GENERAL SCIENCE

# Science and Humanity

**The universality of science proves that mankind is indivisible and the sole criterion is human need, young scientists were told at the Awards Banquet.**

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*Address delivered at the Awards Banquet of the Science Talent Institute in Washington, D.C., March 7.*

➤ SIR William Osler once had occasion to remark rather caustically on the comparative uselessness of men over 40 years of age. I need not say that this distinguished scientist was considerably embarrassed to find that his observation was later misinterpreted by an over-eager press that reported "Dr. Osler recommends chloroform for men over forty."

So, if tonight I pay tribute to deserving youth, I sincerely hope you young ladies and gentlemen will not carry away with you the impression that I advocate liquidation or compulsory retirement for all who attain middle-age. I need not tell you that my own position would be rather precarious in such circumstances.

## Potential Scientists

The Eighth Annual Science Talent Search culminates tonight in the recognition of you 40 young people as the top potential science talent of the nation's high schools. You are here because the sponsors of this search are convinced that each of you has the ability, the ambition and the enthusiasm to make the most of an education in the field of science. And you probably anticipate from me something in the nature of a "pep talk" as my contribution to the occasion. I think I shall disappoint no one if I confess my sincere conviction that youth needs no pep talk, and that you, in particular, who have survived obstacles deliberately placed in your path to test your tenacity and determination, are in no immediate need of verbal stimulus.

It may seem strange to you that a layman, such as I, should be called upon to address the 1949 finalists in the Science Talent Search. I can regard it largely as a compliment to the distinguished welfare organizations that I have the privilege of representing. Beyond that, I take it as a recognition of the universality of science. There is no living individual whose life is not in some way related to the world of the test tube and microscope.

Obviously, connected as I am with the American National Red Cross and with the National Foundation for Infantile Paralysis, I have been greatly interested in the promotion of research in the broad field of public health and in the particular field of a specific disease. Therefore, my claim for inclusion in the select company which you scientists of today and tomorrow form is largely by osmosis.

In a sense this occasion has the flavor of a commencement program. You 40 young men and women are, one might say, the graduating class of a science institute, made up of thousands of students all over the nation. The temptation of your speaker of the evening is to put the finger on you, as countless other commencement speakers have pointed to the graduates as the "hope of the nation," yea, verily, "the hope of the world." According to the age-old formula, we oldsters have failed completely and the future is in your hands. That's what I was told when I came out of high school. That's what I was told when I was graduated from college, and that is what I was told when I finished my course in law school.

I think the problems that face youth today are the problems which face *all* of us. We are all in the same boat, young and old, rich and poor, believer and non-believer —American, Russian, French, British, Chinese and the whole catalogue of human kind.

Never in the world's history has so much knowledge been entrusted to mankind in such a compressed period of time. The sciences I studied are in the realm of archaeology today. In our time the secrets of the universe have been unlocked on a scale that dwarfs the accomplishments of the ages.

## Scientific Development

I shall not attempt to review the advances which have been made, for they are far better known to you young people who discuss the intricacies of science with a facility which shames your elders. We have reached a stage in our scientific development that staggers the imagination, with its planes traveling faster than sound, with its billion electron volt cyclotrons, with its rockets, and even the utterly fantastic, but serious proposal, for creating artificial satellites of the earth.

Man has unlocked Pandora's box and is learning fast the arts of mass destruction and of the ultimate annihilation of civilization. If one were inclined toward pessimism, it would be easy to conclude that the age of the Frankenstein and the robot is at hand.

In my work with Red Cross, I've visited many countries around the world. I've found that people may differ in looks, in beliefs, and in habits of living but, basically, their hopes and their needs are pretty much the same. To be sure, there's suffering and hate, but there's also unselfishness and the will to struggle on.

That's why I don't believe today's voices of doom which say we're nearing the end of our civilization. Will we be destroyed by our own scientific advances? Will we, too, go the way of ancient Egypt, and the Empires of Greece and Rome?

Arnold J. Toynbee, the eminent historian, says the choice is up to us. Says Toynbee: "Although sixteen great civilizations we know about have perished, we today are *not* compelled to submit the riddle of our fate to statistics."

Yet statistical pessimists point out that man first extended his arm with a sword; then to a gun which would hurl missiles for many miles. But we should remember that that same man extended his arm also to paint pictures, to write words, to build schools and churches.

## Man's Progress

That same man first projected his voice through war trumpets; but he also sent it through radios which carry not only his voice but his magnificent music and drama as well. That man also lengthened his legs with wheels, then the wheels grew wings and turned into planes to carry his bombs. But these same planes carry food, medicines, and trade cargoes to the needy around the globe.

Yes, man, through science, has greatly extended his physical universe. But what we must come to realize more fully is that if this world is to have that meaning which gives it value, then man must extend his human spirit even farther. I think that is the choice to which Mr. Toynbee refers.

It is true, of course, that the evolution of sensate society as we know it, has been a steady march forward. Every setback has taught us lessons that have advanced material civilization. Out of the horrors of war have come some of our greatest medical advances. The very creations of war have found their place in the orderly processes of living.

No one will seriously dispute the fact that scientific research has played its part to an extraordinary degree in man's proggress. The horizons of knowledge have been extended almost limitlessly. With knowledge has come power—great power. But power for what?

Power for bigger and better atomic bombs?

Power for deadlier bacteria and gases?

Power for controlled missiles that will strike with devastating effect on civilian communities, bringing death to innocent women and children?

Power to conquer by land, sea and air

those whom we fear or those who threaten us?

I do not wish to be understood as suggesting that we should not have a strong America in the face of present conditions. But I *do wish* to assert emphatically that the arts of peace must go forward even more vigorously than the arts of war if this world is to be of the nature we continually claim for it.

It is in this respect that I think the young scientists of today share with those who have lived longer, a tremendous responsibility.

Let's have no nonsense about the superiority of one race as against another. I hope *that* myth has been exploded for all time. There is no such thing as American science or French science or English science or Soviet science. There are those who for ideological reasons would have us believe that science is doctrinaire and related to a particular form of society. This too is sheer nonsense and can lead to only a fatal conclusion.

## Freedom of Inquiry

Such a concept of science can exist only in an unscientific atmosphere of restraint and repression. When such a condition exists, in any nation, that nation is on the path to self destruction. Such thinking finds expression in the suppression of the rights of the individual. It denies the basic freedoms of a free society. It destroys the right of freedom of inquiry without which there is no science or man of science.

You young men and women, who have been singled out for distinction, share with the rest of us the responsibility for insisting on freedom of inquiry. In a world that is moving too rapidly for many, many people and one, therefore, beset in many places with much suspicion, you will find that even in some of our own academic halls resort is frequently had to the mechanism of repression. I need not urge you to combat vigorously such a condition whenever you encounter it. Unless you do and unless you are willing to participate in those activities that may be necessary to protect our basic freedoms, you will find the search for truth easy of accomplishment because you will be compelled to find as the truth what has already been ordained as truth by others.

We must never forget the world of science is one world. Before the present era of strife and suspicion, it was the rule for scientists of one nation to share their findings with those of another. Witness the field of nuclear physics and all that we know about the atom. Our knowledge springs from the work of the Englishman, Rutherford; the Dane, Niels Bohr; the Italian, Fermi; the French, Joliot-Curies; the Americans, Lawrence and Urey and Oppenheimer; and from the mind of one of the greatest of scholars, Einstein, a refugee from Germany.

The pages of history are filled with similar scientific advances. It proves the universality of science. It proves that while the atom is divisible, mankind is not.

No, mankind is indivisible. There is only one mankind. There may be good or bad individuals, but as Burke said many years ago. "I do not know the method of drawing up an indictment against an whole people."

You young men and women who have been singled out for distinction have the responsibility for taking a stand against the artificial barriers erected between individuals or groups of individuals because of their race, creed, color or national origin. If you are true to the knowledge you have acquired, you know that there is no scientific justification for the inherent superiority of one group over another. No, mankind is indivisible.

It is one of the most heartening signs of our times that this truth is finding expression in the great voluntary welfare organizations of our own country and in countless similar movements throughout the world. On every hand we find men and women banded together in a spirit of compassion and dedicated to the relief of human suffering. The sole criterion is human need. Such an organization is the American Red Cross with its 18,000,000 members in every section of our land. As a part of a world-wide movement, with societies in 68 countries, it enlists under its banner some 100-000,000 members.

Science plays an important part in the merciful work of the Red Cross. Many of the Red Cross programs in our own country are concerned with the health of our people.

## National Blood Program

One of the most important undertakings of the American Red Cross is our new National Blood Program. Science is responsible for our present knowledge of the use of blood in the care of the sick and injured. From the horrors of war we learned much more of the miraculous healing power of blood and its products. The great scientific advances made in the past decade in our knowledge and use of blood in medical practice is one of the invaluable scientific advances of our age.

I think it is appropriate on this occasion to reveal, that for the first time in medical history, work is in progress that will permit the isolation of pure portions of the blood, both the living cellular elements like the red blood cells, the white blood cells and the platelets, as well as the fractions of liquid plasma. In the thirty years or more of collection and banking of blood for human use there has been very little appreciation of the fact that the moment blood is withdrawn from the body it no longer has the protection of the circulation within the body. Various portions of the blood begin to die off at different rates and in turn affect the usefulness of each other.

For example, the blood platelets probably undergo degenerative changes almost immediately when withdrawn from the body. The white cells are probably dead or destroyed within a matter of a few hours. Each of these in turn liberates products, seriously interfering with the usefulness of the remaining natural blood constituents. This may explain why red blood cells, the most hardy and long-lived of the cellular elements, with a life expectancy in the body of three to four months, even under the best of conditions obtained in the past, have rarely lived more than 30 days ouside the body.

The newer advances, for the first time, are showing methods of separating these constituents of the blood almost immediately, so that they cannot adversely affect each other. This offers the promise of giving us each element in its natural, pure, unadulterated form. This will permit physicians to use blood not only much more economically and specifically, but for much longer periods of time. This startling development is of vital importance to civilian practice in medicine as well as to military practice, where stockpiling of blood and its products are so essential for emergency use.

## Threshold of New Era

In short, the brilliant work of scientists has brought us to the threshold of an entirely new era in understanding how to separate the important components of the blood and to use each in the methods that will serve best in the saving of life, in alleviating human suffering and prevention of disease.

You will be hearing more of this epochal scientific advance. I mention it for two reasons: first, it emphasizes my earlier observation, that despite the destructive effect of war on science and civilization, scientific research born of war has played its part to an extraordinary degree in man's progress.

Secondly, it relates directly to the opportunities which lie ahead for young men and women embarking on a career in the realm of research.

I learned of this significant development a short time ago at Harvard University, when I acted as host to a group of about 150 scientists, called to a meeting jointly sponsored by the Red Cross and government and other agencies interested in blood and blood derivatives.

As I rose to welcome these men and

women to a dinner gathering, I could not help noting how many young faces there were before me. In this large gathering of top-flight scientists, invited from all over the country to discuss what is known about our blood, particularly how to collect it better, preserve it better, and use it better, there was a high proportion of "youngsters."

Many of them were biochemists who had set out to study the nature of certain enzymes in the body fluids; others were interested only in the chemistry of non-wetting agents which keep body cells from sticking to glass, rubber and other surfaces; still others were physicists who had been exploring the effects of intense cold—from liquid air or liquid oxygen—on body cells, like the red blood cells; some were plastic engineers, developing the possibilities of amazing new and often unexpectedly useful compounds which can replace our old-fashioned wood, glass, rubber, and metal; many were physicians anxious to try new methods of relieving human suffering and curing disease.

## Young Ideas

What did all these people have in common and how did they happen to be gathered together, from their widely diverse original fields of interest? They all had youthful enthusiasm, innate curiosity and skepticism of the too-readily accepted practices of the past. Even the older participants in this conference had young ideas, scientifically speaking.

For this is how humanity progresses, in every field of endeavor. The young mind re-explores the established principles and picks up the flaws previously overlooked. Or starting off on a tangent, in pursuit of some original idea that may have no obvious practical application or intrinsic value, suddenly ends up with an amazing basic contribution to the art or the science of better living.

It is obviously important to the welfare of the human race that each generation be permitted to contribute its full share of talented young minds, without interference by war, famine, disease, or that latest of scourges, totalitarian muzzling of human expression and individual initiative. Young and inquiring and eager spirits must be encouraged by inexpensive educational opportunities, obtained through merit, to delve into whatever fields they find interesting, whether these seem of immediate practical application or not.

Let me remind you that many great scientists made a major impact upon research during their early adult years. Laennec invented the stethoscope when he was but 34 years old. Jenner was still in his 20's when he discovered how to prevent that dreadful plague, small-pox. Claude Bernard, the father of modern physiology, was only 30 when he first reported on his important studies on the liver. Einstein produced his first paper on relativity at the ripe old age of 26. Many of the great contributions of Niels Bohr were completed while he was in his early thirties, and Paul Ehrlich, who discovered how to stain blood cells and in so doing revealed a method for identifying many of the diseases of the blood, was only 23 when his basic discoveries were made.

## Nobel Prizes in Blood

As you know, within the past two decades Nobel prizes have twice been awarded for researches relating to blood. In 1930 Landsteiner won the coveted award for his discovery of the four human blood groups. In 1934 Minot, Murphy and Whipple received this scientific recognition for their researches on that hitherto invariably fatal blood disorder, pernicious anemia.

I venture to predict that another Nobel prize, or even more than one, will, some day, be awarded for research on blood. It may well be that the winner will be one of you Science Talent Search finalists.

But this is not your only opportunity, as you well know. To mention another of my interests, the isolation of the virus that causes infantile paralysis and the development of a preventive for this disease, predominantly of little children, is but another of the problems facing the scientist of today and tomorrow.

Humanity calls on science to solve its most pressing problems that relate to better living in a better world.

A prerequisite is that there should be willing minds and hearts to undertake the tasks which lie ahead. It is significant that over a long period of years a great industrial corporation, Westinghouse, and one of America's leading educational and scientific organizations, Science Service, have joined hands to discover the creative scientific abilities of our nation.

You are their discoveries.

I congratulate you young men and women who have been selected as likely to carry forward the torch of science. To you and the thousands of your fellow scientists, in schools and science clubs throughout the world, I say—"Well begun!"

## Opportunities for Youth

Before you lies an era of unparalleled opportunity and unparalleled responsibility. Together with those who have been working before you, you face the challenge to produce new foods from the sea, to battle the uncontrolled rain drop which is robbing the good earth of its nutrients, to harness summer's sun for man's year-round use, to fight disease and death with amazing new medicines.

Your opportunity goes beyond the confines of our own land. You will recall the historic fourth point in President Truman's Inaugural Address. He said: "We must embark on a bold new program for making the benefits of our scientific advances and material progress available for the improvement and growth of under-developed areas.

"More than half the people of the world are living in conditions approaching misery," the President said. "Their foods are inadequate. They are victims of disease. Their economic life is primitive and stagnant. Their poverty is a handicap and threat both to them and to more prosperous areas."

The President stated further that for the first time in history, humanity possesses the knowledge and skill to relieve the suffering of these people.

If you had any doubt that opportunity awaits you, I am sure these words of our President would be reassuring. With your help the American ideal can offer man some dignity and some chance for self-improvement.

And, remember, that the American ideal cannot be saved by the sword. It can exist and have value only if we *live it* every hour of every day, and by our own example make it such that peoples everywhere will of their own accord seek the opportunity of embracing it.

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