HARVARD UNIVERSITY
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31 October 1976

Mr. William Boland
Executive Editor
New York Academy of Sciences
2 East 63rd Street
New York, NY 10021

Dear Mr. Boland,

Here is the revised text of the talk I gave in connection with the 1975 Lehman Award.

In case you are looking for illustrations, you may be interested in the enclosed photographs showing a session of the Conference of the U.N. Committee on Disarmament in Geneva and of technicians destroying the U.S. stockpile of biological weapons at Pine Bluff Arsenal in Arkansas. The photographs have been provided by the U.S. government and no special arrangements need be made for their reproduction. Whether or not you use the photographs, please return them to me at your convenience.

Sincerely yours,

Matthew Meselson
Cabot Professor of the Natural Sciences

Enclosures

New York Academy of Sciences
Dr. Matthew Meselson
3 December 1975

On March 26 of this year the Soviet Union, the United Kingdom, and the United States exchanged ratification documents which brought into force as of that date an international treaty known as the Biological Weapons Convention. Now signed by more than one hundred nations, the Convention seeks to insure that our rapidly growing knowledge of fundamental life processes will not be exploited for hostile purposes.

Under article one of this new treaty, each state "...undertakes never in any circumstances to develop, produce, stockpile or otherwise acquire or retain:

(1) Microbial or other biological agents, or toxins, whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes;

(2) Weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict."

The treaty also prohibits giving assistance or encouragement to any state or other international organization in the production or acquisition of biological weapons and equipment designed for their delivery.

It must be admitted that no nation had ever placed major military reliance on biological weapons. Indeed, this must be reckoned as an important factor leading to success in negotiating the treaty. But it would be a mistake to suppose that biological weapons

did not exist or that the treaty is without effect.

The biological weapons program about which we know the most is that which existed in our country. Between the time of World War II and until the order of President Nixon in 1969 renouncing biological warfare, the United States had a large-scale program for the development and production of biological weapons. We had produced and stored thousands of kilograms of biological warfare agents. These have now been destroyed persuant to the unilateral policy of the United States and in accord with the proscription embodied in the Biological Weapons Convention. The U.S. stockpile of biological warfare agents included various bacterial, rickettsial and viral agents which cause disease and death in man and two fungal plant pathogens for use against rice and wheat crops. There were also weapons systems, such as bombs and spray tanks, for distributing these biological warfare agents. All of these agents and special means of delivery have now been destroyed, but at one time they were only too real.

Also as ordered by the Presidential declaration of 1969 and in accord with our commitment under the Biological Weapons Convention, the United States has converted the former biological warfare research laboratory at Ft. Detrick, Maryland to an international center for research on cancer under the jurisdiction of the National Institutes of Health. The former biological warfare production facility at Pine Bluff, Arkansas has been acquired by the Food and Drug Administration for toxicological research and testing.

The former biological weapons test facility at Dugway, Utah remains under military authority but the program there, so far as it concerns biological weapons, is restricted by law to research on means of protection and prophylaxis.

We know much less regarding the biological weapons programs of our major potential adversary. The Soviets themselves said nothing about their possession or non-possession of biological weapons until June 1975, after the Biological Weapons Convention had entered into force. At that time the Soviet government announced that it had no biological weapons and no program for producing them.

The United States' decision to renounce biological warfare was not contingent upon the activities of any other nation. The decision was made unilaterally before the Biological Weapons Convention was negotiated. On November 25, 1969 the President declared that the United States would renounce all development, manufacture, and possession of biological weapons. On February 14, 1970 it was announded by the White House that this renunciation applied not only to live biological agents but also to substances which are the toxic products of living organisms whether or not such products are obtained from living organisms or synthesized by man.

After extensive review, prompted in considerable part by public and congressional criticism, the United States government

concluded that biological weapons could serve no important U.S. military purpose and that their use could have massive, unpredictable, and uncontrollable consequences. In fact, the renunciation of biological warfare is very much in the long-term interests of the United States. Our earlier conspicuous example of a large-scale program of development, testing, and stockpiling risked world-wide proliferation of biological warfare technology. Our apparent interest in such weapons could only stimulate military planners in other countries to establish or intensify biological weapons programs of their own. By removing this stimulus and adding the prohibition of the Biological Weapons Convention we have greatly reduced the likelihood of biological warfare anywhere in the world.

It may be that the decision to outlaw biological weapons came just in the nick of time. Traditionally, an argument put forward by the military for continuing to invest in a line of research is the promise of new developments to come. At the very time that the Biological Weapons Convention was under negotiation a revolution was occurring in our ability to manipulate genetic material. What we now refer to as recombinant DNA technology was making it possible to cut and splice DNA molecules in the laboratory in order to produce tailor-made combinations of genes for basic research and practical applications. The Biological Weapons Convention, by outlawing future as well as existing methods of biological warfare, clearly prohibits the exploitation of recombinant DNA technology for military or other hostile purposes. The U.S. government has emphatically underscored this point in several recent official statements. Moreover, the validity of the military and arms control

arguments that led to U.S. renunciation of biological weapons in 1969 is in no way affected by the advent of recombinant DNA technology. Nevertheless, given the way in which bureaucratic politics often operates, it may well be that our government would not have renounced biological weapons and that a disarmament treaty could not have been negotiated if the real issues had been beclouded with promises of endless vistas of expanding technology.

Aside from its immediate consequences, international renunciation of biological weapons should be seen as a major step towards a profoundly important goal. The rapid and accelerating progress of molecular biology and the biological sciences will inevitably lead to an extraordinary ability to manipulate life processes for good or ill. In parallel with this revolutionary development, it must become a deeply ingrained expectation on the part of mankind that our knowledge of the life process is not to be exploited to kill or manipulate human beings for military or other hostile purposes.

There is clearly more to be done. Progress in understanding neurobiology and the functioning of the brain must be accompanied by greater restraints and prohibitions on chemical warfare. The Geneva Protocol of 1925, to which every major nation of the world is now party, prohibits the use in war of chemical weapons but does not prohibit their development and acquisition. The Protocol, valuable as it is, is generally viewed as a no-first-use

agreement. The Protocol must now be augmented by an international treaty parallel to the Biological Weapons Convention prohibiting development, production, and possession of chemical weapons of war. Article nine of the Convention commits its parties to the negotiation of a treaty prohibiting chemical weapons, and current negotiations in Geneva are directed toward this end. Unfortunately, progress has not been rapid. It would be a loss for all manking if some possibly unexpected discovery, say in neurobiology, prevented successful negotiation of a treaty prohibiting chemical weapons of war. If, however, both chemical and biological weapons can be outlawed, we will have gone a long way toward creating an atmosphere in which our increasing knowledge of life processes is directed not to mankind's degradation but to his benefit.