THE ATOMIC AGE

Scientists in National and World Affairs

Articles from the *Bulletin of the Atomic Scientists 1945-1962*

Edited and with Introductions by

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Library of Congress Catalog Card Number 63–21583
Manufactured in the United States of America
Designed by Sophie Adler

THE ATOMIC AGE

Basic Books, Inc.
Publishers
NEW YORK · LONDON

For
RUTH *and* ANYA

Editors' Foreword

The *Bulletin of the Atomic Scientists* was first published in December, 1945. The power of the fissioned atomic nucleus had been revealed at Alamogordo in June, 1945, to scientists working on the Manhattan Project, and revealed to the world at large at Hiroshima and Nagasaki in August of the same year. The *Bulletin* began as an emergency action, undertaken by scientists who saw urgent need for an immediate educational program. One purpose was to make fellow scientists aware of the new relationships between their own world of science and the world of national and international politics. A second was to help the public understand what nuclear energy and its application to war meant for mankind. It was anticipated that the atom bomb would be only the first of many dangerous presents from Pandora's box of modern science. Consequently it was clear that the education of man to the realities of the scientific age would be a long, sustained effort.

This forecast was not a difficult one, and the subsequent decades have abundantly confirmed it. Hardly had the world begun to comprehend the meaning of the atom bomb, which wiped out in a few seconds a city of several hundred thousand inhabitants, when fusion bombs appeared with a destructive power thousands of times greater—bombs able to wipe out a metropolis of several millions of people. If used close to the ground in sufficient numbers, triple-decker (fission-fusion-fission) bombs can cover continents with a deadly spray of radioactive fallout; if used high enough in the air, fusion bombs can start fires covering millions of acres of woodland and steppe.

Before mankind could comprehend the destructive qualities of these new weapons, ballistic missiles made their appearance, able to carry nuclear destruction and radioactive contamination to any point on the globe from any other point in a matter of minutes. Organized flight from cities became practically impossible, and hiding in underground shelters promised only incineration or asphyxiation to those in target areas. Other apocalyptic threats—psycho-chemical weapons, bacteriological warfare, neutron bombs (which would destroy life without damaging structures)—are in the development stage, more or less advanced but hidden by walls of official secrecy.

At the same time, the scientific revolution has permitted man to venture

on his first space flights and promises to make the whole solar system accessible to exploration within a generation. Antibiotics and insecticides have wiped out diseases such as malaria, once the greatest killer of men on earth, and have doubled or trebled the life expectancy of newborn children in many countries. New energy sources, new materials, and new techniques of agriculture give promise of feeding the hungry two-thirds of the world and of clothing and housing them as well.

But even in saving lives, science has created severe problems. Since it is easier to prevent people from dying than from being born, applied science has led to a "population explosion," which, according to some learned extrapolators, promises to make the population of the earth rise to astronomical numbers shortly after the year 2,000; according to less alarming calculations, the world population will merely double every 50 years. At the same time, science-spurred agriculture and industry are creating in the technologically advanced parts of the world a glut of foods and machines which their populations cannot consume, even under the whip of advertising and with the help of "planned obsolescence." The contrast between this economy of abundance and the poorer nations of Asia, Africa, and South America, accelerated by the worldwide spread of instant communication, puts an end everywhere to resigned acceptance of poverty, hunger, and disease, and stirs mightily what has been called the "revolution of rising expectations."

The explosive growth of man's capacity for constructive and destructive action is confusing societies whose moral standards and organizational traditions were laid out before the scientific revolution. The wealthy nations now behave like natives brought from the bush and given money to buy whatever they like in a store displaying modern consumer goods and weapons. Behind them presses a crowd of people without cash, but also with the dream of acquiring, as soon as possible, all the wonderful and murderous things on display.

To adjust the life of the individual (and more importantly the relations among the traditional nation-states) to this new state of affairs is perhaps the most stupendous challenge encountered by Homo sapiens in his tortuous growth to prominence. A state now has at its disposal energy equivalent to a thousand slaves for each citizen, and (what is more dangerous) the capacity to concentrate the release of this energy in an incredibly small volume in an incredibly short span of time. Two great world powers have the capacity to destroy utterly every other nation on earth in a few seconds. Some of the lesser powers will in the foreseeable future possess the same sort of destructive force. To live safely in this world requires a deep change in the psychology of men and the ways of nations.

Man's hereditary endowment has not changed much from the days of Neanderthal and Cro-Magnon. Even successful application of selective breeding to mankind could do no more than eliminate some physical deformities and predispositions to certain diseases. The changes called

"progress" have been due not to the growth of man as a hereditary species but to education, which adds to the hereditary patrimony of each new generation a continuously larger and more refined body of information and instruction. The adjustment of mankind to the scientific revolution requires a thorough modernization of this educational load.

The aim of the *Bulletin of the Atomic Scientists* was—and remains—to contribute to this re-education. This is not a task of a year or a decade but probably of several generations. It would have to go on even if an immediate solution were found for the continuing crisis that threatens to transform the mutual enmity between the United States and the Soviet Union into a mutual holocaust. Such a solution, highly desirable as it is, would only be an *ad hoc* answer produced by leading elites—involving perhaps only a few individuals—and its chief virtue would be that it would buy time. There would still remain the task of changing mankind's attitudes and rules of international behavior, without which the human race cannot reside permanently on the planet earth under the conditions created by the newest scientific revolution.

The *Bulletin* thus has had a double task: (1) its editors and authors have addressed themselves to the great, immediate problems of national and international politics; and (2) they have also given their attention to the issues of the long haul—to the impact of science on man and society and the appropriate responses to that impact, and to the relations between science and other spiritual and material forces which mold and reflect the minds of men: that is, religion, ethics, law, and art.

The documents and articles collected in this volume represent scientists dealing directly with political issues. The plan of the book is simple. Part I, titled "Failure," is concerned with the unsuccessful efforts, immediately after World War II, to achieve international control over nuclear weapons. We consider part of that effort to have taken place before the United States dropped the first bomb at Hiroshima, and we reproduce several of the prescient documents of 1945 in which scientists urged that the first step in international control of nuclear weapons was not to use them. Parts II ("Peril") and III ("Fear") address themselves, respectively, to the international and national consequences of the failure of control. On the one hand, there is preoccupation with the vulnerability of the world and with substitutes for the safety promised in an effective international control system: disarmament and arms control, deterrence, civilian defense, and a test ban, among other things. On the other hand, the national consequences include preoccupation with Soviet espionage, loyalty and security problems, Congressional alarms, restrictive visa policies, and the like. Part IV of the book is titled "Hope." It is a reminder that behind the tensions of world politics and the recurrent crises that threaten doom, there lies the promise of science for the universal improvement of the human condition.

Among the *Bulletin*'s authors are some of the world's most eminent scientists as well as scholars from other fields. Many of them are represented

in this volume, which, as faithfully as any sample can, represents the political commitment of scientists since 1945. The reader will soon discover that the scientist's perspective may be a special one but that his concern is not. It is the concern of all rational human beings. A volume devoted to the scientist's involvement with politics turns out to be a review of the great political concerns of this nation and the world.

E.R.

August 1963 M.G.

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