

In the Western World controls have been developed gradually for many human communicable diseases. But in the newly emerging nations the developmental stages have been by-passed and measures of controlling disease have been imported in the form of improved public health measures. It took 70 years to halve the death rate in England, 40 years in Japan and only 7 years in Ceylon. Life expectancy on the Island of Mauritius was raised from 33 to 51 in just 8 years after World War II; it took Sweden 130 years to achieve this same increase. As a consequence, the steady state between the available food and number of human beings has been disturbed in the emerging nations, and larger and larger numbers of people are living in a state of malnutrition.

Perhaps the most unique, important, and far-reaching work that is developing in biology now, and which has great human significance, is termed "genetic engineering", "molecular grafting" or "molecular architecture." There is strong evidence that the final secrets of heredity lie in the coiled structure of the deoxyribonucleic acid (DNA) molecule and the complex arrangement of its atoms. The genetic messages of DNA are written out in a four-letter code, each letter being a specific chemical substance. Scientists are able to read the genetic code in some cells and to perform certain unique experiments. As soon as the "reading" becomes more refined it may be possible to give specific genetic instructions to cells or tissues, which in turn will carry out many desired synthetic reactions. Perhaps there may be no limit to such molecular grafting at the nucleic acid level. We may be able to cure some of our defective-gene diseases, such as, hemophilia, by appropriate injection of some relevant piece of DNA, which has been biosynthesized by a bacterium. Several scientists feel that the biochemical mechanisms of tumor tissue can be reverted to a normal metabolic pattern by injecting normal cellular DNA along with antibodies specific for tumor cells. The antibodies would retard the growth of the tumor cells, so the normal DNA could adjust the cell to its regular pattern. Such speculations may seem fantastic, but they are distinct possibilities.

From these brief remarks I have tried to illustrate that new biological knowledge is a necessary prime natural resource of all mankind, regardless of national boundaries. The International Biological Program provides an excellent opportunity to expand our knowledge concerning the most elementary of all human needs—food, water, and health.

We hope that in the near future the President and the Congress will consider a special line item budget for the United States' portion of the financial support of the International Biological Program. Recent discussions within your Committee indicate that to maintain a healthy science in this country, increased financial support of 10–15 per cent each year is necessary. These goals are not being achieved. Thus it appears that it will be impossible to superimpose an extremely important five-year International Biological Program of \$50–\$100 million on agency budgets that are now being strained to the utmost.

Although scientific inquiry needs more and more help from governments if essential achievements are to be reached, there is a danger in the situation if a growing proportion of research is officially directed. Part of the great success of the International Geophysical Year may have been due to the relative financial independence of the organization. We hope that sufficient flexibility can be maintained in the International Biological Program so that proper adjustment can be made if its tempo is impeded in any way.

May I conclude by thanking you for the opportunity to make a statement, and even more for the willingness of your Committee to endorse Concurrent Resolution 273.

STATEMENT OF DR. JOHN R. OLIVE, EXECUTIVE DIRECTOR, AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, ACCOMPANIED BY DR. THEODORE SUDIA, ASSOCIATE DIRECTOR, AIBS

Dr. OLIVE. On behalf of the American Institute of Biological Sciences I wish to thank you for the opportunity to appear before the House Subcommittee on Science, Research, and Development. And my remarks are brief, and a partial summary of what we have in our written statement.