

NOTE: The President spoke at 4:47 p.m. at the Korean War Memorial in West Potomac Park. In his remarks, he referred to Gen. Richard B. Myers, USAF, Commander, U.S. Space Command; Hong Koo Lee, South Korean Ambassador

to the United States; Chaplain John N. Craven, USN (Ret.); Chaplain Samuel Sobel, USN (Ret.); former Senator John Glenn; and General Secretary Kim Chong-il of North Korea.

## Remarks on the Completion of the First Survey of the Human Genome *June 26, 2000*

*The President.* Good morning. I want to, first of all, acknowledge Prime Minister Blair, who will join us by satellite in just a moment from London. I want to welcome here the Ambassadors from the United Kingdom, Japan, Germany, France. And I'd also like to acknowledge the contributions not only that their scientists but also scientists from China made to the vast international consortium that is the human genome project.

I thank Secretary Shalala, who could not be here today, and Secretary Richardson, who is here; Dr. Ruth Kirschstein, Dr. Ari Patrinos, scientists of the Department of Health and Human Services and the Department of Energy, who have played an important role in the human genome project.

I want to say a special word of thanks to my science adviser, Dr. Neal Lane, and of course, to Dr. Francis Collins, the director of the international human genome project, and to the Celera president, Craig Venter. I thank Senator Harkin and Senator Sarbanes for being here, and the other distinguished guests.

Nearly two centuries ago, in this room, on this floor, Thomas Jefferson and a trusted aide spread out a magnificent map, a map Jefferson had long prayed he would get to see in his lifetime. The aide was Meriwether Lewis, and the map was the product of his courageous expedition across the American frontier, all the way to the Pacific. It was a map that defined the contours and forever expanded the frontiers of our continent and our imagination.

Today the world is joining us here in the East Room to behold a map of even greater significance. We are here to celebrate the completion of the first survey of the entire human genome. Without a doubt, this is the most important, most wondrous map ever produced by humankind.

The moment we are here to witness was brought about through brilliant and painstaking work of scientists all over the world, including many men and women here today. It was not even 50 years ago that a young Englishman named Crick and a brash, even younger American named Watson first discovered the elegant structure of our genetic code. Dr. Watson, the way you announced your discovery in the journal "Nature" was one of the great understatements of all time: "This structure has novel features, which are of considerable biological interest." [Laughter] Thank you, sir.

How far we have come since that day. In the intervening years, we have pooled the combined wisdom of biology, chemistry, physics, engineering, mathematics, and computer science; tapped the great strengths and insights of the public and private sectors. More than 1,000 researchers across 6 nations have revealed nearly all 3 billion letters of our miraculous genetic code. I congratulate all of you on this stunning and humbling achievement.

Today's announcement represents more than just an epic-making triumph of science and reason. After all, when Galileo discovered he could use the tools of mathematics and mechanics to understand the motion of celestial bodies, he felt, in the words of one eminent researcher, "that he had learned the language in which God created the universe."

Today, we are learning the language in which God created life. We are gaining ever more awe for the complexity, the beauty, the wonder of God's most divine and sacred gift. With this profound new knowledge, humankind is on the verge of gaining immense new power to heal. Genome science will have a real impact on all our lives and even more on the lives of our

children. It will revolutionize the diagnosis, prevention, and treatment of most, if not all, human diseases.

In coming years, doctors increasingly will be able to cure diseases like Alzheimer's, Parkinson's, diabetes, and cancer by attacking their genetic roots. Just to offer one example, patients with some forms of leukemia and breast cancer already are being treated in clinical trials with sophisticated new drugs that precisely target the faulty genes and cancer cells, with little or no risk to healthy cells. In fact, it is now conceivable that our children's children will know the term "cancer" only as a constellation of stars.

But today's historic achievement is only a starting point. There is much hard work yet to be done. That is why I'm so pleased to announce that from this moment forward, the robust and healthy competition that has led us to this day and that always is essential to the progress of science will be coupled with enhanced public/private cooperation.

Public and private research teams are committed to publishing their genomic data simultaneously later this year for the benefit of researchers in every corner of the globe. And after publication, both sets of teams will join together for an historic sequence analysis conference. Together, they will examine what scientific insights have been gleaned from both efforts and how we can most judiciously proceed toward the next majestic horizons.

What are those next horizons? Well, first, we will complete a virtually error-free final draft of the human genome before the 50th anniversary of the discovery of the double helix, less than 3 years from now. Second, through sustained and vigorous support for public and private research, we must sort through this trove of genomic data to identify every human gene. We must discover the function of these genes and their protein products, and then we must rapidly convert that knowledge into treatments that can lengthen and enrich lives.

I want to emphasize that biotechnology companies are absolutely essential in this endeavor, for it is they who will bring to the market the life-enhancing applications of the information from the human genome. And for that reason, this administration is committed to helping them to make the kind of long-term investments that will change the face of medicine forever.

The third horizon that lies before us is one that science cannot approach alone. It is the

horizon that represents the ethical, moral, and spiritual dimension of the power we now possess. We must not shrink from exploring that far frontier of science. But as we consider how to use new discovery, we must also not retreat from our oldest and most cherished human values. We must ensure that new genome science and its benefits will be directed toward making life better for all citizens of the world, never just a privileged few.

As we unlock the secrets of the human genome, we must work simultaneously to ensure that new discoveries never pry open the doors of privacy. And we must guarantee that genetic information cannot be used to stigmatize or discriminate against any individual or group.

Increasing knowledge of the human genome must never change the basic belief on which our ethics, our Government, our society are founded. All of us are created equal, entitled to equal treatment under the law. After all, I believe one of the great truths to emerge from this triumphant expedition inside the human genome is that in genetic terms, all human beings, regardless of race, are more than 99.9 percent the same.

What that means is that modern science has confirmed what we first learned from ancient faiths. The most important fact of life on this Earth is our common humanity. My greatest wish on this day for the ages is that this incandescent truth will always guide our actions as we continue to march forth in this, the greatest age of discovery ever known.

Now, it is my great pleasure to turn to my friend Prime Minister Tony Blair, who is joined in the State Dining Room at 10 Downing Street by Dr. Fred Sanger and other world-renowned scientists. With the generous support of the Wellcome Trust, British scientists have played an invaluable role in reaching this milestone.

On behalf of the American people, I would like to thank the Prime Minister, the scientists, and the British nation for the brilliant work you have brought to this international effort.

And Mr. Prime Minister, I would like to salute not only your unwavering support for genome research but also your visionary commitment to sparking ever-greater innovation across the full spectrum of science and technology. And on a personal note, I can't help but think that the year of your son's birth will always

be remembered for the remarkable achievements we announce today. I think his life expectancy has just gone up by about 25 years. [Laughter]

[At this point, Prime Minister Tony Blair of the United Kingdom made remarks by satellite.]

*The President.* Tony, if I could, I would like to pick up on your last remark. I think everybody genuinely is concerned about the issues you raised, the privacy issues, and the whole general set of ethical, social, and legal issues. And it strikes me that our scientists—the British and the American scientists, our French, German, Chinese counterparts who worked on this—were working toward a single, clearly defined goal in all those countries and in the other countries of the world that will have to live with both the benefits and the challenges of these discoveries.

There are different legal systems, different social mores, but I think that it would be a very good thing if the U.S., the U.K., and anybody else that wants to work with us could have the same sort of joint endeavor we've had with the human genome to deal with the implications of this, to deal with the legal, the social, the ethical implications. We may have differences from country to country, but I think that if we work together, we'll give a higher sense of urgency to the project, and we'll get a better product.

And so I'm offering you another partnership. It's easy for me to do, because you'll have to do it, and I'll be gone. [Laughter]

[Prime Minister Blair responded.]

*The President.* Thank you. Thank you very much, Tony.

Now, in a few moments, we'll hear from Celera president Dr. Craig Venter, who shares in the glory of this day, and deservedly so because of his truly visionary pursuit of innovative strategies to sequence the human genome as rapidly as possible. And I thank you, Craig, for what you have done to make this day possible.

And now I'd like to invite Dr. Francis Collins to the lectern. I also want to congratulate him. From his development of some of the central

methods for finding human disease genes to his successful application of those methods to the discovery of the cystic fibrosis gene in 1989 to his current leadership for the international human genome project, he has combined the talents of rigorous science and a profound sensitivity to ethical, legal, and social issues. He is a physician-scientist of great faith, compassion, energy, and integrity. And he has truly helped us more than anyone else to understand how the marvels of genome science will actually improve human health.

So Dr. Collins, please come up to the lectern.

[Dr. Francis Collins, Director, National Human Genome Research Institute, and Dr. J. Craig Venter, president and chief scientific officer, Celera Genomics Corp., made brief remarks.]

*The President.* Well, thank you both for those remarkable statements. I suppose, in closing, the most important thing I could do is to associate myself with Dr. Venter's last statement. When we get this all worked out and we're all living to be 150—[laughter]—young people will still fall in love; old people will still fight about things that should have been resolved 50 years ago—[laughter]—we will all, on occasion, do stupid things; and we will all see the unbelievable capacity of humanity to be noble. This is a great day.

Thank you very much.

NOTE: The President spoke at 10:19 a.m. in the East Room at the White House. In his remarks, he referred to Ambassadors to the U.S. Christopher Meyer of the United Kingdom, Shunji Yanai of Japan, Juergen Chrobog of Germany, and Francois Bujon de l'Estang of France; Aristides Patrinos, Associate Director, Office of Science, Department of Energy; James D. Watson, president, Cold Spring Harbor Laboratory; Francis H. Crick, researcher, Cambridge Laboratory of Molecular Biology; Frederick Sanger, 1958 and 1980 Nobel Prize-winner for chemistry; and Prime Minister Blair's son, Leo. The transcript released by the Office of the Press Secretary also included the remarks of the Prime Minister Blair, Dr. Collins, and Dr. Venter.