to take on new responsibilities.

We want you to work with us to help people make the shift into changing jobs. We need you to retrain workers, whose skills may be obsolete. And we need you to work more closely with schools.

I see it happening. When CEOs are faced with turning away business because they cannot find the right people, they are serious about changing.

Let me give you a few more numbers. Last year, 100 million people logged onto the Internet, up from 40 million the year before. That is faster than the phone, TV, and radio were adopted.

When President Clinton took office there were only 50 -- 50 -- web sites. Now, 65,000 are being added -- every hour.

Those are impressive numbers, no doubt. But the question we have to ask is: are businesses truly reshaping themselves? Or are they just dancing around here?

The answer is a big yes to true re-invention.

General Electric went on line to find suppliers -- and cut costs tremendously. In two years, GE plans to buy \$5 billion of goods over the Internet, and expects to save \$500 million.

Dell Computers saw 1997 Internet sales increase from less than \$1 million per day in January -- to daily sales of \$6 million several times in December.

Cisco Systems closed 1996 with \$100 million in sales on the Internet. By the end of 1997, sales topped \$1 billion.

It is small businesses, too. When I was in Michigan last week, I heard an amazing number: 750 computer-related firms in the state export. This is Michigan, smokestack America -- not Silicon Valley.

E-commerce gives small and medium-sized firms immediate access to worldwide markets without the need for overseas trips or overseas reps.

On the retail front, we see two types of distinct activity. First, direct access -- as when music is downloaded directly from a company to a customer's computer.

And second, orders for goods to be delivered physically. For example, Auto-by-Tel is a web-based automotive marketplace. Last year, it generated \$500 million in sales and processed 100,000 purchase requests -- each month.

So, what is the report telling us?

That the digital economy is alive and well and growing; that some businesses and workers are reaping the benefits; that businesses of all sizes should prepare for the digital economy; and that, given the new role of electronic commerce, government should re-think the way it looks at the economy.

To that end, at Commerce, I want to improve our surveys that measure GDP, in order to better capture the value of these technologies. I have asked Congress for the funds to do so.

As you know, our approach to e-commerce is that the private sector should lead. Government's role is to establish a climate where electronic commerce can flourish. We prefer private contracts over government regulation. And, where we need to act, the private sector should be part of the dialogue.

I am obviously focusing on adequate protection of intellectual property on-line. It is staggering to think that one day people with a computer may get every song ever sung, every movie ever made, every creative work ever created.

My children would tell me: this is big. It is also big for the entertainment industry, and clearly you can see their concerns.

The Administration negotiated two treaties in 1996: the World Intellectual Property Organization Copyright Treaty, and the Performances and Phonogram Treat. These set international standards for protecting copyrighted works, musical performances, and sound recording.

I am pleased to say that Rep. Hyde recently moved the implementing legislation through his Committee. Senator Hatch is also working to move it through his Committee, soon after Congress returns. I am also pleased to say that industry has reached an agreement in principle on how to address the potential copyright liability of on-line service providers.

I call on Congress to move quickly to finish the work, so we can give a gift to consumers, while protecting the artists. It is important that industry support these measures. We lead the world in creating copyrightable works. We need to lead the world in protecting those works.

Another key issue is privacy. To me, this is the make or break issue. Look -- you can offer the best products, the best selection, the best distribution. But consumers need to feel a certain level of privacy.

They know companies can collect vast amounts of information and instantly analyze it. And if they feel when they order a plane ticket or buy a stock, that their personal transactions are being shared with others, then I say it will be the last time they do business on the Internet.

Last month, in an editorial, Business Week told businesses and I quote: "Time is running out. The public does not trust its promises for self-regulation to ensure privacy. The polls show that people don't believe that these voluntary standards are working. It's no wonder that the public wants the government to step in immediately."

Now is the time for industry to act. President Clinton has called for a self-regulatory approach to privacy. This would stand on four pillars:

- One, awareness. Consumers need to know who is collecting personal information, how it will be used, and how they may limit disclosure.

- Two, choice. Consumers should have an option as to if and how their personal information is used.
- Three, data security. Companies with personal information must take reasonable measures to assure reliability and protection from loss, misuse, alteration, or destruction.
- And, four, access. Consumers should have reasonable access to personal records held by companies and be able to correct or amend them.

The truth is, industry has been slow to put these protections in place. While the pace has picked up recently, the July 1st deadline when I report the progress to the President is looming. I very much want this to be a positive report. And I would like to use this opportunity to encourage industry to meet this challenge.

I hope you move quickly to establish an overarching, self-regulatory effort that includes consumer representation.

Let me say, I am also working quickly to end federal involvement in Internet addressing. We have put forward a plan. We are reviewing the comments. And we will move ahead to put this into private hands.

We are also working to develop a uniform commercial legal framework for electronic transactions worldwide. A key element of this is recognition and enforcement of electronic signatures.

We have recently proposed an international convention that supports two goals: recognition of signatures for legal and commercial purposes; and expressly allowing a full range of authentication technologies and business applications.

And one last issue I want to address is security, in particular, encryption. Good security is essential. If you don't have confidence your message or transaction will go only to its intended destination and will not be intercepted, and read, or changed by someone else e-commerce will never fulfill its potential.

The President is trying to pursue a policy that balances law enforcement, national security, privacy and commercial interests. At the same time, that policy must be pursued in light of the realities of a global economy. This issue cannot be considered in a vacuum any more than any other economic issue.

The reality is that encryption products are rapidly multiplying in the global market. At the end of 1997, we estimate there were 656 encryption products in 29 countries outside the United States. There are major producers in Germany, Ireland, Canada, Israel and Great Britain. They are competitive with anything U.S. producers can make. And they can supply almost all the needs of computer networks.

And most of these producers do not need an export license if they want to ship encryption software -- a tremendous market advantage. Our policy, ironically, encourages the growth of foreign producers at the same time it retards growth here.

The truth is that while our policy goal -- balance -- is the right one, our implementation has been a failure. We have not been able to agree -- amongst ourselves or with the business community -- on how to reach that balance.

We have not been able to agree on what products can be exported, on how to implement the policies that we have announced, such as that concerning financial institutions. And we have not been able to agree on what we want to encourage companies to do or on what we want Congress to do.

In turn, our own paralysis has made it difficult to persuade other nations to pursue policies similar to ours. Without the cooperation of other nations, the global market is rendering our policy obsolete. And I fear that will soon make our products obsolete as well.

The lack of agreement is caused by the unwillingness to compromise. There are solutions out there. Solutions that would meet some of law enforcement's needs without compromising the concerns of the privacy and business communities. But I fear our search has thus far been more symbolic than sincere.

The cost of our failure will be high. Law enforcement is foregoing the opportunity to have some problems addressed, while effectively forcing our producers to go overseas or fall off the cutting edge of the market.

The ultimate result will be foreign dominance of the market. This means a loss of jobs here, and products that do not meet either our law enforcement or national security needs. We are headed down a lose-lose path. And we have to get back to win-win.

We've talked a lot about this for several years. We can talk some more. But without a commitment on all sides to settle for less than 100 percent, we are no closer to resolution than we were when we began.

So, I say to you today that I intend to make a renewed effort to achieve that willingness to compromise inside the government. And I hope all of you will do the same among your colleagues.

Let me close on this. Tonight, I travel with President Clinton to South America, as we work to bring free trade to the hemisphere. Seventy years ago, Herbert Hoover -- one of my predecessors -- was our first president to ever visit South America. Ironically, he went there to inaugurate air mail service.

Knowing President Clinton, he will head straight to a school, to check our e-mail service. He knows, better than anyone, that in the information age, no matter where you live, we can widen

the circle of opportunity, so more people can make more out of their lives.

That is what this report is all about. It shows -- clearly -- that technology is re-shaping this economy and transforming businesses and consumers.

We have made gigabytes of progress. And, yes, there are more challenges ahead. So, I look forward to working, together, to forever change the face of commerce, to provide more economic opportunities, and to empower consumers as never before.

Thank you very much.



REPORT SUMMARY

The President's Commission on Critical Infrastructure Protection

This report summary is also available in a formatted Acrobat version (30k). The report itself is also available at this Web site.

Critical Foundations

Thinking Differently

"Our responsibility is to build the world of tomorrow by embarking on a period of construction -- one based on current realities but enduring American values and interests..."

President William J. Clinton
National Security Strategy

Introduction

The United States is in the midst of a tremendous cultural change -- a change that affects every aspect of our lives. The cyber dimension promotes accelerating reliance on our infrastructures and offers access to them from all over the world, blurring traditional boundaries and jurisdictions. National defense is not just about government anymore, and economic security is not just about business. The critical infrastructures are central to our national defense and our economic power, and we must lay the foundations for their future security on a new form of cooperation between the private sector and the federal government.

The federal government has an important role to play in defense against cyber threats -- collecting information about tools that can do harm, conducting research into defensive technologies, and sharing defensive techniques and best practices. Government also must lead and energize its own protection efforts, and engage the private sector by offering expertise to facilitate protection of privately owned infrastructures.

In the private sector, the defenses and responsibilities naturally encouraged and expected as prudent business practice for owners and operators of our infrastructures are the very same measures needed to protect against the cyber tools available to terrorists and other threats to national security.

Venues for Change

Terrorist bombings of US forces in Saudi Arabia, the World Trade Center in New York City, and the federal building in Oklahoma City remind us that the end of the Cold War has not eliminated threats of hostile action against the United States.

In recognition of comparable threats to our national infrastructures, President Clinton signed Executive Order 13010 on July 15, 1996, establishing the President's Commission on Critical Infrastructure Protection. The Commission was chartered to conduct a comprehensive review and recommend a national policy for protecting critical infrastructures and assuring their continued operation.

national policy for protecting critical infrastructures and assuring their continued operation.

Our Process -- Who We Are and What We Did

Composition and Operation of the Commission

This was an unusually large commission with broad representation from federal departments and agencies and from the private sector. An Advisory Committee of industry leaders appointed by the President provided the perspective of the infrastructure owners and operators. A Steering Committee, composed of the Commission's Chairman and four top government officials, oversaw the Commission's work on behalf of the Principals Committee, which included Cabinet Officers, heads of agencies, and senior White House staff members.

The Commission generally operated by consensus. Every recommendation was discussed at length with the full Commission and most were revised several times before final approval. No Commissioner agreed completely with all of the recommendations. Nevertheless, each accepted the final report as a reasonable and balanced recommendation to the President.

Sector Studies

The Commission divided its work into five "sectors" based on the common characteristics of the included industries. The sectors are:

1. Information and Communications
2. Banking and Finance
3. Energy, Including Electrical Power, Oil and Gas
4. Physical Distribution
5. Vital Human Services

The Commission characterized the sectors, studied their vulnerabilities, and looked for solutions.

We prepared comprehensive working papers for each of the five sectors providing specific recommendations. Other work contains the results of deliberations on issues that are not sector specific. Among them is a paper on *Research and Development Recommendations*, which outlines a comprehensive set of topics regarding the long term needs of infrastructure protection. The paper on *National Structures* contains our conclusions and recommendations about the functions and responsibilities for infrastructure assurance and the creation of new units in the federal government and the private sector, and some that are jointly staffed by government employees and representatives of the infrastructure owners and operators. The paper on *Shared Infrastructures: Shared Threats* is our collected analysis of the vulnerabilities and threats facing the critical infrastructures. We recognize the enormous significance of physical threats, but we have a significant amount of experience in dealing with them. It is the cyber threat that is new. Cyber issues dominate this analysis because networked information systems present fundamentally new security challenges.

Public Hearings and Outreach

We conducted extensive meetings with a range of professional and trade associations concerned with the infrastructures, private sector infrastructure users and providers, academia, different state and local government agencies, consumers, federal agencies, and numerous others. Of special interest were five public meetings in major cities.

We attended dozens of conferences and roundtables with a variety of groups, and we arranged two strategic simulations with participants drawn from across the infrastructures and from all levels of government. We encouraged questions and comments by anyone, and established a World Wide Web site to facilitate contact. Several meetings with Congressional Members and their staffs added a very useful perspective to our research.

useful perspective to our research.

Development of our Critical Issues

During the preparation of the sector papers we identified several dozen issues for which recommendations might be appropriate. Each issue was described, relevant observations, findings, and conclusions were collected, and several alternative recommendations were prepared. The Commission then deliberated each issue and selected one of the alternative recommendations.

We Found

Increasing Dependence on Critical Infrastructures

The development of the computer and its astonishingly rapid improvements have ushered in the Information Age that affects almost all aspects of American commerce and society. Our security, economy, way of life, and perhaps even survival, are now dependent on the interrelated trio of electrical energy, communications, and computers.

Increasing Vulnerabilities

Classical physical disruptions. A satchel of dynamite or a truckload of fertilizer and diesel fuel have been frequent terrorist tools. The explosion and the damage are so certain to draw attention that these kinds of attacks continue to be among the probable threats to our infrastructures.

New, cyber threats. Today, the right command sent over a network to a power generating station's control computer could be just as effective as a backpack full of explosives, and the perpetrator would be harder to identify and apprehend.

The rapid growth of a computer-literate population ensures that increasing millions of people possess the skills necessary to consider such an attack. The wide adoption of public protocols for system interconnection and the availability of "hacker tool" libraries make their task easier.

While the resources needed to conduct a physical attack have not changed much recently, the resources necessary to conduct a cyber attack are now commonplace. A personal computer and a simple telephone connection to an Internet Service Provider anywhere in the world are enough to cause a great deal of harm.

System complexities and interdependencies. The energy and communications infrastructures especially are growing in complexity and operating closer to their designed capacity. This creates an increased possibility of cascading effects that begin with a rather minor and routine disturbance and end only after a large regional outage. Because of their technical complexity, some of these dependencies may be unrecognized until a major failure occurs.

A Wide Spectrum of Threats

Of the many people with the necessary skills and resources, some may have the motivation to cause substantial disruption in services or destruction of the equipment used to provide the service.

This list of the kinds of threats we considered shows the scope of activity with potentially adverse consequences for the infrastructures, and the diversity of people who might engage in that activity. It may not be possible to categorize the threat until the perpetrator is identified -- for example, we may not be able to distinguish industrial espionage from national intelligence collection.

Natural events and accidents. Storm-driven wind and water regularly cause service outages, but the effects are well known, the providers are experienced in dealing with these situations, and the effects are

limited in time and geography.

Accidental physical damage to facilities is known to cause a large fraction of system incidents. Common examples are fires and floods at central facilities and the ubiquitous backhoe that unintentionally severs pipes or cables.

Blunders, errors, and omissions. By most accounts, incompetent, inquisitive, or unintentional human actions (or omissions) cause a large fraction of the system incidents that are not explained by natural events and accidents. Since these usually only affect local areas, service is quickly restored; but there is potential for a nationally significant event.

Insiders. Normal operation demands that a large number of people have authorized access to the facilities or to the associated information and communications systems. If motivated by a perception of unfair treatment by management, or if suborned by an outsider, an "insider" could use authorized access for unauthorized disruptive purposes.

Recreational hackers. For an unknown number of people, gaining unauthorized electronic access to information and communication systems is a most fascinating and challenging game. Often they deliberately arrange for their activities to be noticed even while hiding their specific identities. While their motivations do not include actual disruption of service, the tools and techniques they perfect among their community are available to those with hostile intent.

Criminal activity. Some are interested in personal financial gain through manipulation of financial or credit accounts or stealing services. In contrast to some hackers, these criminals typically hope their activities will never be noticed, much less attributed to them. Organized crime groups may be interested in direct financial gain, or in covering their activity in other areas.

Industrial espionage. Some firms can find reasons to discover the proprietary activities of their competitors, by open means if possible or by criminal means if necessary. Often these are international activities conducted on a global scale.

Terrorism. A variety of groups around the world would like to influence US policy and are willing to use disruptive tactics if they think that will help.

National intelligence. Most, if not all, nations have at least some interest in discovering what would otherwise be secrets of other nations for a variety of economic, political, or military purposes.

Information warfare. Both physical and cyber attacks on our infrastructures could be part of a broad, orchestrated attempt to disrupt a major US military operation or a significant economic activity.

Lack of Awareness

We have observed that the general public seems unaware of the extent of the vulnerabilities in the services that we all take for granted, and that within government and among industry decision-makers, awareness is limited. Several have told us that there has not yet been a cause for concern sufficient to demand action.

We do acknowledge that this situation seems to be changing for the better. The public news media seem to be carrying relevant articles more frequently; attendance at conferences of security professionals is up; and vendors are actively introducing new security products.

The Commission believes that the actions recommended in this report will increase sensitivity to these problems and reduce our vulnerabilities at all levels.

No National Focus

Related to the lack of awareness is the need for a national focus or advocate for infrastructure protection.

Following up on our report to the President, we need to build a framework of effective deterrence and prevention.

This is not simply the usual study group's lament that "no one is in charge." These infrastructures are so varied, and form such a large part of this nation's economic activity, that no one person or organization *can* be in charge. We do not need, and probably could not stand, the appointment of a *Director of Infrastructures*. We do need, and recommend, several more modest ways to create and maintain a national focus on the issues.

Protection of our infrastructures will not be accomplished by a big federal project. It will require continuous attention and incremental improvement for the foreseeable future.

We Concluded

Life on the information superhighway isn't much different from life on the streets; the good guys have to hustle to keep the bad guys from getting ahead.

Rules Change in Cyberspace -- New Thinking is Required

It is not surprising that infrastructures have always been attractive targets for those who would do us harm. In the past we have been protected from hostile attacks on the infrastructures by broad oceans and friendly neighbors. Today, the evolution of cyber threats has changed the situation dramatically. In cyberspace, national borders are no longer relevant. Electrons don't stop to show passports.

Potentially serious cyber attacks can be conceived and planned without detectable logistic preparation. They can be invisibly reconnoitered, clandestinely rehearsed, and then mounted in a matter of minutes or even seconds without revealing the identity and location of the attacker.

Formulas that carefully divide responsibility between foreign defense and domestic law enforcement no longer apply as clearly as they used to. "With the existing rules, you may have to solve the crime before you can decide who has the authority to investigate it." □

We Should Act Now to Protect our Future

The Commission has not discovered an imminent attack or a credible threat sufficient to warrant a sense of immediate national crisis. However, we are quite convinced that our vulnerabilities are increasing steadily while the costs associated with an effective attack continue to drop. What is more, the investments required to improve the situation are still relatively modest, but will rise if we procrastinate.

We should attend to our critical foundations before the storm arrives, not after: Waiting for disaster will prove as expensive as it is irresponsible.

Infrastructure Assurance is a Shared Responsibility

National security requires much more than military strength. Our world position, our ability to influence others, our standard of living, and our own self-image depend on economic prosperity and public confidence. Clear distinctions between foreign and domestic policy no longer serve our interests well.

At the same time, the effective operation of our military forces depends more and more on the continuous availability of infrastructures, especially communications and transportation, that are not dedicated to military use.

While no nation state is likely to attack our territory or our armed forces, we are inevitably the target of ill will and hostility from some quarters. Disruption of the services on which our economy and well-being depend could have significant effects, and if repeated frequently could seriously harm public

confidence. Because our military and private infrastructures are becoming less and less separate, because the threats are harder to differentiate as from local criminals or foreign powers, and because the techniques of protection, mitigation, and restoration are largely the same, we conclude that responsibility for infrastructure protection and assurance can no longer be delegated on the basis of who the attacker is or where the attack originates. Rather, the responsibility should be shared cooperatively among all of the players.

We Recommend

A Broad Program of Awareness and Education

Because of our finding that the public in general and many industry and government leaders are insufficiently aware of the vulnerabilities, we have recommended a broad and continuous program of awareness and education to cover all possible audiences. We include White House conferences, National Academy studies, presentations at industry associations and professional societies, development and promulgation of elementary and secondary curricula, and sponsorship of graduate studies and programs.

Infrastructure Protection through Industry Cooperation and Information Sharing

We believe the quickest and most effective way to achieve a much higher level of protection from cyber threats is to raise the level of existing protection through application of "best practices." We have accordingly recommended a sector-by-sector cooperation and information sharing strategy. In general, these sector structures should be partnerships among the owners and operators, and appropriate government agencies, which will identify and communicate best practices. We have especially asked the National Institute of Standards and Technology (NIST) and the National Security Agency (NSA) to provide technical skills and expertise required to identify and evaluate vulnerabilities in the associated information networks and control systems.

One very effective practice is a quantitative risk-management process, addressing physical attacks, cyber attacks that could corrupt essential information or deny service, the possibility of cascading effects, and new levels of interdependency.

The first focus of sector cooperation should be to share information and techniques related to -risk management assessments. This should include development and deployment of ways to prevent attacks, mitigate damage, quickly recover services, and eventually reconstitute the infrastructure

We suggest consideration of these immediate actions prior to the completion of a formal risk assessment: (1) Isolate critical control systems from insecure networks by disconnection or adequate firewalls; (2) Adopt best practices for password control and protection, or install more modern authentication mechanisms; (3) Provide for individual accountability through protected action logs or the equivalent.

The sector cooperation and information sharing needed to improve risk assessments and to protect against probable attacks may naturally develop into sharing of information on current status. This would permit assessing whether one of the infrastructures is under a coordinated attack -- physical, cyber, or combined. As this process develops, the national center for analysis of such information should be in place and ready to cooperate.

Reconsideration of Laws Related to Infrastructure Protection

Law has failed to keep pace with technology. Some laws capable of promoting assurance are not as clear or effective as they could be. Still others can operate in ways that may be unfriendly to security concerns. Sorting them all out will be a lengthy and massive undertaking, involving efforts at local,

state, federal, and international levels. Recognizing the dynamic nature of legal reform, we attempted to lay a foundation through various studies, papers, and a legal authorities database that can aid eventual implementation of our recommendations and assist owners, operators, and government at all levels.

We also offered a number of preliminary legal recommendations intended to jump-start this process of reform. We identified existing laws that could help the government take the lead and serve as a model of standards and practices for the private sector. We identified other areas of law which, with careful attention, can enable infrastructure owners and operators to take precautions proportionate to the threat. We identified still other areas of law that should be molded to enable a greater degree of government-industry partnership in areas such as information sharing.

A Revised Program of Research and Development

The Commission believes that some of the basic technology needed to improve infrastructure protection already exists, but needs to be widely deployed. In other areas, additional research effort is needed.

At the same time the Commission recognizes that we are not now able to deploy several capabilities that we need. We have, therefore, recommended a program of research and development focused on those future capabilities. Among them are new capabilities for detection and identification of intrusion and improved simulation and modeling capability to understand the effects of interconnected and fully interdependent infrastructures.

A National Organization Structure

In order to be effective, recommendations must discuss not only what is to be done, but how it will get done and who will do it. We have recommended the following partnering organizations be established to be responsible for specific parts of our vision:

Sector Coordinators to provide the focus for industry cooperation and information sharing, and to represent the sector in matters of national cooperation and policy;

Lead Agencies, designated within the federal government, to serve as a conduit from the government into each sector and to facilitate the creation of sector coordinators, if needed;

National Infrastructure Assurance Council of industry CEOs, Cabinet Secretaries, and representatives of state and local government to provide policy advice and implementation commitment;

Information Sharing and Analysis Center to begin the step-by-step process of establishing a realistic understanding of what is going on in our infrastructures -- of distinguishing actual attack from coincidental events;

Infrastructure Assurance Support Office to house the bulk of the national staff which is responsible for continuous management and follow-through of our recommendations; and

Office of National Infrastructure Assurance as the top-level policy making office connected closely to the National Security Council and the National Economic Council.

Conclusion

It is clear to us that infrastructure assurance must be a high priority for the nation in the Information Age. With escalating dependence on information and telecommunications, our infrastructures no longer enjoy the protection of oceans and military forces. They are vulnerable in new ways. We must protect them in new ways. And that is what we recommend in this report.

The public and private sectors share responsibility for infrastructure protection. Our recommendations

seek to provide structures for the partnership needed to assure our future security. Further, they seek to define new ways for approaching infrastructure assurance -- ways that recognize the new thinking required in the Information Age, the new international security environment emerging from our victory in the Cold War and both the promise and danger of technology moving at breakneck speed.

We do not so much offer solutions as directions -- compass headings that will help navigate through a new geography and ensure the continuity of the infrastructures that underpin America's economic, military, and social strength.

Endnotes

1. Senator Sam Nunn, remarks to the PCCIP Advisory Committee. Washington, DC, September 7, 1997.

This report summary is also available in [a formatted Acrobat version](#) (30k). [The report itself](#) is also available at this Web site.

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A Framework for Global Electronic Commerce

The White House
July 1, 1997

Download Framework in WP 6.0

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A COORDINATED STRATEGY

BACKGROUND

Framework for Global Electronic Commerce
President William J. Clinton
Vice President Albert Gore, Jr.
Washington, D.C.
July 1, 1997

BACKGROUND

The Global Information Infrastructure (GII), still in the early stages of its development, is already transforming our world. Over the next decade, advances on the GII will affect almost every aspect of daily life -- education, health care, work and leisure activities. Disparate populations, once separated by distance and time, will experience these changes as part of a global community.

No single force embodies our electronic transformation more than the evolving medium known as the Internet. Once a tool reserved for scientific and academic exchange, the Internet has emerged as an appliance of every day life, accessible from almost every point on the planet. Students across the world are discovering vast treasure troves of data via the World Wide Web. Doctors are utilizing tele-medicine to administer off-site diagnoses to patients in need. Citizens of many nations are finding additional outlets for personal and political expression. The Internet is being used to reinvent government and reshape our lives and our communities in the process. As the Internet empowers citizens and democratizes societies, it is also changing classic business and economic paradigms. New models of commercial interaction are developing as businesses and consumers participate in the electronic marketplace and reap the resultant benefits. Entrepreneurs are able to start new businesses more easily, with smaller up-front investment requirements, by accessing the Internet's worldwide network of customers.

Internet technology is having a profound effect on the global trade in services. World trade involving computer software, entertainment products (motion pictures, videos, games, sound recordings), information services (databases, online newspapers), technical information, product licenses, financial services, and professional services (businesses and technical consulting, accounting, architectural design, legal advice, travel services, etc.) has grown rapidly in the past decade, now accounting for well over \$40 billion of U.S. exports alone.

An increasing share of these transactions occurs online. The GII has the potential to revolutionize commerce in these and other areas by dramatically lowering transaction costs and facilitating new types of commercial transactions.

The Internet will also revolutionize retail and direct marketing. Consumers will be able to shop in their homes for a wide variety of products from manufacturers and retailers all over the world. They will be able to view these products on their computers or televisions, access information about the products, visualize the way the products may fit together (constructing a room of furniture on their screen, for example), and order and pay for their choice, all from their living rooms.

Commerce on the Internet could total tens of billions of dollars by the turn of the century. For this potential to be realized fully, governments must adopt a non-regulatory, market-oriented approach to electronic commerce, one that facilitates the emergence of a transparent and predictable legal environment to support global business and commerce. Official decision makers must respect the unique nature of the medium and recognize that widespread competition and increased consumer choice should be the defining features of the new digital marketplace.

Many businesses and consumers are still wary of conducting extensive business over the Internet because of the lack of a predictable legal environment governing transactions. This is particularly true for international commercial activity where concerns about enforcement of contracts, liability, intellectual property protection, privacy, security and other matters have caused businesses and consumers to be cautious.

As use of the Internet expands, many companies and Internet users are concerned that some governments will impose

extensive regulations on the Internet and electronic commerce. Potential areas of problematic regulation include taxes and duties, restrictions on the type of information transmitted, control over standards development, licensing requirements and rate regulation of service providers. Indeed, signs of these types of commerce-inhibiting actions already are appearing in many nations. Preempting these harmful actions before they take root is a strong motivation for the strategy outlined in this paper.

Governments can have a profound effect on the growth of commerce on the Internet. By their actions, they can facilitate electronic trade or inhibit it. Knowing when to act and -- at least as important -- when not to act, will be crucial to the development of electronic commerce. This report articulates the Administration's vision for the emergence of the GII as a vibrant global marketplace by suggesting a set of principles, presenting a series of policies, and establishing a road map for international discussions and agreements to facilitate the growth of commerce on the Internet.

PRINCIPLES

1. The private sector should lead.

Though government played a role in financing the initial development of the Internet, its expansion has been driven primarily by the private sector. For electronic commerce to flourish, the private sector must continue to lead. Innovation, expanded services, broader participation, and lower prices will arise in a market-driven arena, not in an environment that operates as a regulated industry.

Accordingly, governments should encourage industry self-regulation wherever appropriate and support the efforts of private sector organizations to develop mechanisms to facilitate the successful operation of the Internet. Even where collective agreements or standards are necessary, private entities should, where possible, take the lead in organizing them. Where government action or intergovernmental agreements are necessary, on taxation for example, private sector participation should be a formal part of the policy making process.

2. Governments should avoid undue restrictions on electronic commerce.

Parties should be able to enter into legitimate agreements to buy and sell products and services across the Internet with minimal government involvement or intervention. Unnecessary regulation of commercial activities will distort development of the electronic marketplace by decreasing the supply and raising the cost of products and services for consumers the world over.

Business models must evolve rapidly to keep pace with the break-neck speed of change in the technology; government attempts to regulate are likely to be outmoded by the time they are finally enacted, especially to the extent such regulations are technology-specific.

Accordingly, governments should refrain from imposing new and unnecessary regulations, bureaucratic procedures, or taxes and tariffs on commercial activities that take place via the Internet.

3. Where governmental involvement is needed, its aim should be to support and enforce a predictable, minimalist, consistent and simple legal environment for commerce.

In some areas, government agreements may prove necessary to facilitate electronic commerce and protect consumers. In these cases, governments should establish a predictable and simple legal environment based on a decentralized, contractual model of law rather than one based on top-down regulation. This may involve states as well as national governments. Where government intervention is necessary to facilitate electronic commerce, its goal should be to ensure competition, protect intellectual property and privacy, prevent fraud, foster transparency, support commercial transactions, and facilitate dispute resolution.

4. Governments should recognize the unique qualities of the Internet.

The genius and explosive success of the Internet can be attributed in part to its decentralized nature and to its tradition of bottom-up governance. These same characteristics pose significant logistical and technological challenges to existing regulatory models, and governments should tailor their policies accordingly.

Electronic commerce faces significant challenges where it intersects with existing regulatory schemes. We should not assume, for example, that the regulatory frameworks established over the past sixty years for telecommunications, radio and television fit the Internet. Regulation should be imposed only as a necessary means to achieve an important goal on which there is a broad consensus. Existing laws and regulations that may hinder electronic commerce should be reviewed and revised or eliminated to reflect the needs of the new electronic age.

5. Electronic Commerce over the Internet should be facilitated on a global basis.

The Internet is emerging as a global marketplace. The legal framework supporting commercial transactions on the Internet should be governed by consistent principles across state, national, and international borders that lead to predictable results regardless of the jurisdiction in which a particular buyer or seller resides.

ISSUES

This paper covers nine areas where international agreements are needed to preserve the Internet as a non-regulatory medium, one in which competition and consumer choice will shape the marketplace. Although there are significant areas of overlap, these items can be divided into three main subgroups: financial issues, legal issues, and market access issues.

Financial Issues

- customs and taxation
- electronic payments

Legal Issues

- 'Uniform Commercial Code' for electronic commerce
- intellectual property protection
- privacy
- security

Market Access Issues

- telecommunications infrastructure and information technology
- content
- technical standards

I. Financial Issues

1. CUSTOMS AND TAXATION

For over 50 years, nations have negotiated tariff reductions because they have recognized that the economies and citizens of all nations benefit from freer trade. Given this recognition, and because the Internet is truly a global medium, it makes little sense to introduce tariffs on goods and services delivered over the Internet.

Further, the Internet lacks the clear and fixed geographic lines of transit that historically have characterized the physical trade of goods. Thus, while it remains possible to administer tariffs for products ordered over the Internet but ultimately delivered via surface or air transport, the structure of the Internet makes it difficult to do so when the product or service is delivered electronically. Nevertheless, many nations are looking for new sources of revenue, and may seek to levy tariffs on global electronic commerce.

Therefore, the United States will advocate in the World Trade Organization (WTO) and other appropriate international fora that the Internet be declared a tariff-free environment whenever it is used to deliver products or services. This principle should be established quickly before nations impose tariffs and before vested interests form to protect those tariffs.

In addition, the United States believes that no new taxes should be imposed on Internet commerce. The taxation of commerce conducted over the Internet should be consistent with the established principles of international taxation, should avoid inconsistent national tax jurisdictions and double taxation, and should be simple to administer and easy to understand.

Any taxation of Internet sales should follow these principles:

It should neither distort nor hinder commerce. No tax system should discriminate among types of commerce, nor should it create incentives that will change the nature or location of transactions.

The system should be simple and transparent. It should be capable of capturing the overwhelming majority of appropriate revenues, be easy to implement, and minimize burdensome record keeping and costs for all parties.

The system should be able to accommodate tax systems used by the United States and our international partners today. Wherever feasible, we should look to existing taxation concepts and principles to achieve these goals.

Any such taxation system will have to accomplish these goals in the context of the Internet's special characteristics -- the potential anonymity of buyer and seller, the capacity for multiple small transactions, and the difficulty of associating online activities with physically defined locations.

To achieve global consensus on this approach, the United States, through the Treasury Department, is participating in discussions on the taxation of electronic commerce through the Organization for Economic Cooperation and Development (OECD), the primary forum for cooperation in international taxation.

The Administration is also concerned about possible moves by state and local tax authorities to target electronic commerce and Internet access. The uncertainties associated with such taxes and the inconsistencies among them could stifle the development of Internet commerce.

The Administration believes that the same broad principles applicable to international taxation, such as not hindering the growth of electronic commerce and neutrality between conventional and electronic commerce, should be applied to subfederal taxation. No new taxes should be applied to electronic commerce, and states should coordinate their allocation of income derived from electronic commerce. Of course, implementation of these principles may differ at the subfederal level where indirect taxation plays a larger role.

Before any further action is taken, states and local governments should cooperate to develop a uniform, simple approach to the taxation of electronic commerce, based on existing principles of taxation where feasible.

2. ELECTRONIC PAYMENT SYSTEMS

New technology has made it possible to pay for goods and services over the Internet. Some of the methods would link existing electronic banking and payment systems, including credit and debit card networks, with new retail interfaces via the Internet. Electronic money, based on stored-value, smart card, or other technologies, is also under development. Substantial private sector investment and competition is spurring an intense period of innovation that should benefit consumers and businesses wishing to engage in global electronic commerce.

At this early stage in the development of electronic payment systems, the commercial and technological environment is changing rapidly. It would be hard to develop policy that is both timely and appropriate. For these reasons, inflexible and highly prescriptive regulations and rules are inappropriate and potentially harmful. Rather, in the near term, case-by-case monitoring of electronic payment experiments is preferred.

From a longer term perspective, however, the marketplace and industry self-regulation alone may not fully address all issues. For example, government action may be necessary to ensure the safety and soundness of electronic payment systems, to protect consumers, or to respond to important law enforcement objectives.

The United States, through the Department of the Treasury, is working with other governments in international fora to study the global implications of emerging electronic payment systems. A number of organizations are already working on important aspects of electronic banking and payments. Their analyses will contribute to a better understanding of how electronic payment systems will affect global commerce and banking.

The Economic Communique issued at the Lyon Summit by the G-7 Heads of State called for a cooperative study of the implications of new, sophisticated retail electronic payment systems. In response, the G-10 deputies formed a Working Party, with representation from finance ministries and central banks (in consultation with law enforcement authorities). The Working Party is chaired by a representative from the U.S. Treasury Department, and tasked to produce a report that identifies common policy objectives among the G-10 countries and analyzes the national approaches to electronic commerce taken to date.

As electronic payment systems develop, governments should work closely with the private sector to inform policy development, and ensure that governmental activities flexibly accommodate the needs of the emerging marketplace.

II. Legal Issues

3. *'UNIFORM COMMERCIAL CODE' FOR ELECTRONIC COMMERCE*

In general, parties should be able to do business with each other on the Internet under whatever terms and conditions they agree upon. Private enterprise and free markets have typically flourished, however, where there are predictable and widely accepted legal environments supporting commercial transactions. To encourage electronic commerce, the U.S. government should support the development of both a domestic and global uniform commercial legal framework that recognizes, facilitates, and enforces electronic transactions worldwide. Fully informed buyers and sellers could voluntarily agree to form a contract subject to this uniform legal framework, just as parties currently choose the body of law that will be used to interpret their contract.

Participants in the marketplace should define and articulate most of the rules that will govern electronic commerce. To enable private entities to perform this task and to fulfill their roles adequately, governments should encourage the development of simple and predictable domestic and international rules and norms that will serve as the legal foundation for commercial activities in cyberspace.

In the United States, every state government has adopted the Uniform Commercial Code (UCC), a codification of substantial portions of commercial law. The National Conference of Commissioners of Uniform State Law (NCCUSL) and the American Law Institute, domestic sponsors of the UCC, already are working to adapt the UCC to cyberspace. Private sector organizations, including the American Bar Association (ABA) along with other interest groups, are participants in this process. Work is also ongoing on a proposed electronic contracting and records act for transactions not covered by the UCC. The Administration supports the prompt consideration of these proposals, and the adoption of uniform legislation by all states. Of course, any such legislation will be designed to accommodate ongoing and possible future global initiatives.

Internationally, the United Nations Commission on International Trade Law (UNCITRAL) has completed work on a model law that supports the commercial use of international contracts in electronic commerce. This model law establishes rules and norms that validate and recognize contracts formed through electronic means, sets default rules for contract formation and governance of electronic contract performance, defines the characteristics of a valid electronic writing and an original document, provides for the acceptability of electronic signatures for legal and commercial purposes, and supports the admission of computer evidence in courts and arbitration proceedings.

The United States Government supports the adoption of principles along these lines by all nations as a start to defining an international set of uniform commercial principles for electronic commerce. We urge UNCITRAL, other appropriate international bodies, bar associations, and other private sector groups to continue their work in this area.

The following principles should, to the extent possible, guide the drafting of rules governing global electronic commerce:

- parties should be free to order the contractual relationship between themselves as they see fit;
- rules should be technology-neutral (i.e., the rules should neither require nor assume a particular technology) and forward looking (i.e., the rules should not hinder the use or development of technologies in the future);
- existing rules should be modified and new rules should be adopted only as necessary or substantially desirable to support the use of electronic technologies; and
the process should involve the high-tech commercial sector as well as businesses that have not yet moved online.

With these principles in mind, UNCITRAL, UNIDROIT, and the International Chamber of Commerce (ICC), and others should develop additional model provisions and uniform fundamental principles designed to eliminate administrative and regulatory barriers and to facilitate electronic commerce by:

- encouraging governmental recognition, acceptance and facilitation of electronic communications (i.e., contracts, notarized documents, etc.);
- encouraging consistent international rules to support the acceptance of electronic signatures and other authentication procedures; and
- promoting the development of adequate, efficient, and effective alternate dispute resolution mechanisms for global commercial transactions.

The expansion of global electronic commerce also depends upon the participants' ability to achieve a reasonable degree of certainty regarding their exposure to liability for any damage or injury that might result from their actions. Inconsistent local tort laws, coupled with uncertainties regarding jurisdiction, could substantially increase litigation and create unnecessary costs that ultimately will be born by consumers. The U.S. should work closely with other nations to clarify applicable jurisdictional rules and to generally favor and enforce contract provisions that allow parties to select substantive rules governing liability.

Finally, the development of global electronic commerce provides an opportunity to create legal rules that allow business and consumers to take advantage of new technology to streamline and automate functions now accomplished manually. For example, consideration should be given to establishing electronic registries.

The Departments of Commerce and State will continue to organize U.S. participation in these areas with a goal of achieving substantive international agreement on model law within the next two years. NCCUSL and the American Law Institute, working with the American Bar Association and other interested groups, are urged to continue their work to develop complementary domestic and international efforts.

4. INTELLECTUAL PROPERTY PROTECTION

Commerce on the Internet often will involve the sale and licensing of intellectual property. To promote this commerce, sellers must know that their intellectual property will not be stolen and buyers must know that they are obtaining authentic products. International agreements that establish clear and effective copyright, patent, and trademark protection are therefore necessary to prevent piracy and fraud. While technology, such as encryption, can help combat piracy, an adequate and effective legal framework also is necessary to deter fraud and the theft of intellectual property, and to provide effective legal recourse when these crimes occur. Increased public education about intellectual property in the information age will also contribute to the successful implementation and growth of the GII.

Copyrights

There are several treaties that establish international norms for the protection of copyrights, most notably the Berne Convention for the Protection of Literary and Artistic Works. These treaties link nearly all major trading nations and

provide them with a means of protecting, under their own laws, each other's copyrighted works and sound recordings.

In December 1996, the World Intellectual Property Organization (WIPO) updated the Berne Convention and provided new protection for performers and producers of sound recordings by adopting two new treaties. The two treaties -- the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty -- will greatly facilitate the commercial applications of online digital communications over the GII.

Both treaties include provisions relating to technological protection, copyright management information, and the right of communication to the public, all of which are indispensable for an efficient exercise of rights in the digital environment. The U.S. Government recognizes private sector efforts to develop international and domestic standards in these areas. The Administration understands the sensitivities associated with copyright management information and technological protection measures, and is working to tailor implementing legislation accordingly.

Both treaties also contain provisions that permit nations to provide for exceptions to rights in certain cases that do not conflict with a normal exploitation of the work and do not unreasonably prejudice the legitimate interests of the author (e.g., "fair use"). These provisions permit members to carry forward and appropriately extend into the digital environment limitations and exceptions in their national laws which have been considered acceptable under the Berne Convention. These provisions permit members to devise new exceptions and limitations that are appropriate in the digital network environment, but neither reduce nor extend the scope of applicability of the limitations and exceptions permitted by the Berne Convention.

The Administration is drafting legislation to implement the new WIPO treaties, and looks forward to working with the Senate on their ratification.

The two new WIPO treaties do not address issues of online service provider liability, leaving them to be determined by domestic legislation. The Administration looks forward to working with Congress as these issues are addressed and supports efforts to achieve an equitable and balanced solution that is agreeable to interested parties and consistent with international copyright obligations.

The adoption of the two new WIPO treaties represents the attainment of one of the Administration's significant intellectual property objectives. The U.S. Government will continue to work for appropriate copyright protection for works disseminated electronically. The Administration's copyright-related objectives will include:

- encouraging countries to fully and immediately implement the obligations contained in the Agreement on Trade-Related Aspects of Intellectual Property (TRIPS);
- seeking immediate U.S. ratification and deposit of the instruments of accession to the two new WIPO treaties and implementation of the obligations in these treaties in a balanced and appropriate way as soon as possible;
- encouraging other countries to join the two new WIPO treaties and to implement fully the treaty obligations as soon as possible; and
- ensuring that U.S. trading partners establish laws and regulations that provide adequate and effective protection for copyrighted works, including motion pictures, computer software, and sound recordings, disseminated via the GII, and that these laws and regulations are fully implemented and actively enforced.

The United States will pursue these international objectives through bilateral discussions and multilateral discussions at WIPO and other appropriate fora and will encourage private sector participation in these discussions.

Sui Generis Protection of Databases

The December 1996 WIPO Conference in Geneva did not take up a proposed treaty to protect the non-original elements of databases. Instead, the Conference called for a meeting, subsequently held, to discuss preliminary steps to study proposals to establish sui generis database protection.

Based on the brief discussion of sui generis database protection that took place before and during the Diplomatic

Conference, it is clear that more discussion of the need for and the nature of such protection is necessary domestically and internationally.

The Administration will seek additional input from, among others, the scientific, library, and academic communities and the commercial sector, in order to develop U.S. policy with respect to sui generis database protection.

Patents

Development of the GII will both depend upon and stimulate innovation in many fields of technology, including computer software, computer hardware, and telecommunications. An effectively functioning patent system that encourages and protects patentable innovations in these fields is important for the overall success of commerce over the Internet. Consistent with this objective, the U.S. Patent and Trademark Office (PTO) will (1) significantly enhance its collaboration with the private sector to assemble a larger, more complete collection of prior art (both patent and non-patent publications), and provide its patent examiners better access to prior art in GII-related technologies; (2) train its patent examiners in GII-related technologies to raise and maintain their level of technical expertise; and (3) support legislative proposals for early publication of pending patent applications, particularly in areas involving fast moving technology.

To create a reliable environment for electronic commerce, patent agreements should:

- prohibit member countries from authorizing parties to exploit patented inventions related to the GII without the patent owner's authority (i.e., disapproval of compulsory licensing of GII-related technology except to remedy a practice determined after judicial or administrative process to be anti-competitive);
- require member countries to provide adequate and effective protection for patentable subject matter important to the development and success of the GII; and
- establish international standards for determining the validity of a patent claim.

The United States will pursue these objectives internationally. Officials of the European, Japanese, and United States Patent Offices meet, for example, each year to foster cooperation on patent-related issues. The United States will recommend at the next meeting that a special committee be established within the next year to make recommendations on GII-related patent issues .

In a separate venue, one hundred countries and international intergovernmental organizations participate as members of WIPO's permanent committee on industrial property information (PCIP). The United States will attempt to establish a working group of this organization to address GII-related patent issues.

Trademark and Domain Names

Trademark rights are national in scope and conflicts may arise where the same or similar trademarks for similar goods or services are owned by different parties in different countries. Countries may also apply different standards for determining infringement.

Conflicts have arisen on the GII where third parties have registered Internet domain names that are the same as, or similar to, registered or common law trademarks. An Internet domain name functions as a source identifier on the Internet. Ordinarily, source identifiers, like addresses, are not protected intellectual property (i.e., a trademark) per se. The use of domain names as source identifiers has burgeoned, however, and courts have begun to attribute intellectual property rights to them, while recognizing that misuse of a domain name could significantly infringe, dilute, and weaken valuable trademark rights.

To date, conflicts between trademark rights and domain names have been resolved through negotiations and/or litigation. It may be possible to create a contractually based self-regulatory regime that deals with potential conflicts between domain name usage and trademark laws on a global basis without the need to litigate. This could create a more stable

business environment on the Internet. Accordingly, the United States will support efforts already underway to create domestic and international fora for discussion of Internet-related trademark issues. The Administration also plans to seek public input on the resolution of trademark disputes in the context of domain names.

Governance of the domain name system (DNS) raises other important issues unrelated to intellectual property. The Administration supports private efforts to address Internet governance issues including those related to domain names and has formed an interagency working group under the leadership of the Department of Commerce to study DNS issues. The working group will review various DNS proposals, consulting with interested private sector, consumer, professional, congressional and state government and international groups. The group will consider, in light of public input, (1) what contribution government might make, if any, to the development of a global competitive, market-based system to register Internet domain names, and (2) how best to foster bottom-up governance of the Internet.

5. *PRIVACY*

Americans treasure privacy, linking it to our concept of personal freedom and well-being. Unfortunately, the GII's great promise -- that it facilitates the collection, re-use, and instantaneous transmission of information -- can, if not managed carefully, diminish personal privacy. It is essential, therefore, to assure personal privacy in the networked environment if people are to feel comfortable doing business.

At the same time, fundamental and cherished principles like the First Amendment, which is an important hallmark of American democracy, protect the free flow of information. Commerce on the GII will thrive only if the privacy rights of individuals are balanced with the benefits associated with the free flow of information.

In June of 1995, the Privacy Working Group of the United States government Information Infrastructure Task Force (IITF) issued a report entitled, *PRIVACY AND THE NATIONAL INFORMATION INFRASTRUCTURE: Principles for Providing and Using Personal Information*. The report recommends a set of principles (the "Privacy Principles") to govern the collection, processing, storage, and re-use of personal data in the information age.

These Privacy Principles, which build on the Organization for Economic Cooperation and Development's *GUIDELINES GOVERNING THE PROTECTION OF PRIVACY AND TRANSBORDER DATA FLOW OF PERSONAL DATA* and incorporate principles of fair information practices, rest on the fundamental precepts of awareness and choice:

- Data-gatherers should inform consumers what information they are collecting, and how they intend to use such data; and
- Data-gatherers should provide consumers with a meaningful way to limit use and re-use of personal information.

Disclosure by data-gatherers is designed to stimulate market resolution of privacy concerns by empowering individuals to obtain relevant knowledge about why information is being collected, what the information will be used for, what steps will be taken to protect that information, the consequences of providing or withholding information, and any rights of redress that they may have. Such disclosure will enable consumers to make better judgments about the levels of privacy available and their willingness to participate.

In addition, the Privacy Principles identify three values to govern the way in which personal information is acquired, disclosed and used online -- information privacy, information integrity, and information quality. First, an individual's reasonable expectation of privacy regarding access to and use of, his or her personal information should be assured. Second, personal information should not be improperly altered or destroyed. And, third, personal information should be accurate, timely, complete, and relevant for the purposes for which it is provided and used.

Under these principles, consumers are entitled to redress if they are harmed by improper use or disclosure of personal information or if decisions are based on inaccurate, outdated, incomplete, or irrelevant personal information.

In April, 1997, the Information Policy Committee of the IITF issued a draft paper entitled Options For Promoting Privacy on the National Information Infrastructure. The paper surveys information practices in the United States and solicits public comment on the best way to implement the Privacy Principles. The IITF goal is to find a way to balance the competing values of personal privacy and the free flow of information in a digital democratic society.

Meanwhile, other federal agencies have studied privacy issues in the context of specific industry sectors. In October 1995, for example, the National Telecommunications and Information Administration (NTIA) issued a report entitled Privacy and the NII: Safeguarding Telecommunications-Related Personal Information. It explores the application of the Privacy Principles in the context of telecommunications and online services and advocates a voluntary framework based on notice and consent. On January 6, 1997, the FTC issued a staff report entitled Public Workshop on Consumer Privacy on the Global Information Infrastructure. The report, which focuses on the direct marketing and advertising industries, concludes that notice, choice, security, and access are recognized as necessary elements of fair information practices online. In June of 1997, the FTC held four days of hearings on technology tools and industry self-regulation regimes designed to enhance personal privacy on the Internet.

The Administration supports private sector efforts now underway to implement meaningful, consumer-friendly, self-regulatory privacy regimes. These include mechanisms for facilitating awareness and the exercise of choice online, evaluating private sector adoption of and adherence to fair information practices, and dispute resolution.

The Administration also anticipates that technology will offer solutions to many privacy concerns in the online environment, including the appropriate use of anonymity. If privacy concerns are not addressed by industry through self-regulation and technology, the Administration will face increasing pressure to play a more direct role in safeguarding consumer choice regarding privacy online.

The Administration is particularly concerned about the use of information gathered from children, who may lack the cognitive ability to recognize and appreciate privacy concerns. Parents should be able to choose whether or not personally identifiable information is collected from or about their children. We urge industry, consumer, and child-advocacy groups working together to use a mix of technology, self-regulation, and education to provide solutions to the particular dangers arising in this area and to facilitate parental choice. This problem warrants prompt attention. Otherwise, government action may be required.

Privacy concerns are being raised in many countries around the world, and some countries have enacted laws, implemented industry self-regulation, or instituted administrative solutions designed to safeguard their citizens' privacy. Disparate policies could emerge that might disrupt transborder data flows. For example, the European Union (EU) has adopted a Directive that prohibits the transfer of personal data to countries that, in its view, do not extend adequate privacy protection to EU citizens.

To ensure that differing privacy policies around the world do not impede the flow of data on the Internet, the United States will engage its key trading partners in discussions to build support for industry-developed solutions to privacy problems and for market driven mechanisms to assure customer satisfaction about how private data is handled.

The United States will continue policy discussions with the EU nations and the European Commission to increase understanding about the U.S. approach to privacy and to assure that the criteria they use for evaluating adequacy are sufficiently flexible to accommodate our approach. These discussions are led by the Department of Commerce, through NTIA, and the State Department, and include the Executive Office of the President, the Treasury Department, the Federal Trade Commission (FTC) and other relevant federal agencies. NTIA is also working with the private sector to assess the impact that the implementation of the EU Directive could have on the United States.

The United States also will enter into a dialogue with trading partners on these issues through existing bilateral fora as well as through regional fora such as the Asia Pacific Economic Cooperation (APEC) forum, the Summit of the Americas, the North American Free Trade Agreement (NAFTA), and the Inter-American Telecommunications Commission (CITEL) of the Organization of American States, and broader multilateral organizations.

The Administration considers data protection critically important. We believe that private efforts of industry working in cooperation with consumer groups are preferable to government regulation, but if effective privacy protection cannot be provided in this way, we will reevaluate this policy.

6. SECURITY

The GII must be secure and reliable. If Internet users do not have confidence that their communications and data are safe from unauthorized access or modification, they will be unlikely to use the Internet on a routine basis for commerce. A secure GII requires:

- (1) secure and reliable telecommunications networks;
- (2) effective means for protecting the information systems attached to those networks;
- (3) effective means for authenticating and ensuring confidentiality of electronic information to protect data from unauthorized use; and
- (4) well trained GII users who understand how to protect their systems and their data.

There is no single "magic" technology or technique that can ensure that the GII will be secure and reliable. Accomplishing that goal requires a range of technologies (encryption, authentication, password controls, firewalls, etc.) and effective, consistent use of those technologies, all supported globally by trustworthy key and security management infrastructures.

Of particular importance is the development of trusted certification services that support the digital signatures that will permit users to know whom they are communicating with on the Internet. Both signatures and confidentiality rely on the use of cryptographic keys. To promote the growth of a trusted electronic commerce environment, the Administration is encouraging the development of a voluntary, market-driven key management infrastructure that will support authentication, integrity, and confidentiality.

Encryption products protect the confidentiality of stored data and electronic communications by making them unreadable without a decryption key. But strong encryption is a double-edged sword. Law abiding citizens can use strong encryption to protect their trade secrets and personal records. But those trade secrets and personal records could be lost forever if the decrypt key is lost. Depending upon the value of the information, the loss could be quite substantial. Encryption can also be used by criminals and terrorists to reduce law enforcement capabilities to read their communications. Key recovery based encryption can help address some of these issues.

In promoting robust security needed for electronic commerce, the Administration has already taken steps that will enable trust in encryption and provide the safeguards that users and society will need. The Administration, in partnership with industry, is taking steps to promote the development of market-driven standards, public-key management infrastructure services and key recoverable encryption products. Additionally, the Administration has liberalized export controls for commercial encryption products while protecting public safety and national security interests.

The Administration is also working with Congress to ensure legislation is enacted that would facilitate development of voluntary key management infrastructures and would govern the release of recovery information to law enforcement officials pursuant to lawful authority.

The U.S. government will work internationally to promote development of market-driven key management infrastructure with key recovery. Specifically, the U.S. has worked closely within the OECD to develop international guidelines for encryption policies and will continue to promote the development of policies to provide a predictable and secure environment for global electronic commerce.

III. Market Access Issues

7. TELECOMMUNICATIONS INFRASTRUCTURE AND INFORMATION TECHNOLOGY

Global electronic commerce depends upon a modern, seamless, global telecommunications network and upon the

computers and information appliances that connect to it. Unfortunately, in too many countries, telecommunications policies are hindering the development of advanced digital networks. Customers find that telecommunications services often are too expensive, bandwidth is too limited, and services are unavailable or unreliable. Likewise, many countries maintain trade barriers to imported information technology, making it hard for both merchants and customers to purchase the computers and information systems they need to participate in electronic commerce.

In order to spur the removal of barriers, in March 1994, Vice President Gore spoke to the World Telecommunications Development Conference in Buenos Aires. He articulated several principles that the U.S. believes should be the foundation for government policy, including:

- (1) encouraging private sector investment by privatizing government-controlled telecommunications companies;
- (2) promoting and preserving competition by introducing competition to monopoly phone markets, ensuring interconnection at fair prices, opening markets to foreign investment, and enforcing anti-trust safeguards;
- (3) guaranteeing open access to networks on a non-discriminatory basis, so that GII users have access to the broadest range of information and services; and
- (4) implementing, by an independent regulator, pro-competitive and flexible regulation that keeps pace with technological development.

Domestically, the Administration recognizes that there are various constraints in the present network that may impede the evolution of services requiring higher bandwidth. Administration initiatives include Internet II, or Next Generation Internet. In addition, the FCC has undertaken several initiatives designed to stimulate bandwidth expansion, especially to residential and small/home office customers.

The goal of the United States will be to ensure that online service providers can reach end-users on reasonable and nondiscriminatory terms and conditions. Genuine market opening will lead to increased competition, improved telecommunications infrastructures, more customer choice, lower prices and increased and improved services.

Areas of concern include:

- *Leased lines:* Data networks of most online service providers are constructed with leased lines that must be obtained from national telephone companies, often monopolies or governmental entities. In the absence of effective competition, telephone companies may impose artificially inflated leased line prices and usage restrictions that impede the provision of service by online service providers.
- *Local loops pricing:* To reach their subscribers, online service providers often have no choice but to purchase local exchange services from monopoly or government-owned telephone companies. These services also are often priced at excessive rates, inflating the cost of data services to customers.
- *Interconnection and unbundling:* Online service providers must be able to interconnect with the networks of incumbent telecommunication companies so that information can pass seamlessly between all users of the network. Monopolies or dominant telephone companies often price interconnection well above cost, and refuse to interconnect because of alleged concerns about network compatibility or absence of need for other providers.
- *Attaching equipment to the network:* Over the years, some telecommunication providers have used their monopoly power to restrict the connection of communication or technology devices to the network. Even when the monopoly has been broken, a host of unnecessary burdensome "type acceptance" practices have been used to retard competition and make it difficult for consumers to connect.
- *Internet voice and multimedia:* Officials of some nations claim that "real time" services provided over the Internet are "like services" to traditionally regulated voice telephony and broadcasting, and therefore should be subject to the same regulatory restrictions that apply to those traditional services. In some countries, these providers must be licensed, as a way to control both the carriage and content offered. Such an approach could hinder the development of new technologies and new services.

In addition, countries have different levels of telecommunications infrastructure development, which may hinder the global provision and use of some Internet-based services. The Administration believes that the introduction of policies promoting foreign investment, competition, regulatory flexibility and open access will support infrastructure development and the creation of more data-friendly networks.

To address these issues, the Administration successfully concluded the WTO Basic Telecommunications negotiations, which will ensure global competition in the provision of basic telecommunication services and will address the many underlying issues affecting online service providers. During those negotiations, the U.S. succeeded in ensuring that new regulatory burdens would not be imposed upon online service providers that would stifle the deployment of new technologies and services.

As the WTO Agreement is implemented, the Administration will seek to ensure that new rules of competition in the global communications marketplace will be technology neutral and will not hinder the development of electronic commerce. In particular, rules for licensing new technologies and new services must be sufficiently flexible to accommodate the changing needs of consumers while allowing governments to protect important public interest objectives like universal service. In this context, rules to promote such public interest objectives should not fall disproportionately on any one segment of the telecommunications industry or on new entrants.

The Administration will also seek effective implementation of the Information Technology Agreement concluded by the members of the WTO in March 1997, which is designed to remove tariffs on almost all types of information technology. Building on this success, and with the encouragement of U.S. companies, the administration is developing plans for ITA II, in which it will seek to remove remaining tariffs on, and existing non-tariff barriers to, information technology goods and services. In addition, the Administration is committed to finding other ways to streamline requirements to demonstrate product conformity, including through Mutual Recognition Agreements (MRAS) that can eliminate the need for a single product to be certified by different standards laboratories across national borders.

Bilateral exchanges with individual foreign governments, regional fora such as APEC and CITEL, and multilateral fora such as the OECD and ITU, and various other fora (i.e. international alliances of private businesses, the International Organization of Standardization [ISO], the International Electrotechnical Commission [IEC]), also will be used for international discussions on telecommunication-related Internet issues and removing trade barriers that inhibit the export of information technology. These issues include the terms and conditions governing the exchange of online traffic, addressing, and reliability. In all fora, U.S. Government positions that might influence Internet pricing, service delivery options or technical standards will reflect the principles established in this paper and U.S. Government representatives will survey the work of their study groups to ensure that this is the case.

In addition, many Internet governance issues will best be dealt with by means of private, open standards processes and contracts involving participants from both government and the private sector. The U.S. government will support industry initiatives aimed at achieving the important goals outlined in this paper.

8. CONTENT

The U.S. government supports the broadest possible free flow of information across international borders. This includes most informational material now accessible and transmitted through the Internet, including through World Wide Web pages, news and other information services, virtual shopping malls, and entertainment features, such as audio and video products, and the arts. This principle extends to information created by commercial enterprises as well as by schools, libraries, governments and other nonprofit entities.

In contrast to traditional broadcast media, the Internet promises users greater opportunity to shield themselves and their children from content they deem offensive or inappropriate. New technology, for example, may enable parents to block their children's access to sensitive information or confine their children to pre-approved websites.

To the extent, then, that effective filtering technology becomes available, content regulations traditionally imposed on radio and television would not need to be applied to the Internet. In fact, unnecessary regulation could cripple the growth and diversity of the Internet.

The Administration therefore supports industry self-regulation, adoption of competing ratings systems, and development of easy-to-use technical solutions (e.g., filtering technologies and age verification systems) to assist in screening information online.

There are four priority areas of concern:

- *Regulation of content.* Companies wishing to do business over the Internet, and to provide access to the Internet (including U.S. online service providers with foreign affiliates or joint ventures) are concerned about liability based on the different policies of every country through which their information may travel. Countries that are considering or have adopted laws to restrict access to certain types of content through the Internet emphasize different concerns as a result of cultural, social, and political difference. These different laws can impede electronic commerce in the global environment.

The Administration is concerned about Internet regulation of this sort, and will develop an informal dialogue with key trading partners on public policy issues such as hate speech, violence, sedition, pornography and other content to ensure that differences in national regulation, especially those undertaken to foster cultural identity, do not serve as disguised trade barriers.

- *Foreign content quotas.* Some countries currently require that a specific proportion of traditional broadcast transmission time be devoted to "domestically produced" content. Problems could arise on the Internet if the definition of "broadcasting" is changed to extend these current regulations to "new services." Countries also might decide to regulate Internet content and establish restrictions under administrative authority, rather than under broadcast regulatory structures.

The Administration will pursue a dialogue with other nations on how to promote content diversity, including cultural and linguistic diversity, without limiting content. These discussions could consider promotion of cultural identity through subsidy programs that rely solely on general tax revenues and that are implemented in a nondiscriminatory manner.

- *Regulation of advertising.* Advertising will allow the new interactive media to offer more affordable products and services to a wider, global audience. Some countries stringently restrict the language, amount, frequency, duration, and type of tele-shopping and advertising spots used by advertisers. In principle, the United States does not favor such regulations. While recognizing legitimate cultural and social concerns, these concerns should not be invoked to justify unnecessarily burdensome regulation of the Internet.

There are laws in many countries around the world that require support for advertising claims. Advertising industry self-regulation also exists in many countries around the globe. Truthful and accurate advertising should be the cornerstone of advertising on all media, including the Internet.

A strong body of cognitive and behavioral research demonstrates that children are particularly vulnerable to advertising. As a result, the U.S. has well established rules (self-regulatory and otherwise) for protecting children from certain harmful advertising practices. The Administration will work with industry and children's advocates to ensure that these protections are translated to and implemented appropriately in the online media environment.

The rules of the "country-of-origin" should serve as the basis for controlling Internet advertising to alleviate national legislative roadblocks and trade barriers.

- *Regulation to prevent fraud.* Recently, there have been a number of cases where fraudulent information on companies and their stocks, and phony investment schemes have been broadcast on the Internet. The appropriate federal agencies (i.e., Federal Trade Commission and the Securities and Exchange Commission) are determining whether new regulations are needed to prevent fraud over the Internet.

In order to realize the commercial and cultural potential of the Internet, consumers must have confidence that the goods and services offered are fairly represented, that they will get what they pay for, and that recourse or redress will be available if they do not. This is an area where government action is appropriate.

The Administration will explore opportunities for international cooperation to protect consumers and to prosecute false, deceptive, and fraudulent commercial practices in cyberspace.

Federal agencies such as the Department of State, U.S. Trade Representative (USTR), the Commerce Department (NTIA), the FTC, the Office of Consumer Affairs and others have already engaged in efforts to promote such positions, through both bilateral and multilateral channels, including through the OECD, the G-7 Information Society and Development Conference, the Latin American Telecommunications Summits, and the Summit of the Americas process, as well as APEC Telecommunications Ministerials. All agencies participating in such fora will focus on pragmatic solutions based upon the principles in this paper to issues related to content control.

9. TECHNICAL STANDARDS

Standards are critical to the long term commercial success of the Internet as they can allow products and services from different vendors to work together. They also encourage competition and reduce uncertainty in the global marketplace. Premature standardization, however, can "lock in" outdated technology. Standards also can be employed as de facto non-tariff trade barriers, to "lock out" non-indigenous businesses from a particular national market.

The United States believes that the marketplace, not governments, should determine technical standards and other mechanisms for interoperability. Technology is moving rapidly and government attempts to establish technical standards to govern the Internet would only risk inhibiting technological innovation. The United States considers it unwise and unnecessary for governments to mandate standards for electronic commerce. Rather, we urge industry driven multilateral fora to consider technical standards in this area.

To ensure the growth of global electronic commerce over the Internet, standards will be needed to assure reliability, interoperability, ease of use and scalability in areas such as:

- electronic payments;
- security (confidentiality, authentication, data integrity, access control, non-repudiation);
- security services infrastructure (e.g., public key certificate authorities);
- electronic copyright management systems;
- video and data-conferencing;
- high-speed network technologies (e.g., Asynchronous Transfer Mode, Synchronous Digital Hierarchy); and
- digital object and data interchange.

There need not be one standard for every product or service associated with the GII, and technical standards need not be mandated. In some cases, multiple standards will compete for marketplace acceptance. In other cases, different standards will be used in different circumstances.

The prevalence of voluntary standards on the Internet, and the medium's consensus-based process of standards development and acceptance are stimulating its rapid growth. These standards flourish because of a non-bureaucratic system of development managed by technical practitioners working through various organizations. These organizations require demonstrated deployment of systems incorporating a given standard prior to formal acceptance, but the process

facilitates rapid deployment of standards and can accommodate evolving standards as well. Only a handful of countries allow private sector standards development; most rely on government-mandated solutions, causing these nations to fall behind the technological cutting edge and creating non-tariff trade barriers.

Numerous private sector bodies have contributed to the process of developing voluntary standards that promote interoperability. The United States has encouraged the development of voluntary standards through private standards organizations, consortia, testbeds and R&D activities. The U.S. government also has adopted a set of principles to promote acceptance of domestic and international voluntary standards.

While no formal government-sponsored negotiations are called for at this time, the United States will use various fora (i.e., international alliances of private businesses, the International Organization for Standardization [ISO], the International Electrotechnical Commission [IEC], International Telecommunications Union [ITU], etc.) to discourage the use of standards to erect barriers to free trade on the developing GII. The private sector should assert global leadership to address standards setting needs. The United States will work through intergovernmental organizations as needed to monitor and support private sector leadership.

A COORDINATED STRATEGY

The success of electronic commerce will require an effective partnership between the private and public sectors, with the private sector in the lead. Government participation must be coherent and cautious, avoiding the contradictions and confusions that can sometimes arise when different governmental agencies individually assert authority too vigorously and operate without coordination.

The variety of issues being raised, the interaction among them, and the disparate fora in which they are being addressed will necessitate a coordinated, targeted governmental approach to avoid inefficiencies and duplication in developing and reviewing policy.

An interagency team will continue to meet in order to monitor progress and update this strategy as events unfold. Sufficient resources will be committed to allow rapid and effective policy implementation.

The process of further developing and implementing the strategy set forth in this paper is as important as the content of the paper itself. The U.S. Government will consult openly and often, with groups representing industry, consumers and Internet users, Congress, state and local governments, foreign governments, and international organizations as we seek to update and implement this paper in the coming years.

Private sector leadership accounts for the explosive growth of the Internet today, and the success of electronic commerce will depend on continued private sector leadership. Accordingly, the Administration also will encourage the creation of private fora to take the lead in areas requiring self-regulation such as privacy, content ratings, and consumer protection and in areas such as standards development, commercial code, and fostering interoperability.

The strategy outlined in this paper will be updated and new releases will be issued as changes in technology and the marketplace teach us more about how to set the optimal environment in which electronic commerce and community can flourish.

There is a great opportunity for commercial activity on the Internet. If the private sector and governments act appropriately, this opportunity can be realized for the benefit of all people.

Clinton Presidential Records Digital Records Marker

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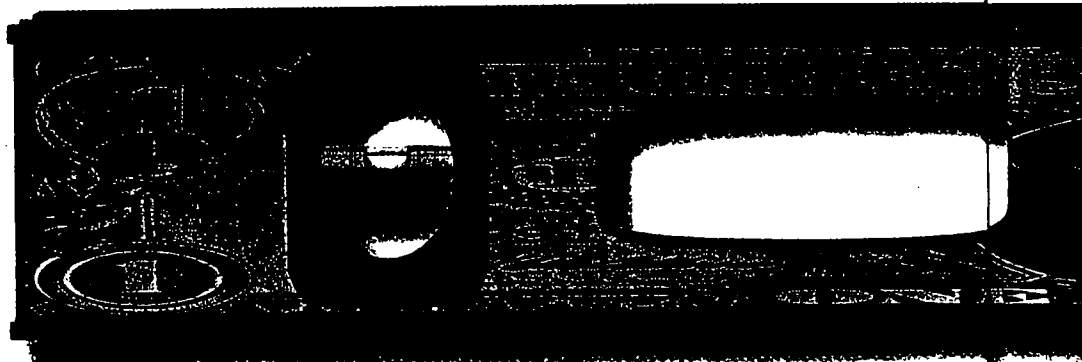
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INFO AGE & NEW ECONOMY ©

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THE ZERO INFLATION ECONOMY

With prices stable—and even falling—expect higher growth, lower rates, rising productivity, and more investment



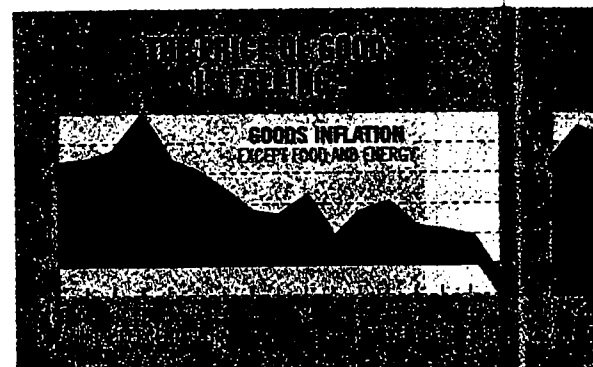
Since inflation skyrocketed into double digits in the late 1970s, central bankers around the world have focused on one main goal: achieving price stability. To control fast-rising prices, policymakers in the U.S., Britain, Germany, and Japan were prepared to absorb years of slow growth, and if necessary, deep recessions.

But 20 years of single-minded inflation-fighting may be ending. In a groundbreaking speech to the American Economic Assn. on Jan. 3, Federal Reserve Chairman Alan Greenspan cited "the remarkable progress" that had been made in achieving low rates of inflation. Greenspan's message was clear: The U.S. is finally close to reaching price stability, a level of inflation low enough that it doesn't affect business or investment decisions.

RIPPLE EFFECT. The numbers tell the story. Despite strong growth, core inflation ran at only a 1.8% annual rate over the last six months. Service inflation is falling in housing, education, and other areas of historically persistent price increases. Goods prices, excluding food and energy, have actually declined since mid-1997. Moreover, Greenspan and other economists now believe that

the official CPI overstates inflation by at least a percentage point. That means the U.S. is actually approaching what many forecasters did not think possible: the zero-inflation economy.

The benefits of zero inflation are already rippling through the entire economy. In a low-inflation environment, corporations are better able to plan and make decisions, since they no longer face the prospect of sudden inflationary shocks. Long-term interest rates fall as investors become more willing to lock up money for years because they are less fearful that the value of their investments will erode. And with inflation under control, the Fed can allow



expansions to run longer, avoiding the boom-bust cycles which have led to recessions in the past. That means the Fed now has room to cut rates if economic growth should slow because of the Asian crisis or for some other reason (page 30).

The result? Higher levels of growth, lower interest rates, more capital investment, and rising productivity. A 1996 study by two Federal Reserve economists suggested that in countries with moderate inflation, a substantial reduction in the rate of price increases could add a half percentage point to the growth rate.

Moreover, low inflation perpetuates

That's the good news. But a zero-inflation economy brings new dangers as well—specifically, the possibility of deflation. Deflation, or falling prices, can be a positive sign if it is caused by rising productivity. But in his speech, Greenspan spoke of the damage that could be done by runaway deflation which pulls down the price of assets such as stocks and real estate.

In addition, a smooth macroeconomic ride does not protect some companies from rude shocks. Price stability means that the cost of raw materials and other inputs won't rise very much. But, at the same time, companies find it difficult to command more for their output. And

of Aluminum Corporation of America.

There's also the fear that companies will face a profit squeeze if they must pay more to keep workers in a tight job market, but can't pass on the cost in price increases. Despite the low unemployment rate, however, that hasn't happened yet. One reason is that a surge of college-educated workers—the crucial resource for many companies—has entered the workforce over the last two years, relieving some pressure on hiring. From March, 1995, to March, 1997, the number of people over 25 with college degrees rose by 6.4%, far outpacing the 4% increase in the number of jobs.

The companies that are most in dan-

itself in a virtuous cycle. With long-term rates below 5.8%, their lowest level since the government first started issuing 30-year bonds in 1977, companies are more willing to invest in productivity-enhancing machinery and equipment. Those improvements will enable them to prosper without raising prices, producing the earnings to make further investments.

NEW DANGERS. For consumers, low inflation means that moderate wage gains can translate into decent improvements in their real standards of living. Over the last year, wages and salaries have risen by only 3.4%—but that still substantially outpaces consumer inflation.

in industries with global overcapacity, such as steel and autos, companies could see earnings hit hard by falling prices.

That's especially true in sectors facing competition from Asia. Over the last six months, the dollar has risen by 16% against the yen, 86% against the Korean won, and 244% against the Indonesian rupiah, enabling Asian rivals to put U.S. companies under severe price pressure. The pressure could intensify as Asian nations try to export their way to economic recovery. "If the Asian financial problem doesn't get corrected in the next 12 months or so, there could be goods dumping," warns Paul H. O'Neill, chairman and chief executive

ger of seeing price stability turn ugly—to serious deflation—are those in commodity businesses. The most outstanding example is oil. Wall Street analysts are now calling for 1998 profits of oil producers to fall 2%, according to researchers First Call Corp., down from the forecast of flat profits a month ago.

And those figures could prove optimistic if the price of oil, which has dropped from \$22 a barrel to less than \$17 over the past three months, continues to fall. Demand is low, inventories are high, and the number of new billion-barrel oil fields keeps growing. "Every single indicator is bearish," says Michael C. Lynch, an oil researcher at Massachusetts Institute of Technology. "I think that we could see sharply lower prices this year."

Copper prices, too, are down 30% since August. That's hurting Phelps Dodge Corp., the biggest copper producer in the U.S. and among the biggest worldwide. Every penny move in the per-pound price of copper is worth about \$17 million in cash before taxes to the company, says vice-president and treasurer Thomas M. Foster.

Steel producers are being hit by excess capacity, and by a slowdown in over-

WHILE SERVICE INFLATION DECLINES

SERVICE INFLATION EXCEPT ENERGY SERVICES



SENDING INTEREST RATES PLUMMETING

30-YEAR BONDS



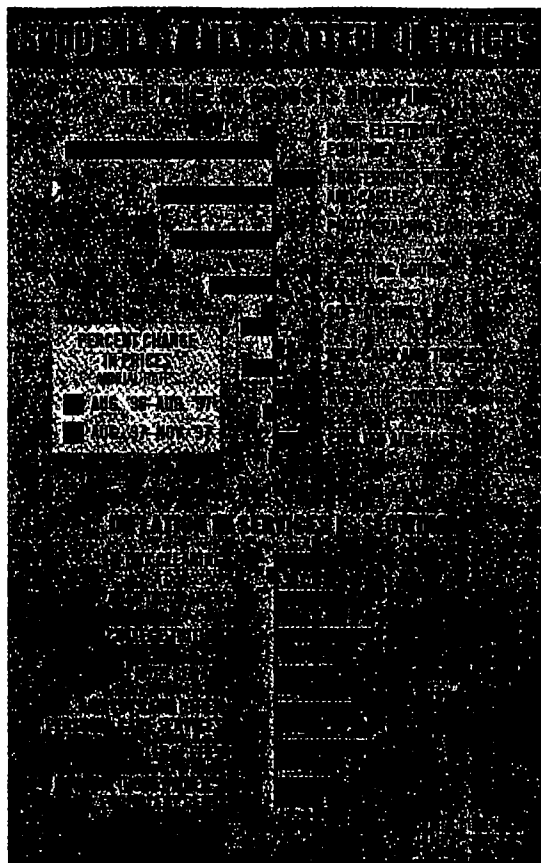
News: Analysis & Commentary

as demand. Prices for flatrolled steel, which have been falling since mid-1997, are now at \$310 per ton, not far from what many analysts say is the breakeven price of \$290 for many integrated steelmakers. And things could get worse: On Jan. 6, minimills Nucor Corp. and Ipsco Inc. both announced plans for new plate mills in the U.S. "There's a risk now that profits will be off the first half of the year," says PaineWebber Inc. analyst Peter F. Marcus.

PRICE WARS. Still, for every company hurt by falling prices, another company is profiting. Falling copper prices make copper cable less expensive. Depressed steel prices benefit big users of steel, such as the auto companies. And not least, falling oil prices help bring down inflation across the economy. According to estimates by Standard & Poor's DRI, a \$5-per-barrel drop in the price of oil would take three tenths of a percentage point off the inflation rate over the next five years.

Pillowtex Corp., one of the country's largest makers of home textiles—including sheets, towels, pillows, and comforters—is benefiting from deflation in cotton prices, which are down about 10% from a year ago and 35% from three years ago. "That should be a net winner for us in terms of profit opportunity," says CEO Charles M. Hansen Jr., even though prices in home textiles are not rising.

For consumers, of course, the benefits



of the zero-inflation economy are undeniable. Prices are dropping on everything from autos to home computers to sporting goods and, in some categories, full-fledged price wars rage. Take soft

drinks. Now, a two-liter bottle of Coke or Pepsi sells for about 59¢ in some stores, compared with \$1 before the two companies started their price war last May. Meanwhile, the prices of appliances and consumer electronics continue to decline as they have for years. Deflation "is not new news to us," says W. Alan McCollough, president of Circuit City Stores, a large consumer electronics chain based in Richmond, Va. "For us it's business as usual."

Consumers are also benefiting from slowing inflation in the service sector. Take housing, which accounts for about half of the services component of the CPI. Despite perceptions of tight housing markets everywhere, "rent of shelter," as the Bureau of Labor Statistics calls the price of housing, is rising at only a 3% annual rate over the last six months, down from 3.2% over the previous six months. The price of building new homes also has been restrained compared with previous expansions. "You're seeing some increase in materials, but moderately so," says homebuilding industry executive Leonard Miller, chairman of Miami-based Lennar Corp.

WHAT GREENSPAN REALLY MEANT

FEDERAL RESERVE Chairman Alan Greenspan's Jan. 6 testimony to Congress was a landmark event. It was the first time since the 1980s that the Fed's top official had appeared before Congress to discuss the economy. Greenspan's testimony was a landmark event. It was the first time since the 1980s that the Fed's top official had appeared before Congress to discuss the economy. Greenspan's testimony was a landmark event. It was the first time since the 1980s that the Fed's top official had appeared before Congress to discuss the economy.



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Surprisingly, even price increases for college, seemingly immune to market forces, have slowed sharply since the early 1990s. That's according to a draft report, not yet public, from the National Commission on the Cost of Higher Education. "In the last two or three years, the situation has changed dramatically," says Martin Anderson, senior fellow at Stanford University's Hoover Institution and a member of the commission. According to the commission, the total cost of attending public universities—tuition, room, board, books and fees, less grants—rose less than 3% a year from 1993 to 1996, down from an annual increase of 12% over the previous six years. Private universities showed a similar decline in cost inflation.

For operators of many service businesses that can still command price hikes—in travel, for example—the low-inflation economy is a boon. Consider Dallas-based Bristol Hotel Co., the largest Holiday Inn franchisee in the country with 86 wholly owned hotels. According to CEO J. Peter Kline of Bristol, falling prices on computer equipment and utilities such as phone service



are helping the bottom line. Bristol has even created a new unit within its purchasing department to buy utility services on a competitive basis nationwide.

THE ZERO INFLATION ECONOMY

On the other hand, there are service companies that can't raise prices. "Pricing has been flat for the last 12 months," says James E. Ksiansnak, vice-chairman of Philadelphia-based ARAMARK Corp., which provides a wide range of business services including food, uniforms, and other support services to corporations.

Overall, the new low-inflation environment leads to a delicate balancing

Despite the perception of tight housing markets everywhere, inflation in home prices is slowing—rising at a 3% annual rate in the last six months

act for companies. Take Illinois-based W. W. Grainger Inc., one of the largest distributors of industrial supplies, ranging from pumps and motors to tools. It has 80,000 items in stock and can buy more things at a lower price now. But the company is apprehensive about possible price declines for what it sells. "We don't dismiss a deflationary spiral as ridiculous," says John A. Schweig, a senior vice-president at Grainger.

Chemical companies, too, are seeing both the positive and negative sides of the zero-inflation economy. With oil prices dropping, the cost of one

of their main inputs is going down. But the industry, which has a hard time raising prices even in a strong economy, is also sensitive to potential global overcapacity. "If Asia stays weak, we haven't got an optimistic view for 1999," says David R. Thomas, senior economist at Imperial Chemical Industries PLC.

Still, absent a deflationary collapse, price stability is a good thing. It took a long time for companies and consumers to get used to inflation. Now they are learning how to live with zero inflation—and love it.

By Michael J. Mandel in New York with bureau reports

CONSUMER PRICE INDEX LESS
FOOD AND ENERGY, ANNUAL CHANGE

You always liked a challenge.



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New Rules for the New Economy

Twelve dependable principles for thriving in a turbulent world

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 E.print electronic reprints available for this article.

by Kevin Kelly

The Digital Revolution gets all the headlines these days. But turning slowly beneath the fast-forward turbulence, steadily driving the gyrating cycles of cool technogadgets and gotta-haves, is a much more profound revolution - the Network Economy.

This emerging new economy represents a tectonic upheaval in our commonwealth, a social shift that reorders our lives more than mere hardware or software ever can. It has its own distinct opportunities and its own new rules. Those who play by the new rules will prosper; those who ignore them will not.

The advent of the new economy was first noticed as far back as 1969, when Peter Drucker perceived the arrival of knowledge workers. The new economy is often referred to as the Information Economy, because of information's superior role (rather than material resources or capital) in creating wealth.

I prefer the term Network Economy, because *information* isn't enough to explain the discontinuities we see. We have been awash in a steadily increasing tide of information for the past century. Many successful knowledge businesses have been built on information capital, but only recently has a total reconfiguration of information itself shifted the whole economy.

The grand irony of our times is that the era of computers is over. All the major consequences of stand-alone computers have already taken place. Computers have speeded up our lives a bit, and that's it.

In contrast, all the most promising technologies making their debut now are chiefly due to communication between computers - that is, to connections rather than to computations. And since communication is the basis of culture, fiddling at this level is indeed momentous.

And fiddle we do. The technology we first invented to crunch spreadsheets has been hijacked to connect our isolated selves instead. Information's critical rearrangement is the widespread, relentless act of connecting everything to everything else. We are now engaged in a grand scheme to augment, amplify, enhance, and extend the relationships and communications between all beings and all objects. That is why the Network Economy is a

big deal.

The new rules governing this global restructuring revolve around several axes. First, wealth in this new regime flows directly from innovation, not optimization; that is, wealth is not gained by perfecting the known, but by imperfectly seizing the unknown. Second, the ideal environment for cultivating the unknown is to nurture the supreme agility and nimbleness of networks. Third, the domestication of the unknown inevitably means abandoning the highly successful known - undoing the perfected. And last, in the thickening web of the Network Economy, the cycle of "find, nurture, destroy" happens faster and more intensely than ever before.

The Network Economy is not the end of history. Given the rate of change, this economic arrangement may not endure more than a generation or two. Once networks have saturated every space in our lives, an entirely new set of rules will take hold. Take these principles, then, as rules of thumb for the interim.

1 The Law of Connection

Embrace dumb power

The Network Economy is fed by the deep resonance of two stellar bangs: the collapsing microcosm of chips and the exploding telecosm of connections. These sudden shifts are tearing the old laws of wealth apart and preparing territory for the emerging economy.

As the size of silicon chips shrinks to the microscopic, their costs shrink to the microscopic as well. They become cheap and tiny enough to slip into every - and the key word here is every - object we make. The notion that all doors in a building should contain a computer chip seemed ludicrous 10 years ago, but now there is hardly a hotel door without a blinking, beeping chip. Soon, if National Semiconductor gets its way, every FedEx package will be stamped with a disposable silicon flake that smartly tracks the contents. If an ephemeral package can have a chip, so can your chair, each book, a new coat, a basketball. Thin slices of plastic known as smart cards hold a throwaway chip smart enough to be your banker. Soon, all manufactured objects, from tennis shoes to hammers to lamp shades to cans of soup, will have embedded in them a tiny sliver of thought. And why not?

The world is populated by 200 million computers. Andy Grove of Intel happily estimates that we'll see 500 million of these by 2002. Yet the number of noncomputer chips now pulsating in the world is 6 billion! They are already embedded in your car and stereo and rice cooker. Because they can be stamped out fast and cheap, like candy gumdrops, these chips are known in the industry as "jelly beans." And we are in the dawn of a jelly bean explosion: there'll be 10 billion grains of working silicon by 2005, a billion not long after. Someday each of them may be as smart as an ant, dissolved into our habitat.

As we implant a billion specks of our thought into everything we make, we are also connecting them up. Stationary objects are wired together. The nonstationary rest - that is, most manufactured objects - will be linked by infrared and radio, creating a wireless web vastly larger than the wired web. It is not necessary that each connected object transmit much data. A tiny chip plastered inside a water tank on an Australian ranch transmits only the telegraphic message of whether it is full or not. A chip on the horn of each steer beams out his pure location, nothing more: "I'm here, I'm here." The chip in the gate at the end of the road communicates only when it was last opened: "Tuesday."

The glory of these connected crumbs is that they don't need to be artificially intelligent. Instead, they work on the dumb power of a few bits linked together. Dumb power is what you get when you network dumb nodes into a smart web. It's what our brains do with dumb neurons and what the Internet did with dumb personal computers. A PC is the conceptual equivalent of a single neuron housed in a plastic case. When linked by the telecosm into a neural network, these dumb PC nodes created that fabulous intelligence called the World

Wide Web. It works in other domains: dumb parts, properly connected, yield smart results.

A trillion dumb chips connected into a hive mind is the hardware. The software that runs through it is the Network Economy. A planet of hyperlinked chips emits a ceaseless flow of small messages, cascading into the most nimble waves of sensibility. Every farm moisture sensor shoots up data, every weather satellite beams down digitized images, every cash register spits out bit streams, every hospital monitor trickles out numbers, every Web site tallies attention, every vehicle transmits its location code; all of this is sent swirling into the web. That tide of signals is the net.

The net is not just humans typing at each other on AOL, although that is part of it too and will be as long as seducing the romantic and flaming the idiotic are enjoyable. Rather, the net is the collective interaction spun off by a trillion objects and living beings, linked together through air and glass.

This is the net that begets the Network Economy. According to MCI, the total volume of voice traffic on global phone systems will be superseded by the total volume of data traffic in three years. We're already on the way to an expanded economy full of new participants: agents, bots, objects, and machines, as well as several billion more humans. We won't wait for AI to make intelligent systems; we'll do it with the dumb power of ubiquitous computing and pervasive connections.

The whole shebang won't happen tomorrow, but the trajectory is clear. We are connecting all to all. Every step we take that banks on cheap, rampant, and universal connection is a step in the right direction. Furthermore, the surest way to advance massive connectionism is to exploit decentralized forces - to link the distributed bottom. How do you make a better bridge? Let the parts talk to each other. How do you improve lettuce farming? Let the soil speak to the farmer's tractors. How do you make aircraft safe? Let the airplanes communicate among themselves and pick their own flight paths.

In the Network Economy, embrace dumb power.

2 The Law of Plentitude

More gives more

Curious things happen when you connect all to all. Mathematicians have proven that the sum of a network increases as the square of the number of members. In other words, as the number of nodes in a network increases arithmetically, the value of the network increases exponentially. Adding a few more members can dramatically increase the value for all members.

Consider the first modern fax machine that rolled off the conveyor belt around 1965. Despite millions of dollars spent on its R&D, it was worth nothing. Zero. The second fax machine to roll off immediately made the first one worth something. There was someone to fax to. Because fax machines are linked into a network, each additional fax machine sliding down the chute increases the value of all the fax machines operating before it.

So strong is this network value that anyone purchasing a fax machine becomes an evangelist for the fax network. "Do you have a fax?" fax owners ask you. "You should get one." Why? Your purchase increases the worth of their machine. And once you join the network, you'll begin to ask others, "Do you have a fax (or email, or Acrobat software, etc)?" Each additional account you can persuade onto the network substantially increases the value of your account.

When you go to Office Depot to buy a fax machine, you are not just buying a US\$200 box. You are purchasing for \$200 the entire network of all other fax machines and the connections between them - a value far greater than the cost of all the separate machines.

The fax effect suggests that the more plentiful things become, the more valuable they become. But this notion directly contradicts two of the most fundamental axioms we attribute to the industrial age.

First hoary axiom: Value came from scarcity; diamonds, gold, oil, and college degrees were precious because they were scarce.

Second hoary axiom: When things were made plentiful, they became devalued; carpets no longer indicated status when they could be woven by the thousands on machines.

The logic of the network flips these industrial lessons upside down. In a Network Economy, value is derived from plentitude, just as a fax machine's value increases in ubiquity. Power comes from abundance. Copies (even physical copies) are cheap. Therefore, let them proliferate.

Instead, what is valuable is the scattered relationships - sparked by the copies - that become tangled up in the network itself. And the relationships rocket upward in value as the parts increase in number even slightly. Windows NT, fax machines, TCP/IP, GIF images, RealAudio - all born deep in the Network Economy - adhere to this logic. But so do metric wrenches, triple-A batteries, and other devices that rely on universal standards; the more common they are, the more it pays you to stick to that standard.

In the future, cotton shirts, bottles of vitamins, chain saws, and the rest of the industrial objects in the world will also obey the law of plentitude as the cost of producing an additional copy of them falls steeply, while the value of the network that invents, manufactures, and distributes them increases.

In the Network Economy, scarcity is overwhelmed by shrinking marginal costs. Where the expense of churning out another copy becomes trivial (and this is happening in more than software), the value of standards and the network booms.

In the Network Economy, more gives more.

3 The Law of Exponential Value

Success is nonlinear

The chart of Microsoft's cornucopia of profits is a revealing graph because it mirrors several other plots of rising stars in the Network Economy. During its first 10 years, Microsoft's profits were negligible. Its profits rose above the background noise only around 1985. But once they began to rise, they exploded.

Federal Express experienced a similar trajectory: years of minuscule profit increases, slowly ramping up to an invisible threshold, and then surging skyward in a blast sometime during the early 1980s.

The penetration of fax machines likewise follows a tale of a 20-year overnight success. Two decades of marginal success, then, during the mid-1980s, the number of fax machines quietly crosses the point of no return - and the next thing you know, they are irreversibly everywhere.

The archetypical illustration of a success explosion in a Network Economy is the Internet itself. As any old-time nethead will be quick to lecture you, the Internet was a lonely (but thrilling!) cultural backwater for two decades before it hit the media radar. A graph of the number of Internet hosts worldwide, starting in the 1960s, hardly creeps above the bottom line. Then, around 1991, the global tally of hosts suddenly mushrooms, exponentially arcing up to take over the world.

Each of these curves (I owe Net Gain author John Hagel credit for these four examples) is a classic template of exponential growth, compounding in a nonlinear way. Biologists know about exponential growth; such curves are almost the definition of a biological system. That's one reason the Network Economy is often described more accurately in biological terms. Indeed, if the Web feels like a frontier, it's because for the first time in history we are witnessing biological growth in technological systems.

At the same time, each of the above examples is a classic model of the Network Economy. The compounded successes of Microsoft, FedEx, fax machines, and the Internet all hinge on the prime law of networks: value explodes exponentially with membership, while this value explosion sucks in yet more members. The virtuous circle inflates until all potential members are joined.

The subtle point from these examples, however, is that this explosion did not ignite until approximately the late 1980s. Something happened then. That something was the dual big bangs of jelly bean chips and collapsing telco charges. It became feasible - that is, dirt cheap - to exchange data almost anywhere, anytime. The net, the grand net, began to nucleate. Network power followed.

Now that we've entered the realm where virtuous circles can unfurl overnight successes in a biological way, a cautionary tale is in order. One day, along the beach, tiny red algae blooms into a vast red tide. Then, a few weeks later, just when the red mat seems indelible, it vanishes. Lemmings boom and disappear. The same biological forces that amplify populations can mute them. The same forces that feed on each other to amplify network presences into powerful overnight standards can also work in reverse to unravel them in a blink. Small beginnings can lead to large results, while large disturbances have only small effects.

In the Network Economy, success is nonlinear.

4 The Law of Tipping Points

Significance precedes momentum

There is yet one more lesson to take from these primeval cases of the Network Economy. And here, another biological insight will be handy. In retrospect, one can see from these expo-curves that a point exists where the momentum was so overwhelming that success became a runaway event. Success became infectious, so to speak, and spread pervasively to the extent that it became difficult for the uninfected to avoid succumbing. (How long can you hold out not having a phone?)

In epidemiology, the point at which a disease has infected enough hosts that the infection moves from local illness to raging epidemic can be thought of as the tipping point. The contagion's momentum has tipped from pushing uphill against all odds to rolling downhill with all odds behind it. In biology, the tipping points of fatal diseases are fairly high, but in technology, they seem to trigger at much lower percentages of victims or members.

There has always been a tipping point in any business, industrial or network, after which success feeds upon itself. However, the low fixed costs, insignificant marginal costs, and rapid distribution that we find in the Network Economy depress tipping points below the levels of industrial times; it is as if the new bugs are more contagious - and more potent. Smaller initial pools can lead to runaway dominance.

Lower tipping points, in turn, mean that the threshold of significance - the period before the tipping point during which a movement, growth, or innovation must be taken seriously - is also dramatically lower than it was during the industrial age. Detecting events while they are beneath this threshold is essential.

Major US retailers refused to pay attention to TV home-shopping networks during the 1980s because the number of people watching and buying from them was initially so small and marginalized that it did not meet the established level of retail significance. Instead of heeding the new subtle threshold of network economics, the retailers waited until the alarm of the tipping point sounded, which meant, by definition, that it was too late for them to cash in.

In the past, an innovation's momentum indicated significance. Now, in the network environment, significance precedes momentum.

Biologists tell a parable of the lily leaf, which doubles in size every day. The day before it completely covers the pond, the water is only half covered, and the day before that, only a quarter covered, and the day before that, only a measly eighth. So, while the lily grows imperceptibly all summer long, only in the last week of the cycle would most bystanders notice its "sudden" appearance. But by then, it is far past the tipping point.

The Network Economy is a lily pond. The Web, as one example, is a leaf doubling in size every six months. MUDs and MOOs, Teledesic phones, wireless data ports, collaborative bots, and remote solid state sensors are also leaves in the network lily pond. Right now, they are just itchy-bitsy lily cells merrily festering at the beginning of a hot network summer.

In the Network Economy, significance precedes momentum.

5 The Law of Increasing Returns

Make virtuous circles

The prime law of networking is known as the law of increasing returns. Value explodes with membership, and the value explosion sucks in more members, compounding the result. An old saying puts it more succinctly: Them that's got shall get.

We see this effect in the way areas such as Silicon Valley grow; each new successful start-up attracts other start-ups, which in turn attract more capital and skills and yet more start-ups. (Silicon Valley and other high tech industrial regions are themselves tightly coupled networks of talent, resources, and opportunities.)

The law of increasing returns is far more than the textbook notion of economies of scale. In the old rules, Henry Ford leveraged his success in selling cars to devise more efficient methods of production. This enabled Ford to sell his cars more cheaply, which created larger sales, which fueled more innovation and even better production methods, sending his company to the top. While the law of increasing returns and the economies of scale both rely on positive feedback loops, the former is propelled by the amazing potency of net power, and the latter isn't. First, industrial economies of scale increase value linearly, while the prime law increases value exponentially - the difference between a piggy bank and compounded interest.

Second, and more important, industrial economies of scale stem from the herculean efforts of a single organization to outpace the competition by creating value for less. The expertise (and advantage) developed by the leading company is its alone. By contrast, networked increasing returns are created and shared by the entire network. Many agents, users, and competitors together create the network's value. Although the gains of increasing returns may be reaped unequally by one organization over another, the value of the gains resides in the greater web of relationships.

Huge amounts of cash may pour toward network winners such as Cisco or Oracle or Microsoft, but the supersaturated matrix of increasing returns woven through their companies would continue to expand into the net even if those particular companies should

disappear.

Likewise, the increasing returns we see in Silicon Valley are not dependent on any particular company's success. As AnnaLee Saxenian, author of *Regional Advantage*, notes, Silicon Valley has in effect become one large, distributed company. "People joke that you can change jobs without changing car pools," Saxenian told Washington Post reporter Elizabeth Corcoran. "Some say they wake up thinking they work for Silicon Valley. Their loyalty is more to advancing technology or to the region than it is to any individual firm."

One can take this trend further. We are headed into an era when both workers and consumers will feel more loyalty to a network than to any ordinary firm. The great innovation of Silicon Valley is not the wowie-zowie hardware and software it has invented, but the social organization of its companies and, most important, the networked architecture of the region itself - the tangled web of former jobs, intimate colleagues, information leakage from one firm to the next, rapid company life cycles, and agile email culture. This social web, suffused into the warm hardware of jelly bean chips and copper neurons, creates a true Network Economy.

The nature of the law of increasing returns favors the early. The initial parameters and conventions that give a network its very power quickly freeze into unalterable standards. The solidifying standards of a network are both its blessing and its curse - a blessing because from the de facto collective agreement flows the unleashed power of increasing returns, and a curse because those who own or control the standard are disproportionately rewarded.

But the Network Economy doesn't allow one without the other. Microsoft's billions are tolerated because so many others in the Network Economy have made their collective billions on the advantages of Microsoft's increasing-returns standards.

In a Network Economy, life is tricky for consumers, who must decide which early protocol to support. Withdrawing later from the wrong network of relationships is painful - but not as painful as companies who bet their whole lives on the wrong one. Nonetheless, guessing wrong about conventions is still better than ignoring network dynamics altogether. There is no future for hermetically sealed closed systems in the Network Economy. The more dimensions accessible to member input and creation, the more increasing returns can animate the network, the more the system will feed on itself and prosper. The less it allows these, the more it will be bypassed.

The Network Economy rewards schemes that allow decentralized creation and punishes those that don't. An automobile maker in the industrial age maintains control over all aspects of the car's parts and construction. An automobile maker in the Network Economy will establish a web of standards and outsourced suppliers, encouraging the web itself to invent the car, seeding the system with knowledge it gives away, engaging as many participants as broadly as possible, in order to create a virtuous loop where every member's success is shared and leveraged by all.

In the Network Economy, make virtuous circles.

6 The Law of Inverse Pricing

Anticipate the cheap

One curious aspect of the Network Economy would astound a citizen living in 1897: The very best gets cheaper each year. This rule of thumb is so ingrained in our contemporary lifestyle that we bank on it without marveling at it. But marvel we should, because this paradox is a major engine of the new economy.

Through most of the industrial age, consumers experienced slight improvements in quality

for slight increases in price. But the arrival of the microprocessor flipped the price equation. In the information age, consumers quickly came to count on drastically superior quality for less price over time. The price and quality curves diverge so dramatically that it sometimes seems as if the better something is, the cheaper it will cost.

Computer chips launched this inversion, as Ted Lewis, author of *The Friction Free Economy*, points out. Engineers used the supreme virtues of computers to directly and indirectly create the next improved version of computers. By compounding *car* learning in this fashion, we got more out of less material. So potent is compounding chip power that everything it touches - cars, clothes, food - falls under its spell. Indirectly amplified learning by shrinking chips enabled just-in-time production systems and the outsourcing of very high tech manufacturing to low-wage labor - both of which lowered the prices of goods still further.

Today, shrinking chip meets exploding net. Just as we leveraged compounded learning in creating the microprocessor, we are leveraging the same multiplying loops in creating the global communications web. We use the supreme virtues of networked communications to directly and indirectly create better versions of networked communications.

Almost from their birth in 1971, microprocessors have lived in the realm of inverted pricing. Now, telecommunications is about to experience the same kind of plunges that microprocessor chips take - halving in price, or doubling in power, every 18 months - but even more drastically. The chip's pricing flip was called Moore's Law. The net's flip is called Gilder's Law, for George Gilder, a radical technothorist who forecasts that for the foreseeable future (the next 25 years), the total bandwidth of communication systems will triple every 12 months.

The conjunction of escalating communication power with shrinking size of jelly bean nodes at collapsing prices leads Gilder to speak of bandwidth becoming free. What he means is that the price per bit transmitted slides down an asymptotic curve toward the free. An asymptotic curve is like Zero's tortoise: with each step forward, the tortoise gets closer to the limit but never actually reaches it. An asymptotic price curve falls toward the free without ever touching it, but its trajectory closely paralleling the free is what becomes important.

In the Network Economy, bandwidth is not the only thing headed this way. Mips-per-dollar calculations head toward the free. Transaction costs dive toward the free. Information itself - headlines and stock quotes - plunges toward the free. Indeed, all items that can be copied, both tangible and intangible, adhere to the law of inverted pricing and become cheaper as they improve. While it is true that automobiles will never be free, the cost per mile will dip toward the free. It is the function per dollar that continues to drop.

For consumers, this is heaven. For those hoping to make a buck, this will be a cruel world. Prices will eventually settle down near the free (gulp!), but quality is completely open-ended at the top. For instance, all-you-can-use telephone service someday will be essentially free, but its quality can only continue to ascend, just to keep competitive.

So how will the telcos - and others - make enough money for profit, R&D, and system maintenance? By expanding what we consider a telephone to be. Over time, any invented product is on a one-way trip over the cliff of inverted pricing and down the curve toward the free. As the Network Economy catches up to all manufactured items, they will all slide down this chute more rapidly than ever. Our job, then, is to create new things to send down the slide - in short, to invent items faster than they are commoditized.

This is easier to do in a network-based economy because the criss-crossing of ideas, the hyperlinking of relationships, the agility of alliances, and the nimble quickness of creating new nodes all support the constant generation of new goods and services where none were before.

And, by the way, the appetite for more things is insatiable. Each new invention placed in the economy creates the opportunity and desire for two more. While plain old telephone service is headed toward the free, I now have three phone lines just for my machines and will someday have a data "line" for every object in my house. More important, managing these lines, the data they transmit, the messages to me, the storage thereof, the need for mobility, all enlarge what I think of as a phone and what I will pay a premium for.

In the Network Economy, you can count on the best getting cheaper; as it does, it opens a space around it for something new that is dear. Anticipate the cheap.

7 The Law of Generosity

Follow the free

If services become more valuable the more plentiful they are (Law #2), and if they cost less the better and the more valuable they become (Law #6), then the extension of this logic says that the most valuable things of all should be those that are given away.

Microsoft gives away its Web browser, Internet Explorer. Qualcomm, which produces Eudora, the standard email program, is given away as freeware in order to sell upgraded versions. Some 1 million copies of McAfee's antivirus software are distributed free each month. And, of course, Sun passed Java out gratis, sending its stock up and launching a mini-industry of Java app developers.

Can you imagine a young executive in the 1940s telling the board that his latest idea is to give away the first 40 million copies of his only product? (It's what Netscape did 50 years later.) He would not have lasted a New York minute.

But now, giving away the store for free is an applauded, level-headed strategy that banks on the network's new rules. Because compounding network knowledge inverts prices, the marginal cost of an additional copy (intangible or tangible) is near zero. Because value appreciates in proportion to abundance, a flood of copies increases the value of all the copies. Because the more value the copies accrue, the more desirable they become, the spread of the product becomes self-fulfilling. Once the product's worth and indispensability is established, the company sells auxiliary services or upgrades, enabling it to continue its generosity and maintaining this marvelous circle.

One could argue that this frightening dynamic works only with software, since the marginal cost of an additional copy is already near zero. That would misread the universality of the inverted price. Made-with-atoms hardware is also following this force when networked. Cellular phones are given away to sell their services. We can expect to see direct-TV dishes - or any object with which the advantages of being plugged in exceed the diminishing cost of replicating the object - given away for the same reasons.

The natural question is how companies are to survive in a world of generosity. Three points will help.

First, think of "free" as a design goal for pricing. There is a drive toward the free - the asymptotic free - that, even if not reached, makes the system behave as if it does. A very small flat rate may have the same effects as flat-out free.

Second, while one product is free, this usually positions other services to be valuable. Thus, Sun gives Java away to help sell servers and Netscape hands out consumer browsers to help sell commercial server software.

Third, and most important, following the free is a way to rehearse a service's or a good's eventual fall to free. You structure your business as if the thing that you are creating is free

in anticipation of where its price is going. Thus, while Sega game consoles are not free to consumers, they are sold as loss leaders to accelerate their eventual destiny as something that will be given away in a Network Economy.

Another way to view this effect is in terms of attention. The only factor becoming scarce in a world of abundance is human attention. Each human has an absolute limit of only 24 hours per day to provide attention to the millions of innovations and opportunities thrown up by the economy. Giving stuff away garners human attention, or mind share, which then leads to market share.

Following the free also works in the other direction. If one way to increase product value is to make products free, then many things now without cost hide great value. We can anticipate wealth by following the free.

In the Web's early days, the first indexes to this uncharted territory were written by students and given away. The indexes helped humans focus their attention on a few sites out of thousands and helped draw attention to the sites, so webmasters aided the indexers' efforts. By being available free, indexes became ubiquitous. Their ubiquity quickly led to explosive stock values for the indexers and enabled other Web services to flourish.

So what is free now that may later lead to extreme value? Where today is generosity preceding wealth? A short list of online candidates would be digesters, guides, cataloguers, FAQs, remote live cameras, Web splashes, and numerous bots. Free for now, each of these will someday have profitable companies built around them. These marginal functions now are not fringe; remember, for instance, that in the industrial age Readers Digest is the world's most widely read magazine, that TV Guide is more profitable than the three major networks it guides viewers to, and that the Encyclopaedia Britannica began as a compendium of articles by amateurs - not too dissimilar from FAQs.

But the migration from ad hoc use to commercialization cannot be rushed. One of the law of generosity's corollaries is that value in the Network Economy requires a protocommmercial stage. Again, wealth feeds off ubiquity, and ubiquity usually mandates some level of sharing. The early Internet and the early Web sported amazingly robust gift economies; goods and services were swapped, shared generously, or donated outright - actually, this was the sole way to acquire things online. Idealistic as this attitude was, it was the only sane way to launch a commercial economy in the emerging space. The flaw that science fiction ace William Gibson found in the Web - its capacity to waste tremendous amounts of time - was in fact, as Gibson further noted, its saving grace. In a Network Economy, innovations must first be seeded into the inefficiencies of the gift economy to later sprout in the commercial economy's efficiencies.

It's a rare (and foolish) software outfit these days that does not introduce its wares into the free economy as a beta version in some fashion. Fifty years ago, the notion of releasing a product unfinished - with the intention that the public would help complete it - would have been considered either cowardly, cheap, or inept. But in the new regime, this precommercial stage is brave, prudent, and vital.

In the Network Economy, follow the free.

8 The Law of the Allegiance

Feed the web first

The distinguishing characteristic of networks is that they have no clear center and no clear outer boundaries. The vital distinction between the self (us) and the nonself (them) - once exemplified by the allegiance of the industrial-era organization man - becomes less meaningful in a Network Economy. The only "inside" now is whether you are on the network or off. Individual allegiance moves away from organizations and toward networks

and network platforms. (Are you Windows or Mac?)

Thus, we see fierce enthusiasm from consumers for open architectures. Users are voting for maximizing the value of the network itself. Companies have to play this way, too. As consultant John Hagel argues, a company's primary focus in a networked world shifts from maximizing the firm's value to maximizing the value of the infrastructure whole. For instance, game companies will devote as much energy promoting the platform - the tangle of users, developers, hardware manufactures, etc. - as they do to their product. Unless their web thrives, they die.

The net is a possibility factory, churning out novel opportunities by the diskful. But unless this explosion is harnessed, it will drown the unprepared. What the computer industry calls "standards" is an attempt to tame the debilitating abundance of competing possibilities. Standards strengthen a network; their constraints solidify a pathway, allowing innovation and evolution to accelerate. So central is the need to tame the choice of possibilities that organizations must make the common standard their first allegiance. Companies positioned at the gateway to a standard will reap the largest rewards. But as a company prospers, so do those in its web.

A network is like a country. In both, the surest route to raising one's own prosperity is raising the system's prosperity. The one clear effect of the industrial age is that the prosperity individuals achieve is more closely related to their nation's prosperity than to their own efforts.

The net is like a country, but with three important differences:

- 1) No geographical or temporal boundaries exist. Relations flow 24 by 7 by 365.
- 2) Relations in the Network Economy are more tightly coupled, more intense, more persistent, and more intimate in many ways than those in a country.
- 3) Multiple overlapping networks exist, with multiple overlapping allegiances.

Yet, in every network, the rule is the same. For maximum prosperity, feed the web first.

9 The Law of Devolution

Let go at the top

The tightly linked nature of any economy, but especially the Network Economy's ultraconnected constitution, makes it behave ecologically. The fate of individual organizations is not dependent entirely on their own merits, but also on the fate of their neighbors, their allies, their competitors, and, of course, on that of the immediate environment.

Some biomes in nature are shy of opportunities for life. In the Arctic there are only a couple of styles of living, and a species had better get good at one of them. Other biomes are chock full of opportunities, and those possibilities are in constant flux, appearing and retreating in biological time as species jockey toward maximum adaptability.

The rich, interactive, and highly plastic shape of the Network Economy resembles a biome seething with action. New niches pop up constantly and go away as fast. Competitors sprout beneath you and then gobble your spot up. One day you are king of the mountain, and the next day there is no mountain at all.

Biologists describe the struggle of an organism to adapt in this biome as a long climb uphill, where uphill means greater adaptation. In this visualization, an organism that is maximally adapted to the times is situated on a peak. It is easy to imagine a commercial organization

substituted for the organism. A company expends great effort to move its butt uphill, or to evolve its product so that it is sitting on top, where it is maximally adapted to the consumer environment.

All organizations (profit and nonprofit alike) face two problems as they attempt to find their peak of optimal fit. Both are amplified by a Network Economy in which turbulence is the norm.

First, unlike the industrial era's relatively simple environment, where it was fairly clear what an optimal product looked like and where on the slow-moving horizon a company should place itself, it is increasingly difficult in the Network Economy to discern what hills are highest and what summits are false.

Big and small companies alike can relate to this problem. It's unclear whether one should strive to be the world's best hard disc manufacturer when the mountain beneath that particular peak may not be there in a few years. An organization can cheer itself silly on its way to becoming the world's expert on a dead-end technology. In biology's phrasing, it gets stuck on a local peak.

The harsh news is that getting stuck is a certainty in the new economy. Sooner, rather than later, a product will be eclipsed at its prime. While one product is at its peak, another will move the mountain by changing the rules.

There is only one way out. The organism must devolve. In order to go from one high peak to another, it must go downhill first and cross a valley before climbing uphill again. It must reverse itself and become less adapted, less fit, less optimal.

This brings us to the second problem. Organizations, like living beings, are hardwired to optimize what they know and to not throw success away. Companies find devolving a) unthinkable and b) impossible. There is simply no room in the enterprise for the concept of letting go - let alone the skill to let go - of something that is working, and trudge downhill toward chaos.

And it will be chaotic and dangerous down below. The definition of lower adaptivity is that you are closer to extinction. Finding the next peak is suddenly the next life-or-death assignment. But there is no alternative (that we know of) to leaving behind perfectly good products, expensively developed technology, and wonderful brands and heading down to trouble in order to ascend again in hope. In the future, this forced march will become routine.

The biological nature of this era means that the sudden disintegration of established domains will be as certain as the sudden appearance of the new. Therefore, there can be no expertise in innovation unless there is also expertise in demolishing the ensconced.

In the Network Economy, the ability to relinquish a product or occupation or industry at its peak will be priceless. Let go at the top.

10 The Law of Displacement

The net wins

Many observers have noted the gradual displacement in our economy of materials by information. Automobiles weigh less than they once did and perform better. The missing materials have been substituted with nearly weightless high tech know-how in the form of plastics and composite fiber materials. This displacement of mass with bits will continue in the Network Economy.

Whereas once the unique dynamics of the software and computer industry (increasing

returns, following the free, etc.) were seen as special cases within the larger "real" economy of steel, oil, automobiles, and farms, the dynamics of networks will continue to displace the old economic dynamics until network behavior becomes the entire economy.

For example, take the new logic of cars as outlined by energy visionary Amory Lovins. What could be more industrial-age than automobiles? However, chips and networks can displace the industrial age in cars, too. Most of the energy a car consumes is used to move the car itself, not the passenger. So, if the car's body and engine can be diminished in size, less power is needed to move the car, meaning the engine can be made yet smaller, which means that the car can be smaller yet, and so on down the similar slide of compounded value that microprocessors followed. That's because smart materials - stuff that requires increasing knowledge to invent and make - are shrinking the steel.

Detroit and Japan have designed concept cars built out of ultralightweight composite fiber material weighing about 1,000 pounds, powered by hybrid-electric motors. They take away the mass of radiator, axle, and drive shaft by substituting networked chips. Just as embedding chips in brakes made them safer, these lightweight cars will be wired with network intelligence to make them safer: a crash will inflate the intelligence of multiple air bags - think smart bubblepak.

The accumulated effect of this substitution of knowledge for material in automobiles is a hypercar that will be safer than today's car, yet can cross the continental US on one tank of fuel.

Already, the typical car boasts more computing power than your typical desktop PC, but what the hypercar promises, says Lovins, is not wheels with lots of chips, but a chip with wheels. A car can rightly be viewed as headed toward becoming a solid state module. And it will drive on a road system increasingly wired as a decentralized electronic network obeying the Network Economy's laws.

Once we see cars as chips with wheels, it's easier to imagine airplanes as chips with wings, farms as chips with soil, houses as chips with inhabitants. Yes, they will have mass, but that mass will be subjugated by the overwhelming amount of knowledge and information flowing through it, and, in economic terms, these objects will behave as if they had no mass at all. In that way, they migrate to the Network Economy.

Nicholas "Atoms-to-Bits" Negroponte guesstimates that the Network Economy will reach \$1 trillion by 2000. What this figure doesn't represent is the scale of the economic world that is moving onto the Internet - that grand net of interconnected objects - as the Network Economy infiltrates cars and traffic and steel and corn. Even if all cars aren't sold online right away, the way cars are designed, manufactured, built, and operated will depend on network logic and chip power.

The question "How big will online commerce be?" will have diminishing relevance, because all commerce is jumping onto the Internet. The distinctions between the Network Economy and the industrial economy will fade to the difference of animated versus inert. If money and information flow through something, then it's part of the Network Economy.

In the Network Economy, the net wins. All transactions and objects will tend to obey network logic.

11 The Law of Churn

Seek sustainable disequilibrium

In the industrial perspective, the economy was a machine that was to be tweaked to optimal efficiency, and, once finely tuned, maintained in productive harmony. Companies or industries especially productive of jobs or goods had to be protected and cherished at all

costs, as if these firms were rare watches in a glass case.

As networks have permeated our world, the economy has come to resemble an ecology of organisms, interlinked and coevolving, constantly in flux, deeply tangled, ever expanding at its edges. As we know from recent ecological studies, no balance exists in nature; rather, as evolution proceeds, there is perpetual disruption as new species displace old, as natural biomes shift in their makeup, and as organisms and environments transform each other. So it is with the network perspective: companies come and go quickly, careers are patchworks of vocations, industries are indefinite groupings of fluctuating firms.

Change is no stranger to the industrial economy or the embryonic information economy; Alvin Toffler coined the term future shock in 1970 as the sane response of humans to accelerating change. But the Network Economy has moved from change to churn.

Change, even in its toxic form, is rapid difference. Churn, on the other hand, is more like the Hindu god Shiva, a creative force of destruction and genesis. Churn topples the incumbent and creates a platform ideal for more innovation and birth. It is "compounded rebirth." And this genesis hovers on the edge of chaos.

Donald Hicks of the University of Texas studied the half-life of Texan businesses for the past 22 years and found that their longevity has dropped by half since 1970. That's change. But Austin, the city in Texas that has the shortest expected life spans for new businesses, also has the fastest-growing number of jobs and the highest wages. That's churn.

Hicks told his sponsors in Texas that "the vast majority of the employers and employment on which Texans will depend in the year 2026 - or even 2006 - do not yet exist." In order to produce 3 million new jobs by 2020, 15 million new jobs must be created in all, because of churn. "Rather than considering jobs as a fixed sum to be protected and augmented, Hicks argued, the state should focus on encouraging economic churning - on continually re-creating the state's economy," writes Jerry Useem in *Inc.*, a small-business magazine that featured Hicks's report. Ironically, only by promoting churn can long-term stability be achieved.

This notion of constant churn is familiar to ecologists and those who manage large networks. The sustained vitality of a complex network requires that the net keep provoking itself out of balance. If the system settles into harmony and equilibrium, it will eventually stagnate and die.

Innovation is a disruption; constant innovation is perpetual disruption. This seems to be the goal of a well-made network: to sustain a perpetual disequilibrium. As economists (such as Paul Romer and Brian Arthur) begin to study the Network Economy, they see that it, too, operates by poisoning itself on the edge of constant chaos. In this chaotic churn is life-giving renewal and growth.

The difference between chaos and the edge of chaos is subtle. Apple Computer, in its attempt to seek persistent disequilibrium and stay innovative, may have leaned too far off-balance and unraveled toward extinction. Or, if its luck holds, after a near-death experience in devolution it may be burrowing toward a new mountain to climb.

The dark side of churn in the Network Economy is that the new economy builds on the constant extinction of individual companies as they're outpaced or morphed into yet newer companies in new fields. Industries and occupations also experience this churn. Even a sequence of rapid job changes for workers - let alone lifetime employment - is on its way out. Instead, careers - if that is the word for them - will increasingly resemble networks of multiple and simultaneous commitments with a constant churn of new skills and outmoded roles.

Networks are turbulent and uncertain. The prospect of constantly tearing down what is now

working will make future shock seem tame. We, of course, will challenge the need to undo established successes, but we'll also find exhausting the constant, fierce birthing of so much that is new. The Network Economy is so primed to generate self-making newness that we may find this ceaseless tide of birth a type of violence.

Nonetheless, in the coming churn, the industrial age's titans will fall. In a poetic sense, the prime task of the Network Economy is to destroy - company by company, industry by industry - the industrial economy. While it undoes industry at its peak, it weaves a larger web of new, more agile, more tightly linked organizations between its spaces.

Effective churning will be an art. In any case, promoting stability, defending productivity, and protecting success can only prolong the misery. When in doubt, churn. In the Network Economy, seek sustainable disequilibrium.

12 The Law of Inefficiencies

Don't solve problems

In the end, what does this Network Economy bring us?

Economists once thought that the coming age would bring supreme productivity. But, in a paradox, increasing technology has not led to measurable increases in productivity.

This is because productivity is exactly the wrong thing to care about. The only ones who should worry about productivity are robots. And, in fact, the one area of the economy that does show a rise in productivity has been the US and Japanese manufacturing sectors, which have seen about a 3 to 5 percent annual increase throughout the 1980s and into the 1990s. This is exactly where you want to find productivity. But we don't see productivity gains in the misnamed catch-all category, the service industry - and why would we? Is a Hollywood movie company that produces longer movies per dollar more productive than one that produces shorter movies?

The problem with trying to measure productivity is that it measures only how well people can do the wrong jobs. Any job that can be measured for productivity probably should be eliminated.

Peter Drucker has noted that in the industrial age, the task for each worker was to discover how to do his job better; that's productivity. But in the Network Economy, where machines do most of the inhumane work of manufacturing, the task for each worker is not "how to do this job right" but "what is the right job to do?" In the coming era, doing the exactly right next thing is far more "productive" than doing the same thing better. But how can one easily measure this vital sense of exploration and discovery? It will be invisible to productivity benchmarks.

Wasting time and being inefficient are the way to discovery. The Web is being run by 20-year-olds because they can afford to waste the 50 hours it takes to become proficient in exploring the Web. While 40-year-old boomers can't take a vacation without thinking how they'll justify the trip as being productive in some sense, the young can follow hunches and create seemingly mindless novelties on the Web without worrying about whether they are being efficient. Out of these inefficient tinkering will come the future.

In the Network Economy, productivity is not our bottleneck. Our ability to solve our social and economic problems will be limited primarily by our lack of imagination in seizing opportunities, rather than trying to optimize solutions. In the words of Peter Drucker, as echoed recently by George Gilder, "Don't solve problems, seek opportunities." When you are solving problems, you are investing in your weaknesses; when you are seeking opportunities, you are banking on the network. The wonderful news about the Network Economy is that it plays right into human strengths. Repetition, sequels, copies, and

automation all tend toward the free, while the innovative, original, and imaginative all soar in value.

Our minds will at first be bound by old rules of economic growth and productivity. Listening to the network can unloose them. In the Network Economy, don't solve problems, seek opportunities.

Kevin Kelly is Wired's executive editor.

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Great for business, but what about the people?

"IF YOU sit on the lid of progress, you will be blown to pieces." Henry Kaiser's aphorism, nailed to the wall in one of Palo Alto's "cyberstores" that connect you to the Internet, conveys the impression that those "blown to pieces" are likely to be those a long way from Silicon Valley and from the sort of economy it represents.

One indication of this is the premium America's high-technology giants command over the old industrial elite. The market capitalisation of Intel, Microsoft and Cisco together is almost three times that of Detroit's big three car companies, even though the car firms' sales are more than ten times higher than the high-tech vendors' (see table).

Nor is it just a matter of technology. Only ten years ago, Japan's hierarchical high-tech industry was thought to be on the point of conquering Silicon Valley. Now it comes as a humble student. Fujitsu, Mitsubishi and many other Japanese firms have set up venture-capital arms in Silicon Valley in an attempt to capture the culture. NEC has a special training programme for executives called "The West Coast School". According to one story--no doubt apocryphal--the managers of a Japanese electronics company have been struggling to translate Sun's motto, "Kick butt and have fun".

However, merely being better than any of the alternatives does not make a place perfect; nor does it protect it from change. This survey has argued that the emergence of other high-tech clusters, together with the long-term effect of the Internet, will make Silicon Valley more of a primus inter pares. In particular, the valley will become even less of a location, and even more of a process: a way of spawning new ideas and young companies.

There are two kinds of threat to Silicon Valley: from outside and from inside. The sort of outside threat it fears most is a change in the political climate. For instance, if the American government were to embark on the sort of protectionist, anti-immigration policies proposed by Pat Buchanan in last year's election campaign, the effect on the valley would be devastating.

Above or below politics?

It is hard to exaggerate how far ahead of the American government Silicon Valley has moved. Even the statistics are a quagmire. Nobody in Washington has

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yet worked out how to calculate the output of a software developer, or into which employment category to put designers for the World Wide Web (at the moment, they go into "business services, not elsewhere classified"). California's governor, Pete Wilson, recently complained that economic figures generated in Washington were "virtually irrelevant to California's new economy".

However, the gulf between American politics and Silicon Valley is not just a matter of incompetence in Washington. Until recently the valley has tried to keep as far away from politics as possible, but this is changing slightly. In the 1992 election Bill Clinton scored a coup by persuading a group of high-tech executives to endorse him. Last year Silicon Valley raised \$ 40m in a matter of days to crush a Californian ballot initiative that would have made it easier to file shareholder lawsuits against high-tech companies. This display of financial clout caused a frisson in Washington, but most of those who gave money saw it as a one-off.

To Silicon Valley's nerds, "government is the ultimate big company," and they want nothing to do with it. That is fine if it means they will not be passing the hat round in Washington, the way that the car industry does. But their resolutely non-political stance also reflects their almost complete lack of interest in the sort of society developing around them. That, in turn, creates a threat from within.

One obvious outcome of that lack of interest is Silicon Valley's creaking infrastructure. Transport delays are said to cost Silicon Valley companies \$ 3.4 billion a year. During rush hours, the 101 freeway often resembles a parking lot. And since employment in the valley is rising roughly twice as quickly as the local labour force, ever more workers have to commute in from outside.

Education is an even bigger problem. As Doug Henton at Collaborative Economics points out, Silicon Valley outsources the provision of its most important resource--clever people--from the local community. At the top end, Stanford, which is a private university, and Berkeley, which is not, continue to produce fine students, but enrolment in public universities and colleges has been declining in the past few years. Silicon Valley's public high-schools are neglected. Despite the Internet's importance to the local economy, by the end of last year nearly a third of the schools in Santa Clara and San Mateo still lacked high-speed connections to the Net.

Yet at the same time Silicon Valley is getting increasingly fussy about whom it will employ. Until the early 1990s, manual dexterity was often enough to secure a job; now one in three of Santa Clara's adults has a degree (compared with one in five nationally). Children from poorer backgrounds find it difficult to prepare for the information age. A national study by the Children's Partnership, based in Santa Monica, found that only 14% of low-income students had a computer at home, compared with 82% in affluent homes.

So far, this inequality has not shown up in the statistics. Official figures for Santa Clara County (which, however, go up only to 1993) show incomes for both the top and the bottom quartiles rising in tandem. However, Stephen Levy, a local economist, points to the underlying paradox: "Those people who are participating in the cluster are doing so more broadly. But the problem is those people who are not participating at all."

The Economist, March 29, 1997

Systems failure

Anecdotal evidence suggests the presence of a statistically uncharted underclass. Around one in four of the region's inhabitants is Latino, yet this group is spectacularly under-represented among the Valley's office staff. Such groups do not share the region's affluent lifestyle. When a storm ripped off the roofs of two buildings in East San Jose last year, it revealed 300 people living in just 42 apartments.

The reason why Silicon Valley looks so uniformly rich is that its poorer, less well-educated people have been driven out by the sheer expense of living there and by the high standard of educational qualification it demands. Around one in five of Santa Clara's residents have lived somewhere else in the past five years. Interestingly, the income figures for California as a whole--as, to a lesser extent, for America as a whole--show a widening gap between rich and poor.

All this makes Silicon Valley look like a grander version of one of California's less attractive creations, the gated community: rich, elitist and insular. It is hard to see why Silicon Valley would want to give up being rich and elitist; those are just the flip sides of being successful and meritocratic. But does it need to be so insular? The harsh fact is that with a few notable exceptions (David Packard springs to mind), Silicon Valley's wealth has not trickled down into the community at large.

Three explanations are usually advanced for this. First, most of Silicon Valley's multi-millionaires are still young, and have not yet got round to the good-works stage. Second, their industry is so competitive that most of their money has to be reinvested in their companies (thus promoting the cluster's long-term success). And third, unlike the Rockefellers and DuPonts, Silicon Valley's rich do not feel guilty about either the way they have made their money or about the way they are spending it.

Developing a conscience

Perhaps it is just early days. In 1992 Joint Venture Silicon Valley was set up to become "a dynamic new model for regional rejuvenation". Its board includes most of Silicon Valley's elite (one of its chairmen is Lew Platt, the chief executive of Hewlett-Packard). JVSV has been notably successful in making the valley easier to do business in, persuading all the local cities to streamline regulations, promoting a local Internet network called Smart Valley and setting up a \$ 23m privately financed fund to support local education. JVSV is largely responsible for new Internet links in the schools, and for persuading 11,000 technology people to visit those schools on "Smart Valley NetDay".

In an optimistic new book, "Grassroots Leaders for a New Economy: How Civic Entrepreneurs are Building Prosperous Communities" (Jossey-Bass), Mr Henton insists that the valley's collaborative economic model can be extended to the local community, and that new "civic entrepreneurs" will fill the gaps between the state and private sectors.

On the other hand, Silicon Valley's ability to create wealth depends on its single-mindedness and leanness. Look back at the chart comparing the big three technology companies with the big three car companies, and note how the car makers, despite their lowly valuations, employ 1m more workers. Even

The Economist, March 29, 1997

Hewlett-Packard, which lives by Mr Packard's kindly HP Way, keeps a sharp eye on payroll, which has risen by only a fifth since 1985, while its sales have reased nearly sixfold.

To be sure, Silicon Valley is no paradise. But as this survey has made clear, there are plenty of things to admire about it: its emphasis on merit, its tolerance, its openness to new ideas, its common desire to make the future a better place. Above all, it is better than th Zschau, a local businessman and politician, puts it, "a society full of opportunity where there is some disparity between different levels of success sure beats a cesspool of poverty." For all Silicon Valley's faults, it is hard to think of a place better prepared for the 21st century.

GRAPHIC: chart, table

LANGUAGE: ENGLISH

LOAD-DATE: April 2, 1997

Foreign Affairs

THOMAS L. FRIEDMAN

The Internet Wars

PALO ALTO, Calif.

Three years ago I visited Microsoft to ask its top managers these basic questions: How does Microsoft measure power, and which countries have it and which ones don't? They answered that Microsoft measured power by one ratio: personal computers per household. And on Microsoft's power map South Korea ranked highest in the world, with the U.S. and Japan also near the top; Europe was all on the rise, except for France; but the Middle East, save for Israel, was a black hole.

Well, last week I went to Silicon Valley to ask the same questions to the cutting-edge technology companies there, and I got a very different answer from three years ago. Silicon Valley measures power today not in PC's per household, but in networks per capita. That is, how broadly and deeply has a country taken its PC's and linked them together into networks within companies, schools and entertainment sources, and then tied them into the Internet and the World Wide Web? And how broad is its bandwidth, which is the capacity of cable, telephone lines and fiber optics to carry digital communications from point to point in networks? "Bandwidth" and "degree of connectivity" — those are the new measures of power in the Silicon Universe.

"What people have not grasped is that the Internet will change everything," says John Chambers, the dynamic president of Cisco Systems — the most important American company that no one has ever heard of. It makes the black boxes that connect the Internet around the world. "The Internet will change how people live, work, play and learn. The Industrial Revolution brought together people with machines in factories, and the Internet revolution will bring together people with knowledge and information in virtual companies. And it will have every bit as much impact on society as the Industrial Revolution. It will promote globalization at an incredible pace. But instead of happening over 100 years, like the Industrial Revolution, it will happen over 7 years."

A few caveats: Mr. Chambers has an obvious self-interest in promoting this world view. The Internet revolution will take more than seven years. And bandwidth is a huge problem, because until the digital pipes get bigger and more organized, network-

The global balance of power@.com.

ing will be constrained. All that aside, Mr. Chambers is still right: Jobs and economic power will gravitate to those societies with the most networks and bandwidth, because those countries will find it easiest to gather, tap and deploy knowledge in order to design, invent, manufacture, communicate, educate and entertain.

Beyond bandwidth and connectivity, three other factors will distinguish companies and countries. One is whether you have a business culture where your people are comfortable exploiting networks and sharing their knowledge. I know a management consultant who likes to say about the German electronics giant Siemens: "If Siemens only knew what Siemens knows it would be a rich company." The second is whether you have a competitive culture in which big companies have to either constantly reinvent themselves or be overtaken by start-up companies, which is the essence of Silicon Valley. And the third factor is whether your company is good at creating strategic partnerships. You cannot compete today on a large scale without going global, and you can't go global without partners — the markets are simply too big and complex, and the level of investment too great.

"No one can do it by themselves anymore," argues Mr. Chambers. "The companies who do not understand how to truly partner will get left behind."

So who's hot and who's not in today's world? Taiwan is feared in Silicon Valley for its innovative prowess, connectivity and dynamic capitalist business culture that exploits all this technology. The U.S., Britain, Canada, Australia and parts of Israel and India also fall into this category, with China rising. Scandinavia, particularly Finland, scores very high on total networking, but lacks the entrepreneurial culture to fully exploit it. Japan and Korea are falling behind in network investments. Germany is catching up and France has just woken up.

"Companies and countries who will thrive in this Internet economy are those who change before the rest of the world realizes that they have to change," argues Mr. Chambers. If you do that faster than your competitors, he adds, there's only one thing you'll have to say to them: "Game over." □

The New York Times

SATURDAY, APRIL 11, 1998

Another is securities-litigation reform. Clinton lost favor in the Valley in December, 1995, when he vetoed a bill that would have made it harder for shareholders to bring what the industry considers frivolous lawsuits. "Clinton's veto shocked high tech out of its relative quiet," says Representative Tom Campbell (R-Calif.). "They'll never be passive again." Silicon Valley mobilized, helped push Congress to override the veto. And it followed up with a successful campaign against Prop. 211, which would have shielded California shareholder suits from the tougher federal restrictions.

At the moment, there's a rift be-

tween the software and Internet companies and the older computer makers over encryption. The government wants to limit exports of encryption technology to keep it out of the hands of terrorists. FBI Director Louis J. Freeh wants domestic restrictions, too. "The hardware guys, with all their experience in Washington, are willing to look for compromise, whereas the nouveau software guys want to have it all their way," says Kenneth Flamm, an economist at the Brookings Institution. Not surprisingly, hardware companies have gotten further. "Saying, 'Screw you, FBI and Defense Dept.' is not a

productive approach," observes Flamm.

Veterans of the Beltway predict that even the most arrogant and libertarian software execs will quickly learn to play the Washington game. They can't afford not to, considering the multitude of issues on the horizon. Battles over everything from privacy to intellectual property to electronic commerce will shape the economy of tomorrow. Welcome to Washington, Mr. Gates.

By John Carey, with Howard Gleckman, Catherine Yang, and Susan B. Garland in Washington and Steve Hamm and Andy Reinhardt in San Francisco

THE 'NEW ECONOMY' AND ITS BIGGEST FAN

Venture capitalist John Doerr is famous for launching Silicon Valley startups such as Netscape Communications Corp. These days, however, the Kleiner Perkins Caufield & Byers partner spends a chunk of his time pushing public policy—in monthly meetings with Vice-President Gore and through Technology Network, a nonpartisan group of high-tech CEOs. TechNet's hot buttons: improved public education and securities litigation reform. Doerr shared his views with BUSINESS WEEK correspondent Steve Hamm.

Q: What made you jump into politics?

A: It wasn't so much political as it was public policy. That's increasingly important to technology companies and to citizens. Technology is a bigger part of the economy, and the kinds of things we want to do fall under a really important umbrella called the New Economy. And to build the New Economy, we can't do it in our garages all by ourselves.

Q: What is TechNet's goal?

A: We picked two issues we focus on. One is education reform. The other is legal reform. And more broadly, we said we should be a meeting maker. We've had 100 meetings with elected officials of both political parties.

Q: Your group has people of all political persuasions. How does that work?

A: It's everything from neo-Liberals to neo-Libertarians. We focus on a few issues and we only take positions with a two-thirds vote. There's broad agreement that we want to advance

the growth of the New Economy.

Q: What is the New Economy?

A: The old economy, you learn a skill. The New Economy is lifelong learning. The old economy is concerned with security; the new is risk-taking. The New Economy is job creation; the old is job preservation. The old economy is capital equipment. In the new, it's intellectual property that matters. The old economy is about the status quo. The New Economy embraces speed and change. The old economy is top down and highly regulated, and tends to be a zero-sum game: You win, I lose. The New Economy is distributed, and instead of being highly regulated we form public/private partnerships. If the old economy is zero sum, the New Economy is win-win.

Q: What has TechNet accomplished?

A: Several things. In our first month, we got 300 executives to stand up and call for national education standards in each state to measure if 8-year-old kids can read and 12-year-olds can do math. Last week, we pledged to fund and do



"If the old economy is zero sum, the New Economy is win-win"

JOHN DOERR
Venture capitalist

what we can do to pass a major charter school initiative in California. Also, Marc Andreessen of Netscape came up with the idea of the Education Dashboard—technology for linking parents, teachers, and students. One other thing: We joined with other organizations to get federal securities litigation reform passed so companies can use this safe harbor to tell their investors about an uncertain future.

Q: How could the government improve the climate for investment in high tech?

A: The first and most important

thing they could do would be to adopt uniform national standards for securities litigation reform. Step No. 2 would be more federal funding of basic research in universities. This is me talking, not Tech Net now. We need support in Congress. Netscape didn't happen just because Marc Andreessen was smart. There was federally funded research that led to the whole Web revolution. The third thing they can do is check their damned politics at the schoolhouse door and get serious about public education.

No one can accuse Genzyme Corp., the biotech giant based in Cambridge, Mass., of being a technological laggard. Its scientists work at the forefront of biological research, while computer-controlled production equipment churns out hundreds of different advanced compounds.

So imagine the reaction of Robert Cowie, Genzyme's chief information officer, when he realized in 1996 that nearly every major system at Genzyme would be unable to cope with dates in the next century—the so-called Year 2000, or Y2K, computer bug. If left unfixed, the production equipment, the research and development computers used to analyze DNA, and the computers handling order-taking and billing would all fail on or before Jan. 1, 2000. Thanks to an early start, Cowie expects to have all his systems repaired well ahead of the deadline. Other businesses won't be so fortunate, he believes. "People will have to be complete by the end of this year, or it will be too late," says Cowie. "But there are still many companies that haven't done anything yet."

If Cowie is right about the overall lack of preparedness for Year 2000—and there's growing evidence that he is—a lot of businesses are in for a nasty shock. Up to now, skeptics have been able to pooh-pooh Year 2000 as a relatively easy-to-fix bug, an example of overheated hype by consultants looking for a quick buck. But there's growing alarm in Washington and elsewhere. The Securities & Exchange Commission has recently been strongly urging companies to start reporting the effect of Year 2000 on their earnings. "Many people think it is vastly exaggerated," says Percy Barnevik, chairman of Swiss-Swedish industrial giant ABB Asea Brown Boveri Ltd., one of the world's largest companies. "But it is a really big challenge." **ARMIES OF PROGRAMMERS.** Indeed, the Y2K bug is shaping up to have a profoundly negative impact on the U.S. economy—starting almost immediately. According to a new analysis prepared for BUSINESS WEEK by Standard & Poor's DRI, the growth rate in 1999 will be 0.3 percentage points lower as companies divert resources to fix the problem. Then Y2K could cut half a percentage point off growth in 2000 and early 2001. That would be the same size as the ex-

pected economic damage from the turmoil in East Asia.

All told, the Year 2000 bug could cost the U.S. about \$119 billion in lost economic output between now and 2001. "The Year 2000 bug will certainly hurt the economy," says DRI chief economist David A. Wyss, "and it could be a real killer if more of the problems are not fixed."

It's not only the growth rate that will be affected. Starting in 1999, inflation will be higher than it otherwise would have been and productivity growth will be lower. The reason:

Instead of creating or installing new productivity-enhancing programs, every company that uses computers is diverting money and skilled workers into patching old programs.

Think of it as a town threatened by a rising river. Every able-bodied person—no matter what their job—is put to work stacking sandbags, while economic activity in the rest of the town slows down. In the case of the Y2K bug, experienced programmers and computer-science PhDs are doing what is essentially unproductive labor.

And the amount of skilled labor needed is enormous. Finding, fixing, and testing all Y2K-affected software would require over 700,000 person-years, calculates Capers Jones, head of Software Productivity Research, a firm that tracks programmer productivity. "People are spending huge sums of money fixing problems that are 35 or 40 years old, just to stay in business," says John Bace, research director at Gartner Group Inc.

Indeed, the demand for Year 2000 fixes helps explain why management consulting and accounting

firms have added a stunning 200,000 new workers over the past two years. Moreover, with programmers' wages soaring because of the overpowering need to fix the problem, Year 2000 has the potential to push up inflation.

Then, at the beginning of 2000, the economy is almost certain to be hit by some computer failures, since it's becoming clear that many companies have gotten a late start attacking their Y2K problems. The BUSINESS WEEK/DRI estimate assumes that 85% of software programs will be fixed or replaced, which may be optimistic: A December, 1997, survey

ZAP!

HOW THE YEAR 2000 BUG WILL HURT THE ECONOMY

Growth could take a half-point hit in 2000 as inflation rises

Cover Story

by Howard Rubin, a computer-science professor at Hunter College New York, indicated that two of three large companies did not yet have detailed plans in place to address Year 2000. Small companies and government agencies are even further behind.

Year 2000 is going to pose a serious policy dilemma for the Federal Reserve, which has been trying to steer a tricky course. Over the next couple of years, Fed Chairman Alan Greenspan is going to be under increasing pressure to raise interest rates as labor shortages for information-technology workers send wages skyrocketing. The problem: A rate hike in 1999 would run the risk of worsening the post-2000 slowdown.

Cover Story

Morgan Grenfell Inc., sees a 40% chance of a sharp downturn. One way that could happen is if there's a major failure in the government's computer systems. Each week, the federal government sends out \$32 billion in Social Security and payroll checks and payments for such mundane items as rent. Even a short delay could be a major shock to the economy.

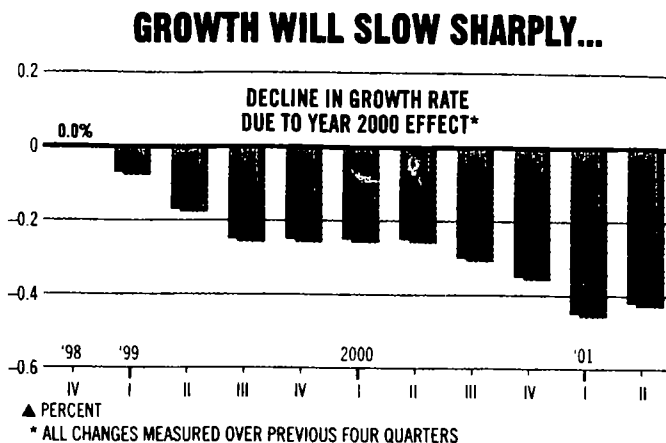
Unfortunately, when the Office of Management & Budget issues the next official report on the government's Y2K readi-

YEAR 2000: THE ECONOMIC DAMAGE

TOTAL LOSS OF OUTPUT
1998-2001

\$119 BILLION

(IN 1998 DOLLARS)



flow of Medicare and Medicaid funds. In the worst case, the tax system and the Medicare payment system will experience severe disruptions in 2000, halting the delivery of refund and reimbursement checks. "What is going to happen is the government is going to say, 'It's O.K., trust us,'" says Richard M. Kovacevich, CEO of Minneapolis-based Norwest Corp. "It could get scary."

NOT LOSING SLEEP. To be sure, there are some, especially in Silicon Valley, who aren't concerned. "Frankly, I don't lose any sleep on worrying about being Year 2000-ready," says Eric Benhamou, CEO of 3Com Corp., the large network-equipment maker. Adds Tony Hampel, group manager for Year 2000 Marketing at Sun Microsystems Inc.: "Year 2000 is an an-

ELECTRIC POWER

Many electric utilities realized only last year that their generating plants were susceptible to Y2K problems. Scattered power outages are likely, and some nuclear power plants may be shut down temporarily

noyance, a speed bump. We're overassessing the end-of-the-world aspect of the Year 2000 problem."

Perhaps. But other knowledgeable people are more worried about the widespread economic impact of the Y2K bug, including the Federal Re-

serve. "The failure to get it right will affect the integrity of the payment system, financial markets, and the performance of the domestic and the global economies," said William McDonough, president of the Federal Reserve Bank of New York, in a recent speech.

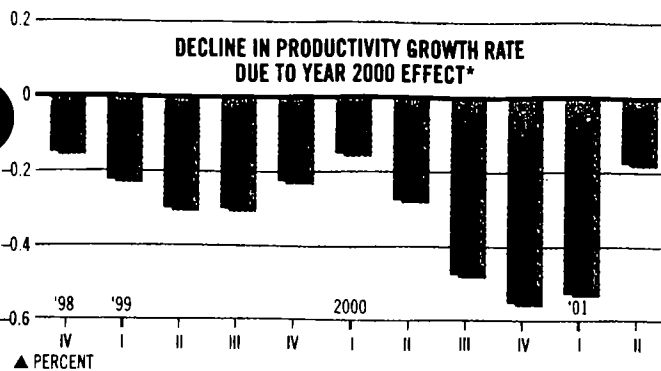
How can a single computer bug turn out to be so potentially hazardous to the economy? In theory, any single instance of the 2000 bug is relatively easy to repair. But the



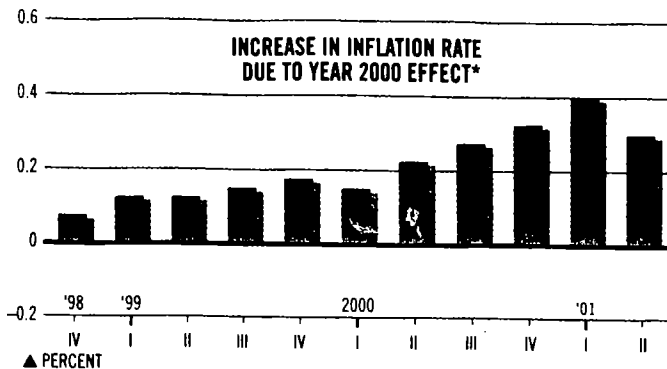
ness on Mar. 15, the news is not likely to be good. On Feb. 6, the Defense Dept.'s Inspector General issued a report saying that the military has no assurance that it is purchasing Year 2000-compliant products, "which may seriously hamper the ability of DoD to perform its administrative and warfighting mission requirements." The Internal Revenue Service is struggling to meet the deadline, as is the Health Care Financing Administration (HCFA), which handles the enormous

RECESSION? The chances that the Year 2000 bug will spark a sl

...PRODUCTIVITY WILL SUFFER...



...AND INFLATION WILL RISE



DATA: BUSINESS WEEK, STANDARD & POOR'S DRI

sheer number and complexity of computer programs that use dates turn the process of fixing the programs—also known as “remediation”—into a herculean task.

Consider a household analogy. If you have to change one lightbulb or one electric switch in your house, there's no problem. But if you have to replace the lightbulbs and electric switches in everything you own, including your refrigerator, your car dashboard, and your furnace, it becomes a

that programmable controllers—which have replaced mechanical relays in virtually all electricity-generating plants and control rooms—may behave badly or even freeze up when 2000 arrives. Many utilities are just getting a handle on the problem. “It's probably six months too soon for anyone to try to guess the complete extent of the problem,” says Charlie Siebenthal, manager of the Year 2000 program at the Electric Power Research Institute, the industry group that serves as

GOVERNMENT

Major problems exist at the Internal Revenue Service and many other agencies. Most state and local governments are way behind fixing date-sensitive programs needed for tax collection, payrolls, and welfare payments

very time-consuming and expensive process.

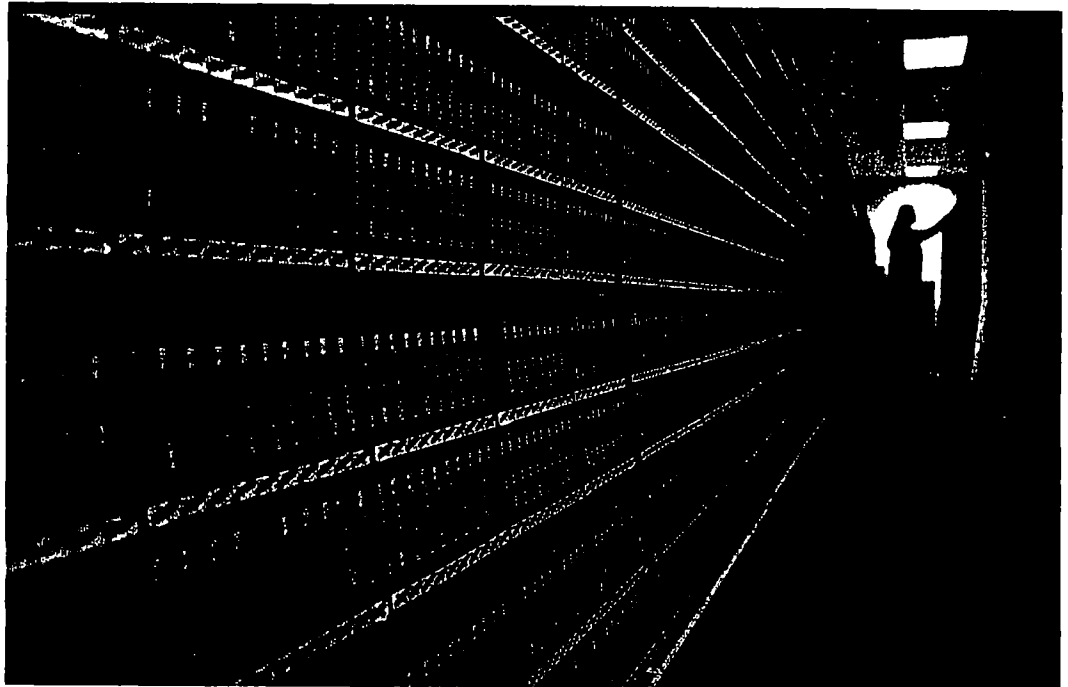
Indeed, what makes Year 2000 particularly vexing is that it affects both stand-alone computers and the embedded processors built into all sorts of modern equipment, from automated factory equipment to power plants to cars to cellular telephones. Last fall, Phillips Petroleum Co. engineers ran Year 2000 tests on an oil-and-gas production platform in the North Sea. The result: In a simulation, an essential safety system for detecting harmful gases such as hydrogen sulfide got confused and shut down. In real life, that would have rendered the platform unusable. Similar problems can occur in almost any sort of modern manufacturing that involves sensors and “smart” machinery. “There will be facilities where they go in and turn on the machines and they won't go on,” says Dean Kothmann, head of the technology division at engineering firm Black & Veatch, the world's largest provider of power plants.

In particular, electric utilities are only now becoming aware

an information clearinghouse. “We don't know” if electricity flow will be affected, he said.

Nuclear power plants, of course, pose an especially worrisome problem. While their basic safety systems should continue to work, other important systems could malfunction because of the 2000 bug. In one Year 2000 test, notes Jared S. Wermiel, who is leading the millennium bug effort at the Nuclear Regulatory Commission, the security computer at a nuclear power plant failed by opening vital areas that are normally locked. For that reason, the NRC is in the process of issuing a letter requesting confirmation from utilities that their plants will operate safely come Jan. 1, 2000. Given the complexity and the need to test, “it wouldn't surprise me if cer-

DAVID BURNETT/CONTACT



sharp downturn are pegged at 40% by economist Yardeni

Think of a date—say, Feb. 10, 1998. In the U.S., no one would object if you wrote that date as 2/10/98. People would know what you meant.

So there were no worries in the 1970s and '80s when programmers wrote software that represented years with only the last two digits rather than all four—"85" rather than "1985."

Programmers thought they were clever since they were conserving memory, which was expensive back then. Despite falling memory prices, the practice continued into the 1990s—out of habit and inertia.

Unfortunately, these programs interpret the year 2000 as 1900, which has the same last two digits. So any program with a date—billing, payroll, inventory, bank accounts—could crash or give misleading answers on Jan. 1, 2000, or before, since software that does scheduling or planning often uses dates a year or more in the future.

For example, if a program figures the age of a person

HOW DID WE GET INTO THIS MESS, ANYWAY?

by subtracting the date of birth from the current year, then starting in 2000 it will look as if everyone less than 100 years old will have a negative age. Some other daunting errors: a missing paycheck, a scrambled bank statement, the shutdown of a factory, or a power plant's inability to deliver electricity. Or the software can simply freeze up. "We

feel you'll be a lot luckier if the system stops functioning," says Larry Olson, chief information officer for the state of Pennsylvania. "It might be two months before you realize you're getting bad information."

The Year 2000 bug also shows up in microprocessors built into machinery, from automated assembly lines to cellular telephones. "Our biggest concern is that we miss an integrated circuit buried down inside somewhere that would have a cascade effect," says Bruce Colgate, process control manager at Phillips Petroleum Co. This is one bug whose effects may only be known when it bites.

tain plants find that they are not Year 2000-ready and have to shut down," says Werneil.

By contrast, the securities industry, big banks, and the Federal Reserve have been taking Year 2000 seriously for years. Chase Manhattan Corp. is spending \$250 million on the problem, while Wells Fargo & Co. will ultimately deploy 400 people to fix Y2K. Later this year and next year, Wall Street firms will run an industrywide test simulating the rollover to 1, 2000.

But smaller banks are lagging way behind. According to an extensive new survey from accounting firm Grant Thornton, community banks are only spending an average of \$7,000 each on the bug. "They are not taking it seriously enough," says Diane Casey, national director of Thornton's financial-services practice. Only 44% have tested their vaults and other time-sensitive security systems for Year 2000, raising the possibility that they will either be locked out or that doors and vaults will spring open on New Year's Day, 2000.

PREOCCUPIED IN ASIA. These smaller banks, which typically outsource check processing and other computer-dependent operations to outside service providers, are assuming that those companies will handle the problem. But bank-service providers themselves are faced with the tough prospect of fixing their own systems. If outside vendors don't get the problem corrected, "banks are then in a real bind," says Mark L. O'Dell, director of the bank-tech-

BANKING AND FINANCIAL SERVICES

Most large banks, the Federal Reserve, and the exchanges should be well prepared. But foreign banks and small U.S. banks are lagging. The result: Disruptions in the financial system

current economic threat than worrying about Year 2000. "Y2K could trigger a whole new round of country debt negotiations," warned Philip Kozloff, a member of Citibank's Credit Policy Committee, speaking at a Securities Industry Assn. conference in January. Adds Yardeni: "If foreign banks fail to comply, that could have a serious impact on world trade."

Closer to home, state and local governments are lagging even further behind the federal government. In Massachusetts, for example, according to a report released on Feb. 3, more than 40% of state agencies had not yet even begun an

Cover Story

nology division at the Office of the Comptroller of the Currency. Another danger to the U.S. financial system comes from abroad. European and Asian banks are far behind their U.S. counterparts. In Europe, banks are focusing on the enormous task of converting their financial programs to handle the Y2000, rather than fixing Y2K. "Western Europe will not achieve Year 2000 compliance for even 65% of the applications that need Year 2000 repair," says software expert Jones.

And the situation in Asia may be even worse, since banks in those countries are more preoccupied with surviving the



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GETTING LATE It takes time to test Year 2000 fixes. Large companies just starting their Y2K repairs are in big trouble

effort to become Year 2000-compliant. "It is likely that certain systems will not attain Year 2000 compliance in time and that alternative processing methods will be needed," wrote State Auditor A. Joseph DeNucci, whose office prepared the report.

Massachusetts isn't alone. Only about one-third of states are in decent shape, estimates Larry Olson, chief information officer of Pennsylvania, which got an early start on fixing Year 2000 problems. "Everybody else will have significant problems." What's more, the problems reach down to local levels, including school systems, which must run payroll systems, track student records, and operate other date-sensitive systems. The fixes could be quite expensive: The Columbus (Ohio) school system, with 65,000 students, may have to pay \$8 million to fix its most significant applications.

"NO SILVER-BULLET SOLUTION." Is there any chance of avoiding major economic upheaval from Y2K? Yes, but it will take a huge effort. Smaller companies and organizations still have time to fix their typically less complicated computers and software. And utilities and manufacturers with embedded chip problems can fix them—if they start right now. "It's not something they can study for a year," says Kothmann.

But a large company or organization that has not yet started dealing with Year 2000 is in big trouble. While software tools do exist for identifying trouble spots and speeding

finding the trained workers they need to fix their Year 2000 woes. A just-released study from the Information Technology Association of America shows that the U.S. already has 350,000 job vacancies for computer scientists and programmers that are not getting filled. "The big issue for corporations is going to be around resources," says Cowie. "If you need to change your systems, and you have to get programmers in to do that, it will be very hard."

To be sure, far-sighted companies have up to now solved their Y2K problems by simply installing new software and hardware. But such major productivity-enhancing projects take even longer than fixing old software. "Until now, many people have been ripping things out, installing new software," says William T. Ruckle, managing director of Ernst & Young's Year 2000 business. "It's getting too late to do that." Adds ABB's Barnevik: "Some of the biggest problems will come when people have planned to substitute new systems for old ones. If there are problems, it will be too late to rebuild the old system."

What happens next, aside from everyone working very hard to fix the problem? Some organizations that have their Year 2000 bug under control are getting ready to turn it into

Cover Story



MANUFACTURING

Most large companies are on top of the problem, but they are vulnerable to problems at smaller suppliers. Industries such as pharmaceuticals and petroleum refining depend on timing-sensitive computer programs

a competitive advantage. "Solving this problem gives us a marketing edge that we plan on using," says Pennsylvania Governor Tom Ridge.

Most manufacturers, though, are getting ready to start

fixes, they only solve part of the problem. "There is no silver-bullet solution," says Jean-Charles André, director of Year 2000 Services for IBM Global Services.

In particular, no software tool can eliminate the need for testing Year 2000 fixes once they are made—and testing a complicated software program is so time-consuming that it may prove to be one of the biggest barriers to finishing on time. A large company that has not started making fixes will have great difficulty completing tests before the deadline, according to Jones. The same is true for governments: "If you're not well on your way now, you just don't have time to do anything," says Olson.

Companies and other organizations may also have trouble

about contingency plans and workarounds. "There's a possibility that things will fail," says Judith List, who led the Year 2000 effort for Bellcore, which develops telecommunications software. "What Bellcore recommends is to start on the mission-critical systems first."

Year 2000 is a unique and unprecedented event. Previous jolts to the economy, like the Gulf price shocks of the 1970s, were surprises. The first economic disaster to arrive on a scale as dangerous as the danger is that the U.S. economy will not come through the millennium.

By Michael J. Mandel, with Peter C. Judge in Boston, and bureau reports

News: Analysis & Commentary

The Model Ts of the Digital Age will help wire the world. But will they bring prosperity to computer makers?

For years, Gerald Busenitz refused to buy a personal computer. The 49-year-old owner of an 1,800-acre farm in Newton, Kan., told his disappointed son that he would just have to keep doing his homework on a PC at school—the family couldn't justify \$2,000 for a machine he didn't even know how to use. "If I buy a tractor, I can make the farm more profitable," he told his wife, Margie. "But a PC? I just couldn't see it."

He can now. On Mar. 2, the Busenitzes took the plunge, bringing home a Compaq Presario—for \$999 including a monitor. "I think the price has gotten to be about right—plus, we had a good year," says Busenitz.

That's just what executives at Compaq Computer Corp. had hoped would happen last spring, when they redesigned Compaq's low-end home PCs and cut price tags to below \$1,000. Oth-



CHE

er PC makers quickly followed, and by yearend, sub-\$1,000 PCs accounted for 30% of all computers sold through U.S. computer and electronics stores. A third of those sales were to people who had never before purchased a PC.

UBIQUITOUS. In short order, the flood of new buyers nudged the penetration of PCs to 43% of U.S. homes—up from the 30% range where it had been stalled for three years, according to IDC/Link. From January, 1997, to January, 1998, the average selling price of a home PC dropped 30%, to \$1,169. By Christmas,

1998, analysts expect top PC makers to offer \$600 machines—setting the stage for PCs to find their way into 60% of U.S. homes by 2002, according to projections by Forrester Research Inc.

If those numbers prove accurate, the home-PC business is in for at least several more years of steady growth—from 12 million units a year now to 17.5 million by 2002, figures Forrester. And

American society will be in for another profound change at the hands of technology. Why? Because the PC will no longer be simply a staple of white-collar households, but a nearly ubiquitous tool for most Americans—like the telephone or the automobile. Even now, the new cheap PCs are bringing blue-collar families into the Digital Age. According to a survey by Forrester, the median income

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The median income of people intending to b

DIGITAL HARVEST: *The Busenitzes, Kansas farmers, finally took the plunge: a \$999 PC*

of people intending to buy such PCs is \$27,000, vs. \$50,000 for current PC owners. That means that the electronic realms where home-PC owners roam will be opened to millions more citizens—to shop, to chat, and to explore.

The new online masses are apt to bring huge changes to the Web—and perhaps new riches for people doing business there. Indeed, investors are already bidding up shares of companies such as Yahoo! Inc. and Excite Inc. on the assumption that the millions of consumers snapping up cheap PCs will bring more traffic to those Web sites—driving up ad rates and generating many more transactions. Electronic commerce could quickly change from a bonanza for the few—such as Amazon.com—to a huge business for all sorts of online merchants.

But the arrival of the new mass-market computer heralds painful changes for companies that make PCs. While the number of PCs sold through U.S. stores grew 54% for January over last January, revenues grew a measly 10%, says Computer Intelligence.

There's a parallel

crunch in the corporate computer market—the cash cow that enabled companies such as Compaq to compete so hard in home PCs. Watching prices contract in home PCs, machines not vastly different from what they use, corporations have demanded price cuts, too. In 1998, prices for all kinds of corporate hardware, from PC servers to notebooks, are expected to fall as much as 20%. James D. Poyner

Jr., an analyst at Oppenheimer Securities, estimates that profit margins on corporate PCs will drop to the low teens, close to the single-digit margins on some home PCs. When the year is over, predicts International Data Corp., computer makers around the world will have shipped 13.4% more PCs. But thanks to price cuts, their revenues will be up only 4.4%.

PRICE WAR. That means a profit pinch ahead and the casualties are already mounting. On Mar. 6, Compaq announced that its first-quarter sales had fallen short of its optimistic forecast. Revenue, it warns, will likely be flat with last year's final quarter, at about \$7.25 billion, and profits are likely to drop 25% for the year—to \$1.4 billion. On Mar. 4, Intel Corp. stunned investors by announcing that first-quarter sales would fall 10% below the fourth quarter's, its worst quarterly revenue drop in a decade. And Intel is expected to post its first year-over-year profit decline since 1989. Analysts think it will earn \$5.9 billion, down 15% from 1997's record \$6.5 billion. One factor affecting the chip giant: the inroads made by the likes of Advanced Micro Devices Inc., whose inexpensive Pentium clones go into the new cheap PCs.

As often happens, there's a momentary pause in final demand as buyers await lower prices. The PC industry knows what to do now: stage a price war. "We've been at the edge, and it seems we just jumped over," says Oppenheimer's Poyner. "The question is whether the industry jumps back."

Indeed, this year's jolt may be anything but routine. Increasingly, PC makers are bracing for a fundamental change in their industry—a wrenching shift to a new, lower-margin business model. They will, most likely, come to resemble the consumer-electronics com-

panies with whose products theirs are increasingly in competition.

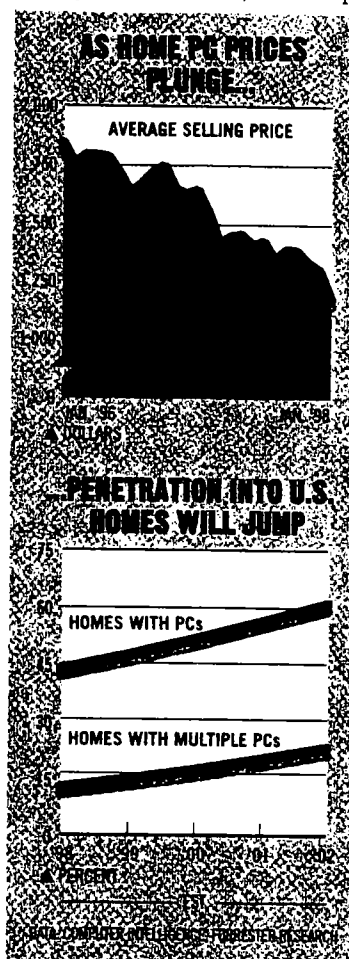
When the dust clears, the personal computer will have morphed into a true mass-market phenomenon—the Model Ts of the Digital Age. Just as Henry Ford's car for the masses profoundly changed where and how Americans lived, the next generation of low-priced computers will revolutionize the computer industry, the Internet, and lifestyles. With personal computers in 60% of homes, for example, the number of Americans surfing the Web could explode. Assuming it gets easier to use, "the impact could be as great as the impact of the TV," says Paul Saffo, director of the Institute of the Future.

Already, you can see the beginning of the revolution. Cheap PCs will make Web-surfing, electronic learning, and digital commerce so much a part of daily life that many families will have multiple PCs. In a recent BUSINESS WEEK/Harris Poll of 1,009 people, 25% of those who bought a PC last year were adding one to their home.

But price alone will not put the personal computer on a par with cars, phones, and TVs in the lives of Americans. "We're doing what we need to do to move to 60%," says Microsoft Chairman William H. Gates III. But reaching 36% of Americans still say they need for a PC require more than mere changes in prices. "As th

drops, computer manufacturers forced to get volumes up," says Penzias, a Nobel prize-winning physicist who is now chief scientist at Bell Laboratories unit of Intel. "The only way is to make things less intimidating. The real winners are people who use these things look friendly."

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to buy cheap PCs is \$27,000, vs. \$50,000 for current PC

News: Analysis & Commentary



the technology that go into them are paying close attention. If PC makers don't do it, somebody else will. "All I want to do is send E-mail and access Web sites," says Robert Anderson, a West Palm Beach (Fla.) nurse, who recently passed up a home PC and bought a \$99 Webtv setup. He's one of 250,000 customers for the service that lets you surf the Net via TV. "I don't want to worry about all those icons and stuff," he explains.

But how can PC makers, whose margins are shrinking—perhaps permanently—fund development of innovative products? They can't. Those that once

The market share of the top five PC makers

tried have pulled back. Compaq collaborated with Mattel Inc.'s Fisher-Price on PC add-ons for kids and with Thomson Consumer Electronics on a deluxe TV-PC combo. Neither project bore fruit. And now, with a new price war beginning in the sub-\$1,000 market, most computer makers are riveted on more immediate goals. "We don't want to go pioneer new markets when we're in share-gaining mode for the next two to three years," says Hewlett-Packard Co.

CONSUMER TOOL: consumer-PC chief A mass-market Webb McKinney. PC must work as So, ironically, 15 easily as a TV years after Apple Computer Inc. set

out to build "a computer for the rest of us" with the easy-to-use Mac, it may be up to Intel and Microsoft to finish the job. These companies have the profits to fund research and development for the industry and are starting to do so. Since 1996, Intel has invested some \$450 million in startups pushing the edges of multimedia, videoconferencing, and Web content, and now it is attacking the consumer-PC market more directly. On Mar. 4, it announced it will develop a separate microprocessor family, called Celeron, aimed at the low-end consumer market. Intel's push: to make the PC better at handling visual information. Intel, says Chairman Andrew S. Grove, won't "make compro-

mises that will make that [PC] interface less friendly."

Microsoft says its main focus this year is on simplifying its software. That starts with Windows 98, due out in June. The plan is to tightly integrate its Internet Explorer browser with the Windows operating system, making the now-familiar browser format a fundamental way of using all kinds of computer functions. The company plans similar integration for its Windows NT

A WONDERFUL DAY IN THE CYBER-NEIGHBORHOOD

Three years ago, the Newton Street Elementary School in Newark, N.J., tried an experiment. Using federal grants, teachers sent PCs home with 15 students. They knew the kids would pull lots of information from the Internet, but never guessed how much the children would soon give back.

Within months, says program director Angela Caruso, the families, and their school were linked in a network with neighboring universities and hospitals. Chat rooms sprang up where students discussed health issues with doctors. Families caught up in the AIDS scourge banded together online. One girl who witnessed a drive-by slaying posted a poem so powerful that it galvanized an antigang movement. In a way that was utterly new, says Caruso,

"we created a close-knit community."

Newton Street is part of a great technology migration, which plummeting PC prices are sure to hasten. As it gathers force, the terrain in at least some stretches of cyberspace will finally start to look a lot like America. In a survey of 120,000 North American homes, Forrester Research Inc., based in Cambridge, Mass., found that almost 70% of new PC buyers will have incomes of \$50,000 or less. African-Americans and Hispanics who don't already own a PC are 50% more likely to buy one in the coming year than non-minority Americans who don't. In a matter of years, predicts Forrester analyst Bill Bluestein, "the concern about PC haves and have-nots will fade away."

Early Internet users, most of them

wealthy, white, and male, will probably groan about the latest hordes of "newbies" flooding into cyberspace. Instead, they should applaud. Experiments such as Newton Street's prove that access to computer technology can lift spirits, shatter barriers between people, and transform lives. The technology "gives people a window," says Assistant Secretary of Commerce Larry Irving, whose office funds the Newark project. "The Net is a place where you can stand and talk to your neighbor."

MORE CRIME. Irving has dozens of examples. Native Americans use online technology to preserve their language. Seriously ill kids in Mississippi hospitals stay in touch with classmates over the Net. Shopowners in eastern Kentucky sell crafts online. And in working-class

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network operating system, which is due out by early '99. Microsoft also hopes to work to make desktop PCs behave more like TV sets—easy to use and quick to turn on and off. That means no “booting up” and an end to maddening software crashes. “Can you imagine if your TV crashed when you tried to change channels?” asks Paul Voois, chairman of videophone maker 8x8 Inc.

Before the PC is reinvented, though, the industry may have to revamp how it does business. Already, Wall Street analysts are making massive downward revisions on their earnings estimates for Compaq, Micron Electronics, IBM, and HP. Some analysts think PC margins may keep eroding to the range of consumer electronics. That means even greater pressure on manufacturers to slash prices and build market share.

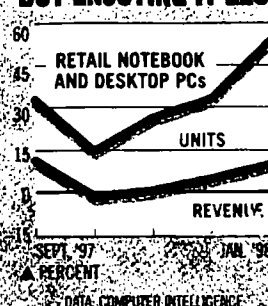
Inevitably, the result will be more industry consolidation. Analyst Vadim D. Zlotnikov of Sanford C. Bernstein & Co. figures the top five players command a 10%-to-13% cost advantage on

ing demand. But rivals and computer distributors say much of Compaq's problem stems from special deals that the PC leader offered to get them to increase orders.

“LIKE A DOG.” Meanwhile, IBM may have even more PC products sitting on dealers' shelves than Compaq. IDC analyst Jay Bretzmann says IBM has an eyebrow-raising 40 weeks' worth of PC servers in the reseller channel. Compaq has 16 weeks' worth, and HP some 10 weeks'—both closer to typical levels for these products. Wall Street expects bloated PC inventories to cut into first-quarter earnings, which IBM has already signaled could fall 10% below last year. IBM declines to comment.

The result: Compaq and IBM will clear out inventories by slashing prices. That's going to put even more heat on sec-

SELLING MORE NOW, BUT ENJOYING IT LESS



machine,” says U S West Chief Information Officer David R. Laube. “It can certainly think a lot faster than I can type.”

That means computer makers must adjust costs now or wither. The No. 1 cost-efficiency mantra is death to inventory: by letting resellers assemble computers as orders come in from customers, PC makers can limit the amount of inventory in stock and get it sold

PC makers will rise from 34% in '96 to an estimated 46% in '98

key components over smaller rivals. Those five—Compaq, Packard-Bell, HP, Dell, and IBM—will increase their combined market share from 34% of PC sales in 1996 to an estimated 46% in 1998, he says, elbowing out AST Research, Acer, and Apple.

Count on a continuing drive for market share among the leaders. Never mind that a failed market-share grab led to Compaq's first-quarter woes. Officially, the company blames disappoint-

ond-tier players, already feeling the pinch of the new bargain-hungry PC buyers. Toshiba and AST left the home-PC business last year. Even IBM, which lost \$300 million on its consumer PCs in '97, is growing weary. “We're not particularly interested in chasing a lot of volume in businesses where we can't make money,” says IBM CEO Louis V. Gerstner Jr. “We'll be in the consumer-PC space, but we'll be there selectively.”

There's not much hope for getting

faster, before prices fall. Yet while Compaq and IBM intend to use such tactics, they'll still be far behind direct-sales juggernaut Dell Computer Corp. The build-to-order king, whose costs are roughly nine percentage points less than rivals, continues to roll along. Michael Kwatinetz of DMG Technology Group expects Dell to post a 50% jump in profits, to \$294 million, on a 49% rise in sales this quarter.

That leaves PC makers looking for



East Palo Alto, Calif., in Silicon Valley, low-income kids produce a chat-style teen “show” for America Online.

The great migration won't be cost-free. Crowds in cyberspace spell worse

traffic jams at popular Web sites. Within a year, expect to see tiered service on the Net: Folks who pay higher access fees can cruise the fast lanes, but not the disadvantaged.

THAT'S THAT!

People in all walks of life—from inner-city schoolkids to AIDS patients—are buying PCs, going online, and forming new digital communities

In addition, even at \$20 a month, access fees will be a barrier for some, says Mercedes Soto, 30, who runs a program that promotes PC use at public-housing communities in Hartford, Conn. She also wonders who is going to train all of America's new PC users. Then, there's quality of life: A larger online community means more criminals, more noise, and more confusion.

But Soto is optimistic that technology will be a force for good. Not long ago, she watched an 8-year-old at a project teach his parents how to get online. She came away less worried about training. A sense of community may also be the antidote to crime, says John Gage, top science officer at Sun Microsystems Inc. “The Internet should be like the best of cities. The streets are safe when a lot of people are looking out their windows.” With cheap computers, more people will share the view.

By Neil Gross in New York

News: Analysis & Commentary

new ways to make profits. One route is to broaden the line card with new products. The company that has cleaned up this way is HP, which has built a massive business selling PC printers and the ink and paper that go with them. It's unlikely that other PC makers can match HP's printer business, but, argues Poyner, they need to try to squeeze profits from non-PC

sales—things such as digital photo printers, videoconferencing gear, and hi-fi speakers.

Eventually, PC makers may have to think a lot bolder. "The railroads thought they were in the railroad business—until cars, buses, and trains showed them they were in the transportation business," says Antonio Perez, head of HP's printer business. "The PC

industry has a chance to remain the center of the home-computing universe." But only if PC makers realize that as much as they've changed the world so far, they now have to change themselves—and ultimately, the machine that got them here.

By Peter Burrows in Palo Alto, Calif., with Gary McWilliams in Houston, and Robert D. Hof in San Mateo, Calif.

BUSINESS WEEK/HARRIS POLL

AMERICANS ARE GETTING HOOKED ON THE HOME PC

The PC juggernaut rolls on—into home offices and family rooms everywhere. Of Americans who intend to buy a home computer in the next year, nearly two-thirds would be doing so for the first time, according to a recent BUSINESS WEEK/Harris Poll. Even better for PC makers, respondents expect to spend



an average of \$1,500 on the basic machine—\$2,400 with monitor, software, and accessories. Only 20% (in fact) expect the bill to be under \$1,000. Still the cheap PCs definitely have their appeal—especially as a machine for the kids and a tool to go online and do a little personal financial management.

AN UNTAPPED MARKET

Do you personally use a computer at home, work, or another location?

	USE	DO NOT USE		USE	DO NOT USE
Home	41%	59%	Another		
Work	44%	56%	location	24%	76%

THE TWO-PC HOME

If you use a computer at home, have you bought a computer in the past year?

Yes, have bought a computer	38%
No, have not bought a computer	62%

THE PRICE IS RIGHT

If so, how much did you pay?

	AVERAGE
Excluding monitor, software, and accessories	\$1,547
Including monitor, software, and accessories	\$2,300

IS IT YOUR FIRST?

Did the new computer:

Represent the first computer in your home?	34%
Replace an existing home computer?	41%
Add to an existing home computer?	25%

THE COMPUTER'S WINNING WAYS

How satisfied are you with your most recently purchased computer?

Very satisfied	73%	Not at all satisfied	0%
Somewhat satisfied	23%	Don't know	1%
Not very satisfied	3%		

IS THERE A PC IN YOUR FUTURE?

[All respondents] Do you intend to purchase a new home computer in the next year?

Yes, intend to purchase	27%
No, do not intend to purchase	71%
Don't know	2%

A FEW BELLS AND WHISTLES

If so, how much do you intend to spend?

	AVERAGE
Excluding monitor, software, and accessories	\$1,618
Including monitor, software, and accessories	\$2,399

NEWBIES ARE LEGION

Will the new computer:

Represent the first computer in your home?	62%
Replace an existing home computer?	24%
Add to an existing home computer?	14%

BARGAIN HUNTERS

If you have spent or intend to spend under \$1,000 for your new computer (excluding monitor and accessories), why?

I don't need a machine that costs more than that	41%
I can't afford to spend more than \$1,000	37%
The new computer adds to an existing, more expensive computer that can do more	3%
Don't know	19%

THAT'S EDUTAINMENT

If you have spent or intend to spend under \$1,000 for your new computer, what will your new computer be used for? (multiple responses allowed)*

Kids' education and entertainment	41%
Personal finance management	38%
Internet/Web surfing	28%
Job-related work	26%
Entertainment	19%
Electronic mail	12%
Other	13%

EDITED BY KEITH H. HAMMONDS

Survey of 1,009 adults conducted Dec. 11-15, 1997, for BUSINESS WEEK by Louis Harris & Associates Inc. and the Baruch College of Business at the City University of New York.

*Because of small samples, caution should be used in interpreting answers to these questions.

THE VIRTUAL MALL GETS REAL

Online buying is expected to hit \$4.8 billion in '98, and the Net may now be the place retailers have to be

For the past two months, Office Depot Inc. has been using the image of Dilbert, the cartoon character, in its advertising to help sell everything from staples to personal computers. But now, the wisecracking Dilbert is going interactive. On Jan. 16, when Office Depot launches its online store, the cartoon character will double as a sales clerk who helps cybershoppers find what they're looking for and walks them through their first online purchase. Office Depot figures Dilbert may make the experience easier as a new crop of shoppers flocks to the Net this year. "People have voted with their mouse clicks that if you make it more convenient, they will come," says Paul Gaffney, Office Depot's vice-president for systems development. "There is a huge opportunity here."

Indeed, online sales have never been better. In the quarter just ended, cybernauts snapped up everything from airline tickets to tennis rackets, to the tune of nearly \$1 billion—twice the volume for the same period a year ago and higher than any previous quarter, according to Forrester Research Inc. Experts now say that 1998 is the year when electronic commerce could finally begin to fulfill its promise as a vast new marketplace. Online sales are projected to reach \$4.8 billion this year, double that of 1997. "We're moving people from being window-shoppers to buyers," says Robert W. Pittman, president of America Online Networks, the division that runs the No. 1 online service.

So whose virtual cash registers are ringing in the New Year? The early winners are those hawking computers and other high-tech gear—\$863 million worth in 1997, a total that's expected to grow 85% this year, to some \$1.6 billion. Dell Computer Corp. is the PC king on the Net, selling an average of \$3 million

a day. But even lesser-knowns are making hay. Computer reseller NECX, based in Peabody, Mass., sold \$60 million on the Web in 1997, a fivefold jump over the previous year.

The computer crowd won't hold sway forever. Sales of everything from music CDs to shoes are on the upswing. But the biggest corner of cyberspace activity could be in travel. Web merchants selling airline tickets and booking hotel and car reservations accounted for \$654 million in sales last year. Travelocity, Preview Travel, and Microsoft's Expedia, for example, are booking more than \$2 million a week, on average. And Travelocity says it has topped \$3 million several times in recent months. It could get better yet. By 1999, travel is expected to be the No. 1 electronic commerce category, with some \$2.8 billion in total sales, according to Forrester.

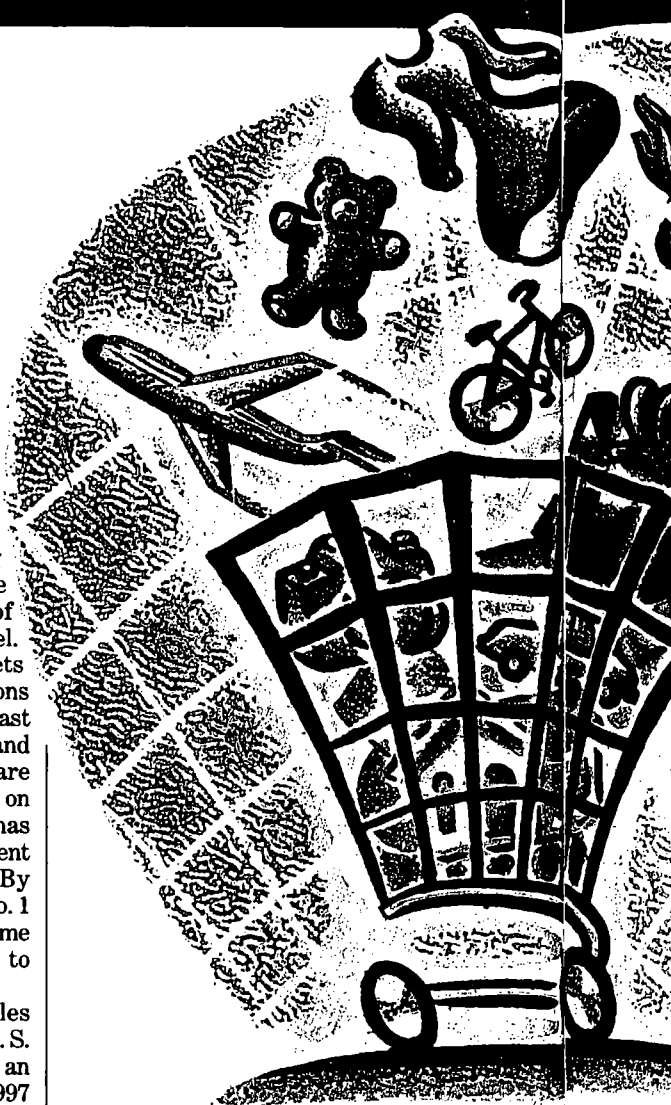
OPEN WINDOW. Why are online sales taking off? For one, the number of U.S. households dialing into the Web is on an upward path: from 20 million in 1997 to an expected 26 million by the end of 1998, says market researcher Yankee Group Inc. That has prompted a slew of brand-name companies to open shop, including Bloomingdale's, the Gap, Sears, and Clinique—which, in turn, draws more shoppers. "This is a great way to get to a large number of people," says Angela Kapp, vice-president for special markets and new media for Estée Lauder Inc., which owns Clinique. "There is a window of opportunity here now."

HOW INTERNET SHOPPING IS SHAPING UP

KEY CATEGORIES	1997*	2000*
PC HARDWARE AND SALES	\$863	\$2,901
TRAVEL	654	4,741
ENTERTAINMENT	298	1,921
BOOKS AND MUSIC	156	761
GIFTS, FLOWERS, AND GREETINGS	149	591
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DATA: FORRESTER RESEARCH INC.

* Estimates



Just so. Merchants hopping on the Net say that some of the impetus is seeing the success of early pioneers, such as Amazon.com. The Seattle-based startup was the first to open a megabookstore online, offering 2.5 million titles—more than any bricks-and-mortar counterpart. Amazon's huge selection, easy-to-use site, and hacker-free track record helped propel 1997 sales to an expected \$131.7 million, up from \$15.8 million a year ago, estimates Hambrecht

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& Quist Inc. Now, Barnes & Noble Inc. is fighting back, investing in its own Internet site, and bookseller Borders Inc. has plans for the Web, too.

The lesson: Getting on the Net early can be a huge advantage, especially for tiny startups. Even big-name retailers can't afford to wait. "I'm constantly pounding the tables, telling the companies whose boards I sit on, 'Don't

get Amazoned,'" says James F. McCann, president of 1-800-FLOWERS, which has been selling online for three years. Clearly, cybershoppers have signaled they won't wait for the brand names if Net startups can offer a good selection, discounts, convenience, and security. Danielle Battle, a housewife in Bedford, Mass., is a point in case. She has spent about \$1,500 over the past couple of years at fledgling online stores, including Amazon. "With the modem and the PC, you have the world before you," she says. "It is a bit of fun and a big convenience."

WISH LIST. It's also getting more customer-friendly by the day. In recent months, many Web-site operators have gotten smarter about how to appeal to buyers. Walt Disney Co.'s site, for example, has made it easy to find shopping online by putting links to its virtual store on the opening page of its site—no more plowing through Web page after Web page. And this week, IQVC, the online division of QVC Inc., launched a separate section on its site called Gemsandjewels.com that offers general information about gold and stone cuttings. QVC also features a new service that lets visitors set up a wish list of items friends or family can look through when searching for a gift.

At the same time, merchants are streamlining the online shopping experience with better technology. They have improved so-called cybershopping carts that let consumers put the products they want in a virtual basket. That way, shoppers can continue browsing the site rather than having to pay for each product before selecting the next one on that site. And merchants, such as Amazon and L. L. Bean, are using passwords to preserve billing and credit-card information so that once shoppers register at a site, they don't have to fill in that data again.

E-merchants also are making headway in figuring out how to grab Web surfers' attention. Many online merchants have begun using the heavily

trafficked Net search engine sites as a springboard to their sites. Consumers using No. 1 search engine Yahoo!, for example, can click on an icon that links directly to Hallmark Cards Inc.'s Web site, where the greeting-card company offers 17,000 graphics and messages—some for free and others for a fee. And Yahoo!, AOL, Lycos, Infoseek, and Excite! have all introduced or redesigned shopping areas to highlight specific online shops, such as Eddie Bauer, Barnes & Noble, or J. C. Penney. Merchants can pay millions of dollars for top billing on these popular sites. "From a retailer's perspective, you can build a great store, but if the traffic isn't there, it's like a phone number in the white pages," says AOL's Pittman. "You've got to be where the people are."

SECURITY FEARS. Even with the improvements, shopping online isn't always a breeze. Consumers still have to type in order forms at each separate site. And the Web has a ways to go before it delivers on the promise of easy-to-find goods for every taste and price range. In November, Yahoo! and Excite introduced shopping tools that are designed to search according to price or product. Still, they include only a few hundred merchants. Technology that can scour the entire Web and the thousands of shops out there isn't available yet. And it's still hard to judge colors and sizes on Web pages. "I'm waiting for the online avatar that can make suggestions and show me how things look on me," says Harold Wolhandler, director of research at ActivMedia Inc., a technology consultant based in Peterborough, N. H.

Concerns also linger about security, especially among those consumers who are new to the Web. Technology developed by Visa USA Inc. and MasterCard International Inc. that outlines how credit-card transactions are handled by merchants and banks is still in the testing phase. That means that the marketing machines of two of the most trusted credit-card companies haven't begun pushing consumers to buy online—yet.

Still, some experts say the grassroots growth of cybershoppers is almost making the endorsement by credit-card companies a non-issue, especially when giants such as AT&T and IBM are pushing electronic commerce in TV and print ads. That could help put the Internet on any savvy shopper's list of places to shop till they drop.

By Heather Green in New York, Gail DeGeorge in Miami, and Amy Barrett in Philadelphia

2000*	1997*	2000*
DOLLARS	MILLIONS OF DOLLARS	MILLIONS OF DOLLARS
2,901	92	361
4,741	90	354
1,921	38	107
761	20	63
591	19	93
	65	197

APPAREL AND FOOTWEAR

FOOD AND BEVERAGES

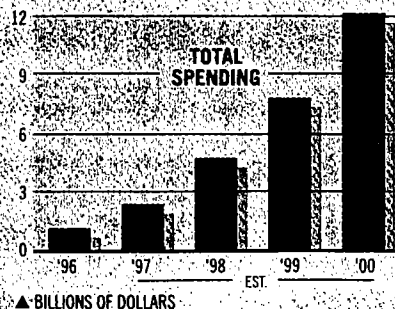
JEWELRY

SPORTING GOODS

CONSUMER ELECTRONICS

OTHER (TOYS, HOME, ETC.)

*Estimates



Getting To Know Your Audience

By Daniel Bennett
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Cookies are the ultimate sales device. Not the kind of cookies that crumble, but rather the kind that compute. And whether you're a consumer surfing the Web or a politician pushing an issue, it's time to start thinking about what this can mean.

Cookies came about when Netscape created a system for Web sites to deposit information on the client's computer, to be accessed the next time the site is visited. Simply put, this gives a Web browser a memory -- for passwords, your favorite news subjects, the number of chocolate chips you will order -- anything. This and similar technologies have revolutionized the possibilities of advertising, making the Web the ultimate marketing tool.

Forget such recent innovations as Net ratings and data mining. Both depend on averages and are predictors of future behavior. Cookies allow real-time, individual measures of each and every user. Where, when and how often a person peruses web pages can be recorded and analyzed. (For a demonstration, go to the Center for Democracy and Technology.) Pair that with information on who the visitor is and the Web becomes the heaven of advertising -- privacy rules and policies notwithstanding.

Commercial organizations are leading the way in developing and exploiting this brave new world, but politicians and their consultants will have to learn to operate in it. Simply creating a Web site or buying banner advertising on highly trafficked sites is not enough -- this is learning how to relate one-to-one with a potential audience of millions. Right now, companies like Yahoo! and Amazon Books are pioneering new methods of creating a one-to-one relationship with consumers.

One-On-One For Everyone

Advertising is no longer constrained to general ratings, but to actual real-time behavior. Searching for Web sites related to Florida? You should expect travel ads to pop up on the search engine. Want free e-mail? Hotmail will supply it for you - in exchange for a personal profile so you can be peppered with properly targeted advertising. "Surfing the Web" once meant

sifting through disparate sites -- now Web sites can surf you, anticipating your every need and desire. It's as if ABC could monitor your use of the TV remote.

Currently, political campaigns have trouble buying advertising that targets only voters in that state or district. In the not-so-distant future, Web ads will be tailored not only to the right ZIP codes, but focused to reach only individuals who meet certain criteria-and reach them when they are most receptive to a particular message.

For example, a Republican candidate could buy ad space on a tax preparation Web site where the ad itself would vary based on the income level of the individual. Enter a high income while computing your returns, and the ad becomes a tax calculator that shows the savings a proposed tax cut would have. Enter a medium income, and the ad details how much the government spends per capita on the poor and elderly. Enter a low income and a PSA would remind them not to miss voting next Wednesday. All of this without actually gathering private information -- just reacting to it.

This new technology could make even very targeted radio campaigns seem grossly imprecise. Online campaigns could use all the glitz of television, but not be scattershot and impersonal. Combine it with good poll data, and online politics could be as focused and finely tuned to the audience as an old-fashioned town meeting.

Ads Are Only The Beginning

It's not just campaigns, of course. Constituent services, issue polls, support for legislation -- all stand to benefit from smart, focused ads and Web pages that tailor themselves to the audience.

And this is only the beginning. As more and more is done on the Web, from calculating tax returns to calling friends to watching movies, the Web will start to watch us. This all may seem like the telescreen in Orwell's 1984, but it is coming, and it may even make sense. Why sit through a haphazard blizzard of commercials -- regardless of whether they are for politics or Polident -- when you can see only what you might want or need?

On the other hand, understand that people may rebel and demand anonymity. The trick -- regardless of whether you're a Hill staffer, campaign consultant or plain old private citizen -- is to strike that balance between privacy and personalization, utility and respect for the user.

And while you're working on that, you might also want to wipe away those cookie crumbs on your cheek-no, the other side.

About This Column: Written by Daniel Bennett and James M. Smith -- both of whom are campaign and Capitol Hill

veterans -- Capitol Hypertext is a weekly look at the changes being wrought on the Hill by technology. It is intended to highlight innovations, opportunities and missteps on both sides of the aisle.