News of Science

Scientists Appeal for Abolition of War

In an effort to make quite clear to the world what will happen in the event of nuclear warfare, nine eminent scientists have submitted a statement to the United States, the Soviet Union, Great Britain, France, Communist China, and Canada, which are the countries that have acquired or will eventually acquire nuclear armaments. According to Bertrand Russell, who released the statement, the appeal grew out of a broadcast that he gave in London last December on the peril of nuclear weapons. The late Albert Einstein nominated Russell to draft the statement, the full text of which follows.

"In the tragic situation which confronts humanity we feel that scientists should assemble in conference to appraise the perils that have arisen as a result of the development of weapons of mass destruction, and to discuss a resolution in the spirit of the appended draft.

"We are speaking on this occasion, not as members of this or that nation, continent or creed, but as human beings, members of the species man, whose continued existence is in doubt. The world is full of conflicts, and, overshadowing all minor conflicts, the titanic struggle between Communism and anti-Communism.

"Almost everybody who is politically conscious has strong feelings about one or more of these issues. But we want you, if you can, to set aside such feelngs and consider yourselves only as members of a biological species which has had a remarkable history, and whose disappearance none of us can desire.

"We shall try to say no single word which should appeal to one group rather than to another. All, equally, are in peril, and if the peril is understood, there is hope that they may collectively avert it.

"We have to learn to think in a new way. We have to learn to ask ourselves not what steps can be taken to give military victory to whatever group we prefer, for there no longer are such steps; the question we have to ask ourselves is, what steps can be taken to prevent a military contest of which the issue must be disastrous to all parties?

"The general public, and even many men in position of authority, have not realized what would be involved in a war with nuclear bombs. The general public still thinks in terms of the obliteration of cities. It is understood that the new bombs are more powerful than the old and that, while one A-bomb could obliterate Hiroshima, one H-bomb could obliterate the largest cities, such as London, New York, and Moscow.

"No doubt in an H-bomb war great cities would be obliterated. But this is one of the minor disasters that would have to be faced. If everybody in London, New York, and Moscow were exterminated the world might, in the course of a few centuries, recover from the blow. But we now know, especially since the Bikini test, that nuclear bombs can gradually spread destruction over a very much wider area than had been supposed.

"It is stated on very good authority that a bomb can now be manufactured which will be 2500 times as powerful as that which destroyed Hiroshima.

"Such a bomb, if exploded near the ground or under water, sends radioactive particles into the upper air. They sink gradually and reach the surface of the earth in the form of a deadly dust or rain. It was this dust which infected the Japanese fishermen and their catch of fish.

"No one knows how widely such lethal radioactive particles might be diffused, but the best authorities are unanimous in saying that a war with H-bombs might quite possibly put an end to the human race.

"It is feared that if many H-bombs are used there would be universal death—sudden only for a minority; but for the majority a slow torture of disease and disintegration.

"Many warnings have been uttered by eminent men of science and by authorities in military strategy. None of them will say that the worst results are certain. What they do say is that these results are possible, and no one can be sure that they will not be realized.

"We have not yet found that the views of experts on this question depend in any degree upon their politics or prejudices. They depend only, so far as our researches have revealed, upon the extent of the particular expert's knowledge. We have found that the men who know most are the most gloomy.

"Here then is the problem which we present to you, stark and dreadful and inescapable: Shall we put an end to the human race: Or shall mankind renounce war? People will not face this alternative because it is so difficult to abolish war.

"The abolition of war will demand distasteful limitations of national sovereignty. But what perhaps impedes understanding of the situation more than anything else is that the term *mankind* feels vague and abstract.

"People scarcely realize in imagination that the danger is to themselves and their children and their grandchildren, and not only to a dimly apprehended humanity. They can scarcely bring themselves to grasp that they, individually, and those whom they love, are in imminent danger of perishing agonizingly. And so they hope that perhaps war may be allowed to continue, provided modern weapons are prohibited.

"This hope is illusory. Whatever agreements not to use H-bombs had been reached in time of peace, they would no longer be considered binding in time of war, and both sides would set to work to manufacture H-bombs as soon as war broke out, for if one side manufactured the bombs and the other side did not, the side that manufactured them would inevitably be victorious.

"Although an agreement to renounce nuclear weapons as part of a general reduction of armaments [H. J. Muller makes the reservation that this be taken to mean 'a concomitant balanced reduction of all armaments'] would not afford an ultimate solution, it would serve certain important purposes.

"First: Any agreement between East and West is to the good insofar as it tends to diminish tension.

"Second: The abolition of thermonuclear weapons, if each side believed that the other had carried it out sincerely, would lessen the fear of a sudden attack in the style of Pearl Harbor, which at present keeps both sides in a state of nervous apprehension.

"We should therefore welcome such an agreement, though only as a first step.

"Most of us are not neutral in feeling, but, as human beings, we have to remember that, if the issues between East and West are to be decided in any manner that can give any possible satisfaction to anybody, whether Communist or anti-Communist, whether Asian or European or American, whether white or black, then these issues must not be decided by war. We should wish this to be understood, both in the East and in the West.

"There lies before us, if we choose, continual progress in happiness, knowledge and wisdom. Shall we, instead, choose death because we cannot forget our quarrels? We appeal, as human beings, to human beings: Remember your humanity, and forget the rest. If

you can do so, the way lies open to a new paradise; if you cannot, there lies before you the risk of universal death.

"We invite this congress, and through it the scientists of the world and the general public, to subscribe to the following resolution.

"In view of the fact that in any future world war nuclear weapons will certainly be employed, and that such weapons threaten the continued existence of mankind, we urge the governments of the world to realize and to acknowledge publicly that their purpose cannot be furthered by a world war, and we urge them, consequently, to find peaceful means for the settlement of all matters of dispute between them." (Signed)

PERCY W. BRIDGMAN (Harvard University, foreign member of Royal Society, London, Nobel prize for physics)

ALBERT EINSTEIN (Institute for Advanced Study, Nobel prize for physics)

LEOPOLD INFELD (University of Warsaw, member of Polish Academy Sciences, joint author with Einstein of *The Evolution of Physics* and *The Problem of Motion*)

HERMAN J. MULLER (formerly a professor in Moscow, India, and so forth, now at Indiana University; Nobel prize in physiology and medicine)

CECIL F. POWELL (Bristol University, England; Nobel prize for physics)

JOSEPH ROTBLAT (professor of physics in the University of London, at St. Bartholomew's Hospital Medical College)

BERTRAND RUSSELL

HIDEKI YUKAWA (Kyoto University; Nobel prize for physics)

JEAN FRÉDÉRIC JOLIOT-CURIE (University of Paris, Nobel prize for chemistry)

A week later, on 15 July, at the end of the 5th annual Lindau, Germany, conference, 18 Nobel prize winners signed the following statement.

"We, the undersigned, are scientists of different countries, different races, different denominations and different political convictions.

"The only thing that binds us—on the surface—is the Nobel prize which we have the honor to possess. It was with enthusiasm that we became servants of science. We believe it a way to happy life. We are terrified to see that this science gives mankind instruments to destroy itself.

"Full use in wartime of all weapons available would contaminate this earth with radiation sufficient to destroy entire nations.

"This kind of death can hit the neutrals as well as the combating parties should a war break out between the major powers.

"Who can guarantee that such a war would not develop into such a deadly fight?

"Thus, a nation which engages in a deadly war invites disaster for itself and endangers the whole world.

"We do not deny that perhaps today fear of these lethal weapons maintains peace.

"But in spite of this, we believe that a government betrays itself by thinking that fear of these weapons will prevent wars for a long time. Fear and tension have often led to wars. We also believe it is wrong to speculate that smaller conflicts would continue to be solved by the use of conventional weapons.

"In extreme danger, no nation will refrain from using a weapon which science can help to produce.

"All nations must come to the conclusion to refrain from the use of power as an ultimate means of statesmanship. If they won't do this they will cease to exist." (Signed)

KURT ADLER, Germany
MAX BORN, England
ADOLPH BUTENANDT, Germany
ARTHUR H. COMPTON, United States
GERHARD DOMAGK, Germany
HANS VON EULER-CHELPIN, Sweden
OTTO HAHN, Germany
GEORGE DE HEVESY, Denmark and Sweden
WERNER HEISENBERG, Germany
RICHARD KUHN, Germany
FRITZ A. LIPMANN, United States
PAUL MUELLER, Switzerland
HERMANN J. MULLER, United States
LEOPOLD RUZICKA, Switzerland
FREDERICK SODDY, England
HERMANN STAUDINGER, Germany
WENDELL M. STANLEY, United States
HIDEKI YUKAWA, Japan

Traveling Science Libraries for Small High Schools

To assist high-school students to learn more about science, and to interest some of them in becoming scientists, the AAAS will start in the fall a program of sending traveling science libraries to a selected list of small high schools. Plans were developed cooperatively with the U.S. Office of Education and the National Science Foundation, which has made a grant to the Association to cover the costs. (This program is in addition to the Science Teaching Improvement Program [*Science*, **122**, 151 (22 July 1955)].)

The lack of appropriate reading material in small high schools deprives a large segment of the student population of the opportunity to learn what science is like and what scientists do. As a result, many young people with potential interest in careers in science fail to capitalize on their talents. Furthermore, many lack motivation to continue their education. It is also important that those not contemplating science careers be informed citizens in science as well as in other cultural areas.

It is the hope of the sponsors that the traveling science libraries will serve the following purposes: (i) develop greater interest on the part of high-school students in reading books on science and about scientists; (ii) make available to students a larger fund of factual information from the great scientific storehouse; (iii) develop a sounder basis for the choice of a career in science; (iv) afford science teachers an opportunity to extend their scientific reading; (v) stimulate an interest on the part of schools in purchasing similar collections of books for their libraries.

Selection of participating schools. Ten reasonably limited geographic areas, with varying cultural and educational characteristics, will be selected. In each area six senior high schools in the smaller communities will be chosen. The schools will be asked whether they wish to avail themselves of the traveling libraries; only those offering full cooperation will be given the privilege of participating.

Selection of books. The collection is to consist of 120 books covering the major fields, such as agriculture, anthropology, astronomy, botanical sciences, biology, chemistry, engineering, geology and geography, history and philosophy of science, mathematics, meteorology, medical sciences, physics, psychology, and zoological sciences. The selection will be based on the suggestions and recommendations of individuals, committees, and organizations representing the various scientific disciplines. The books to be included must contain authoritative scientific information written in a style that will interest high-school students. Textbooks or research monographs will not be included. In general the books will be chosen because they may be read and understood by persons with a limited background in science. A few, however, will be at a level to challenge the better students.

Plan of operation. The 120 books will be divided into 6 units of 20 each. Each unit will be fitted into an attractive case that can be used both for shipping and display. Each participating school will be permitted to retain each of the 6 units of 20 books for 4 class weeks. The first unit will arrive at each school about 1 Oct. 1955. All units will leave the schools approximately 1 May 1956.

Since the project is experimental and is supported by very limited funds, the libraries can be sent only to the selected schools. Voluntary applications for participation cannot be honored.

A brochure describing the collection and its use and containing a brief résumé of each book, will be sent to the school librarian and to the science teachers at