Sen Randolph
Sen Byrd

NOTES

Seaborg
Weaver
Heckler

VICE PRESIDENT HUBERT HUMPHREY

NATIONAL YOUTH SCIENCE CAMP

WASHINGTON, D.C.

Mr Cochran

JULY 13, 1966

Stans
Sears

I am glad to see you here sharing your interests and exchanging your knowledge.

Science brings men together. It has brought men together over the centuries -- across the boundaries of nations, races and generations.

Today, in America, we see a spirit of creative cooperation fostered by the quest for scientific knowledge. One of the rewarding experiences that has come to me, as chairman of the Space Council, has been to see universities . . . the many departments of the government . . . labor . . .

large and small businesses all working together to achieve our common goal -- mastery of space.

With this and other similar examples to serve as a model, we must try to harness our divergent and separated resources, and our energies, to solve the problems of our earthly environment -- problems of housing, of health, of education, of transportation . . . yes, and problems too of defeating poverty, injustice and discrimination, and of keeping the peace.

These problems are of immense magnitude. But if we create the science needed, discover the relevant knowledge, apply the best technologies, and utilize all our resources, each of these problems turns into an exciting opportunity to make life better.

A mathematician told me recently that, in his field, if a man or woman did not contribute some significant result before age 30 -- it was too late.

While I think he may have been exaggerating for effect -- he assured me he was not. He was an old fogey of 33.

The truth is that scientists in their 20's and 30's are in important positions in our scientific programs. I expect that in the next few years I will be able to say the same of you.

It took mankind 200,000 years to emerge from the Stone Age.

It took another 10,000 years from the first use of metal tools to the Industrial Revolution, now hardly a century old.

Two key exhibits in our Smithsonian Institution vividly illustrate the dramatic acceleration in the tempo of progress. One is the first commercial computer, only 17 years old. The other is astronaut John Glenn's space capsule, only four years old, but already a museum piece.

If any age can lay claim to being a golden age of adventure and discovery, ours can. Yet we have barely begun.

Here are some of the developments we can look forward to within the next 20 years.

· In agriculture, the large-scale use of de-salinated sea water.

· In medicine, the transplantation of natural organs and the use of artificial ones.

· In psychiatry, the widespread application of drugs that control or modify the personality.

· In education, the use of more sophisticated teaching machines.

· In worldwide communication, the everyday employment of translating machines.

· In industry, the extensive use of automation, up to and including some kinds of decision-making at the management level.

· In space, the establishment of a permanent base upon the moon.

Some of you might say that there is nothing very surprising here. And you would be right.

Experience shows that it takes 10 to 30 years for a new idea to make its way from its inception in a scientist's mind to its general application in everyday life. Therefore, the world of 20 years from now already exists, in embryo, in today's advanced research establishments.

For the year 2000 however, we can foresee some really far-our developments.

· The virtual elimination of bacterial and viral diseases.

· The correction of hereditary defects through the modification of genetic chemistry.

· The stepping-up of our food supply through large-scale ocean-farming and the fabrication of synthetic proteins.

· Control of the weather, at least on a regional scale.

· In space, the landing of men on Mars and the establishment of a permanent unmanned research station on that planet.

· The creation, in the laboratory, of primitive forms of artificial life.

This can indeed be an age of miracles. It will be your age.

Your federal government is committed to working with you to help bring about a better tomorrow. The amount of the budget which is devoted to support of research and development has been the fastest growing item in the federal budget.

I have heard it suggested that this is a result not of public officials learning about science, but of scientists learning about politics. In fact, I think it has been a bit of both: The nation and its store of knowledge have been the beneficiaries of this mutual learning process.

The percentage of funds for research and development has gone up from about 25 per cent of the monies to support science in 1957 to about 40 per cent in 1965.

Since you have a mathematical background, you know that these percentages tell you nothing about the absolute dollar magnitude.

So I feel I must add that the 1957 figure is 25 percent of 3 billion dollars and the 1965 figure is 40 per cent of 15 billion dollars.

The funds available for scientific research have increased in the last 8 years by a factor of 8.

Of course, the costs of doing scientific research increase very quickly as scientists ask more sophisticated questions of nature, and expect answers which are much more precise. Probably the most dramatic example of this is the decision to build an atom smasher with the power of 200 Bevatron (billion electron volts) at a cost of approximately 300 million dollars.

Since this item and many others are beyond the financial limits of any of our universities, and since the benefits are for everyone, it is only right and proper for the federal government to play its role and it will continue to do so.

Research costs more. There has also been a change in the strategy of research.

I return, for my example, to our space program.

I have logged over a quarter of a million miles in looking into various aspects of our space program.

The discovery of the structure of space has required new theories, new instruments, new materials and techniques. We have begun to experiment on a vast scale and we are only now at the threshold. The impetus which the space program has given us has led to advances in education, medicine, electronics, and many other fields.

And this has increasingly been done -- as I pointed out before -- through the creative development of many programs, involving many disciplines and many scientists, carried out not only by government but by all sectors of our society.

The value of our coordinated assault on the unknown has given us the impetus to extend our knowledge in other places. Luckily, for me, I am again involved.

I have recently been appointed chairman of a newly created National Council on Marine Resources and Engineering Development which will look at the state of our knowledge of the oceans to see what kind of national program is needed to extend and utilize our knowledge of this inner space. We are now in the position where current exploration and theory has revealed how little we know and has suggested the vast benefits which may be possible.

The oceans cover 70 per cent of the earth's surface and hold untold wealth. Maybe it is time we took the plunge.

I have only touched today on some of the challenges and opportunities that lie ahead.

But I will go no further. I would like to close by having a brief personal word with you.

I have heard it said that science is a cold and unemotional career.

We know better.

The world of science is the world of man's greatest adventure. It is an adventure far beyond that begun by Columbus or by Alexander the Great or by Cortez.

It is an adventure into the unknown. It is the search into the deep secrets which may yield answers far beyond man's hope. It is the place for the man or woman who will devote himself, through long hours of labor and difficulty, to mankind's cause. It is the place where years of dedication and effort may yield little. Yet it is the place where discovery and accomplishment can bring a sense of reward and exhilaration that comes to few people.

I applaud your choice of career. It is a career of excitement. I wish you well in it.

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OFFICE OF THE VICE PRESIDENT

WASHINGTON, D.C.

TO: Ruth Felt

FROM: Julie

RE: JULY 13 -- SCIENCE YOUTH CAMP

The original transcript.

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COMMENTS BY

HONORABLE HUBERT H. HUMPHREY

VICE PRESIDENT OF THE UNITED STATES

BEFORE

LUNCHEON MEETING OF

100 PARTICIPANTS IN THE

NATIONAL SCIENCE YOUTH CAMP

WASHINGTON, D. C.

July 13, 1966

Thank you very much. Thank you, Senator Randolph, Senator Bob Byrd, Congressman Hechler, Mr. Cochran, our distinguished scientists and head of the Atomic Energy Commission, Mr. Seaborg, our Administrator of our great space program, Mr. Webb, and all of these budding young scientists who are here along with their friends and members of Congress, I see a number of them here.

But, I learned a long time ago, boys, that if they are not sitting at the head table, don't start talking about them because you are going to miss one.

I just want you to know that you've done something today that the Vice President is seldom ever able to do -- you have been able to get a substantial number of the members of Congress to meet with you. On occasion I try that, but it doesn't work.

I'm here today to talk to you about this exciting world in which we live. I am delighted that Senator Randolph indicated to you that when I came to Washington, I came with "stars in my eyes." I was listening mighty carefully to how he pronounced the words -- he mentioned stars, and when he spoke

a little bit later, it seemed like he slurred over and I thought I heard "scars." But this happens sometimes in public life. You start out with stars, and you can end up with a few scars. But they are all badges of honorable conflict and not anything to be ashamed of.

I welcome you as one of several officers of your Government who has welcomed you to your Nation's capital. I welcome you here to this New Senate Office building. It is a very important structure -- not only because of its structure, but because of its meaning in this Government of ours. They say that science brings men together, and in many ways it is a universal language like music -- its own. In fact, it has brought men together over the centuries, just as it has brought you together from every one of the states of our great Republic. It has brought men together; it has crossed boundaries of nations; it has brought people together without any regard to race, religion or ethnic origin, and indeed, without any regard to age.

Today, in America, we see a spirit that I think

is so typical of our country that the expression of it once again is very worthwhile. It is the spirit of creative cooperation. That is what made this country -- being creative, imaginative, bold, adventuresome, searching out for new sites and indeed new worlds -- but to do it in the spirit of cooperation. Now, this spirit of cooperation has been fostered in a large part in the quest for scientific knowledge because we learn from each other.

The body of scientific evidence and knowledge is the result of the cooperative endeavors of millions and millions of people -- each making an individual contribution, but each in a sense living off the other and building from the achievements of another.

One of the rewarding experiences that has come to me was first as a Senator when I served as Chairman of a subcommittee on science and research which held meetings right here in this very meeting hall. That was my first opportunity to be engaged publicly in the field of scientific endeavor. I should mention to you that I am a graduate pharmacist. Many

people do not feel that that's very scientific, but I do know the old pharmacy college yell -- in Latin.

There aren't many Senators who can repeat it; I venture to say no other Vice President. So that does give me some claim to scientific excellence.

I serve now as the Chairman of the Space Council. Two of the members of that Council are here with me, distinguished government servants. The Space Council has given me the opportunity to see a little of our work in the field of scientific endeavor in the government. I've seen, too, how our universities and our government and our business, large and small, our labor force, are all working together in this country to achieve a common goal -- the mastery of space, and the advancement of science. If I leave no other thought with you today, it is one that I received in my work with James Webb. It is this: that what we're doing today in the great field of exploration of space is putting together here on earth a tremendous system of cooperation, of management of human and physical resources, drawing upon all of the talents of this country and the universities

and the institutes -- the technical institutes in finance, in management, in business, in skilled labor, in your government. The United States can be very proud of the fact that it excels in the world in these management techniques. Without those techniques, scientific advance would be, indeed, much less than it is right now. But with this and similar experiences to serve as a model, we must try to harness our divergent and separate resources and our energies to solve some other problems, not only to solve the problems of pioneering and new adventure in space research, but to solve problems of our earthly environment. We're going to need you in this, young men -- on problems of housing, of health, of education, of transportation; problems, too, of defeating poverty, of injustice, of discrimination and of keeping the peace. All of these great challenges right here on earth require the same kind of dedication, the same kind of creative cooperation, the same kind of motivation, that we have witnessed so much in the space program, in the unbelievable feats of our astronauts and of our exploration of the universe.

Now, these problems are of immense magnitude,

but if we create the science needed, discover the relevant knowledge, apply the best technologies, and utilize all of our resources, each of these problems turns into an exciting opportunity to make life better, here on earth.

I've said many times that I believe strongly in our program to put a man on the moon by the end of this decade. I know that our great government and our scientists and engineers and business people will get this job done. Mr. Webb can expand upon this in a much more detailed and interesting fashion that I can, but we're going to do it. A nation that thinks it can put a man on the moon ought to be able to also think about how it helps put men on their feet, right here on earth. How do we make it a better place in which to live? What are we going to do about these cities? What are we going to do about transportation? If we can orbit around the moon a celestial body, a vehicle, if we can put a surveyor up there on the moon and take pictures, why can't you get somebody in from LaGuardia Airport to downtown New York before you "collect your old age pension?" Why can't we solve problems of transportation? Why can't we do a much better job on the

environment in which man lives here on earth? We make a very good environment for a man to live in a space capsule, but many of our cities today are choking themselves to death because we haven't learned how to control an automobile in the fumes that it spews out or in a factory.

We're killing off, well, we're destroying our rivers, our lakes, because we haven't learned how to take care of pollution. Yet we take care of it in many scientific endeavors. Each of the problems we're going to ask you to bend yourself to, because you have to; otherwise, there will be no place to live with a growing population and a great industrial complex.

A mathematician told me recently something that sort of shocked me; as long as it upset me, I might as well pass it on to you. It will only be a challenge to you. He said that in his field if a man or woman did not contribute something significant before age 30, it was too late. That's a terrible thing to tell a Vice President, age fifty-five. I thought maybe there was a little time left to make at least some significant contribution. He may have been exaggerating. At least, I thought he was, but he said no, he

wasn't exaggerating at all because actually he said he was an old fossil at age 33. When I see men in science today and women in science, I see you on the march. The truth is that scientists in their 20's and 30's are in important positions today in government and in scientific programs and in business. And I expect in the next few years I'll be able to say the same thing of everyone of you in this room.

It took mankind 200,000 years to emerge from the Stone Age; slow learners in those days. It took him another 100,000 years from the first use of metal tools to the industrial revolution -- a revolution that's hardly a century old by now.

Two key exhibits that are right here in Washington in the Smithsonian Institution tell you what I speak of -- they emphasize the dramatic acceleration in the tempo of progress. One is the first commercial computer -- only 17 years old. The other is astronaut John Glenn's space capsule -- a little over 4 years old, already a museum piece. 17 years old and 4 years old, and we talk about these things as the basics, the beginnings, the most rudimentary basic items in the field of the computer, and of the capsule. Any age

can lay claim to being a golden age of adventure, of discoveries. Discoveries, I suppose, are standard. And yet, we've only begun. Here are some of the developments that we can look forward to in the next twenty years. There's a whole list of them, by the way, published by one of our great companies (I think it's General Electric), a magazine called Challenge. It had a picture of the kind of a world you might see in the year 2000, if we don't destroy ourselves between now and then. That is still a question mark -- whether we'll be able to get men so that they'll be able to live together rather than just fight one another. That magazine gave me a picture of what we might see ahead. I want you to get a hold of it to look at it; it's an exciting document.

In agriculture, we're going to see in the next twenty years large scale use of desalinated sea water. The country that discovers the economical way to take salt out of sea water and make it sweet water will have brought a blessing to this earth, second to none; because this earth of ours is going to have over six billion people on it between now and the year 2000, double the population. Here in America, we will have over 400 million. We had better find some way to use

this good earth; it's here, and bring water to it.

In medicine, we're going to see the transplanting of natural organs and the use of artificial ones. They are in the pioneering and experimental stage; they will become common place in surgery.

In psychiatry, the widespread application of drugs that control or modify the personality. They won't all be sensational drugs; they'll be taken under proper medical care.

In education, the use of much more sophisticated teaching machines. By the way, many of you will go into education. I want to say that one quality of education which needs to be re-examined is its timidity. There's always a hesitation on the part of educators to try something new. But if we're going to break through the mass of illiteracy in this world, we're going to have to do a great deal more than trying to teach more than one by one. Just like it took mass producation to meet consumer needs in a growing economy, it's going to take mass education techniques. The teaching machine is in its infancy in worldwide communication; so is the every day employment of translating machines. There isn't any reason at all that

before you're age 30 you shouldn't be able to receive instantaneous translation of scientific documents in five languages. Not at all, that's already in a stage where it can be done. It is only a matter of putting ourselves to it, so you don't have to go running around wondering what's happening all over the world. It'll be here and it will all be in available regional centers, so that you can tap into it.

In industry, the extensive use of automation, yes, often including some kinds of decision-making at the management level through the computer.

In space, I'm sure that Mr. Webb could tell you that we can look forward to at least the establishment of a permanent base upon the moon. That will be a minimum.

Some of you might say there's nothing very surprising here, and I suppose that's true. Experience shows, however, that it takes from ten to thirty years for a new idea to make its way from its inception in the scientists's mind to general application in everyday life.

Therefore, the world of twenty years from now

already exists -- in the laboratory, in embryo, in the test tube, in today's advanced research establishments.

For the year 2000, however, we can foresee some really far out developments, and, my goodness, that's not very far away; that's just around the corner. Most of you will just be at the most productive period of your life when that year arrives. We ought to have by that time the virtual elimination of bacterial and viral diseases, and prayerfully and hopefully, cancer.

The correction of hereditary defects through the modification of genetic chemistry. This we already know a great deal about. We're examining the cellular structure, the structure of the cell -- great advances are being made in this. I was talking last evening with some doctors and scientists about what we're learning about human life and how actually to create life artificially by the study of the cell.

The stepping up of our food supply through large-scale ocean farming and the fabrication of

synthetic protein by the year 2000.

The control of the weather, at least on a regional scale, that's well advanced already.

In space, the landing of men on Mars, possibly, at least greater knowledge of it and the establishment of a permanent, unmanned research station on that planet. That's not too far out to suggest; I think that's within the possibilities of our time.

Oh, I tell you, if I had one prayer, it is that I could live to be 100, not because I think I could contribute much by living to the year 100; I'd just like to see what you do with this old world of ours. And if I make it, I'll volunteer right now to take one of those space flights, so you won't lose much if anything goes wrong.

I think that we can talk, too, about the creation in the laboratory of primitive forms of artificial life, as I've mentioned before.

This is what we see ahead in the next 35 years, not 350, not 3000 -- 35 years. So if we talk about miracles, this is it.

I was asked sometime ago, what is my favorite passage of Scripture. It just dawned on me as I'm

thinking and talking to you here -- and it's very tricky for a man ever to have a favorite passage of Scripture, because if you take one from the Old Testament somebody says, "Well, why didn't you take it from the New Testament" -- if you take it from the New Testament, somebody says "What's the matter with the Old Testament?" and "Why did you pick that one?" and "Which version did you take?" and so on.

But I remember there's one that I like above all, and I always take a few chances that a man shouldn't, so I'll take it again. It's written in the Gospel according to St. John and it reads as follows:

"Greater things than I have done,
ye shall do also."

And this speaks, of course, of the time of Jesus when he was healing and performing miracles. But he was saying to his disciples and to posterity that, look, this is nothing. "Greater things than I have done, ye shall do also."

And if there was ever anything that made me believe in the true validity and the eternity of the Scriptures, it's that statement, because it is surely true that greater things have been done. Life has been restored. People have been raised from the dead -- in our time. Sight has been restored. Organs

have been transplanted. Miracles are performed every day that far exceed anything that you have ever read about in Scripture or even in fiction.

So, I believe that all of these things are not only possible, probable, but they are inevitable.

Now your Government puts a great deal in science, and you're the beneficiaries of it. Twenty years ago you couldn't possibly have believed that a Federal Government would do what it's doing today in the field of budgetary assistance to universities and industry and scientific laboratories.

I've heard it suggested that all of this is a result not of public officials learning about science, but of scientists learning about politics. In fact, I think it's been a bit of both. The nation and its store of knowledge have been the beneficiaries of a mutual learning process. The percentage of funds for research and development has gone up from 25 percent of the monies to support science in 1957 to 40 percent in 1965.

Since you have had a mathematical background, you know that these percentages tell you nothing about the absolute dollar magnitude. So I feel that

I must add that, in 1957, the figure was 25 percent of 3 billion dollars for science, and the 1965 figure was 40 percent of 15 billion dollars. Now, this is what you might call for research and development. The funds available for scientific research have increased in the last eight years by a factor of eight. We've made tremendous progress.

The costs of doing scientific research have, of course, increased very quickly, as scientists ask more sophisticated questions of nature and expect answers which are much more precise. Probably the most dramatic example of this is the decision to build an atom smasher with the power of 200 bevatrons -- 200 billion electronic volts at a cost of approximately 300 million dollars.

That's "all" that Dr. Seaborg is asking for. Can you understand why President Johnson has all these worries? But that is a wise investment and one that is being budgeted.

Now, since this item and many others are beyond the financial limits of any of our individual universities and since the benefits obviously are for everyone, it's only right and proper that the Federal

Government play its role and share and assist and continue to do so.

Research, like everything else, costs more as you refine it.

There's also been a change in the strategy of research. Let me return to the example of the space program. I wouldn't talk this much about space if I had know Jim Webb was going to be here, but he's my mentor and he's going to grade me when I finish.

I just want to say a very personal thing here to these young people, these friends of yours. I have had a marvelous opportunity to be associated with the two men who are with us today, Mr. Webb and Dr. Seaborg:

I only scratch the surface; mine is a layman's interest. But it is a rich and rewarding experience just to be in contact with people who are literally lifting you out of this world in thinking and in the techniques of research and the accumulation of knowledge. The constant adventure of man to find out why am I, who am I, what am I, where am I, and where can I go and what can I do? These are the questions

that man has asked since the time of creation.

So, returning to my example on space, I can say that I have logged over a one quarter of a million miles in looking into the various aspects of our space program.

The discovery of the structure of space has required new theories, new instruments, new materials, and new techniques -- all of great benefit to every civilian that has never even come close to a space capsule. We've begun to experiment on a vast scale, and we're now literally at a threshold. We're just getting started. The impetus which the space program has given us has let to advances in education. Inter-disciplinary activity in our universities has improved the quality of education beyond any dream that any educator ever had twenty years ago.

The great universities today, the ones that you're going to attend, are greater today because of the space program of your government and the requirements for integration of knowledge and their interrelationship in the different disciplines. This is surely true in medicine and in electronics

and in a host of other fields. As I pointed out before, this is being increasingly done through the creative development of many programs involving many diciplines and many scientists, carried out, not only by Government but by all sectors of the society.

Now, just let me conclude with a reference to a new project of your Government. The value of our coordinating an assault on the unknown has given us the impetus to extend our knowledge into other places, and, luckily for me, I have the chance to be involved. This is what keeps you young.

I've recently been appointed Chairman of a newly created National Council on Marine Resources and Engineering Development which will look at the state of our knowledge of the oceans to see what kind of a national program is needed to extend and utilize our knowledge in inner-space. We are now in a position where current exploration and theory have revealed how little we know and has suggested the vast benefits which may be possible.

The oceans cover 70 percent of the earth's surface and hold untold wealth. Once again, I can't help but feel a sense of spiritual knowledge or spiritual implication. I've always felt that this globe

of ours was here for man's benefit, and I couldn't believe that God in his infinite wisdom could have put 70 percent of it aside not to be used.

And of the 30 percent, a large part of it is arrid and apparently unusable for agricultural purposes -- not to be used. I've always felt that we had a purpose here, that man was put here for the purpose of using all of these great resources and discovering these "acres of diamonds," as one writer put it, that are right here under our feet -- these waters, these oceans, these arrid lands and these productive lands -- to use them.

I've only touched today on some of the challenges and opportunities that I think are ahead. I'll go no further. I'd like to close by having a brief, personal word with you.

I've heard it said that science is "cold" and that it really is an "un-emotional" career. Of course, you know better. We all ought to know better. This is the most exciting of endeavors. I can't think of anything more exciting except being in politics. And I hope you'll get into that, too.

The world of science is the world of man's greatest adventure. It is an adventure far beyond

that was begun by Columbus, or Alexander the Great, or Cortes, or even Leif Erickson. I had to get that in for my friends of Scandinavian ancestry.

It's an adventure into the unknown. It is the search into the deep secrets which may yield answers far beyond man's hope. It is a place for the man and woman who will devote themselves to long hours of labor and difficulty to mankind's cause.

The scientist has to be dedicated to mankind, not just to science for science's purpose. I do urge you that just as you develop your great minds, also develop your heart, your sensitivity. The scientist, above all, should be compassionate. The scientists, above all, should love life because he understands life. He understands its meaning, how it was created. And if there's one purpose that any of us have on this earth, it is to serve our fellow man. It is to make life better, a little more meaningful. So, as I say to you, it's a place where discovery and accomplishment can bring a sense of reward and exhilaration that comes to few people.

I carry in my pocket a little card that has

meant a great deal to me, and I leave it with you. It's a quotation that I've repeated so much that some people feel that it's been overdone. But you are young men and women who are going to enter this career of science, undoubtedly. I don't want it to be a career that looks like it's going to be a mathematical calculation or a statistical abstract or charts or graphs; I want it to be a career for you that is filled with the meaning of life. I want American science, or rather, science in America (there really is no American science) -- science in America -- to be the very spirit of our Nation.

Thomas Wolfe, an American author in the '30's said these words that I think tell us what the meaning of America really is and what we're here for. He said these words: "To every man regardless of his birth, his shining goal and opportunity, to every man, the right to live, to work and to be himself and to become whatever thing his manhood and his vision can comebine to make him. This is the promise of America."

I think that tells our national history. I think it tells our story -- your shining goal and opportunity -- to have the right to make of your-

self whatever your manhood and your vision combine to make you. That's it.

Thank you for letting me come over here and my congratulations to you.

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