MAN AND ATOM

BUILDING A NEW WORLD THROUGH NUCLEAR TECHNOLOGY

GLENN T. SEABORG
WILLIAM R. CORLISS

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by Glenn T. Seaborg
and William R. Corliss

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Preface

Man and Atom, conceived partly as a "labor of love," became during the course of its writing a work of necessity, the completion and publication of which seemed to become more urgent each day.

This book, written during a period of both great progress and controversy in atomic affairs, has dwelled in the mind of the senior author for many years prior to its actual writing. He has spent the better part of his life engaged in investigating and working with this new source of energy and with colleagues involved with nuclear matters in the United States and throughout the world. During this time he became increasingly aware that as our knowledge of the atom and our ability to use it grew, so also did there grow a gap of understanding between those engaged in nuclear affairs and the general public.

Broadly speaking, a deficiency of public understanding of science poses a problem in a democratic society—especially one that is also a technological society so dependent for its human progress on scientific progress. But in recent years we have become impressed with the fact that public understanding of the atom specifically is an even more urgent problem, as to a growing extent our very future may hinge on how wisely we manage this great new source of energy and its myriad applications.

Human civilization is rapidly approaching a series of crises that can be managed only through some radical departures in man's dealings with the relationship between energy and matter. Nuclear energy holds one key—a crucial one—to the successful resolution of these crises. Without it there is no doubt that civilization, as we know it, would slowly grind to a halt. With it not only will we be able to raise a greater part of the world's people to a decent standard of living, but we will be able to move all mankind ahead into an era of new human advancement—human advancement which takes place in harmony with the natural environment that must support it.

It is understandable that a source of energy introduced to the world through the destructive force of a weapon as awesome as an atomic bomb would long be held in fear and would meet public resis-

tance in its development for peaceful uses. But it is also unforgivable that when those peaceful uses are so vital to man's needs and particularly to those needs which when fulfilled could help eliminate so much human conflict, we have failed to create sufficient understanding to overcome that fear and resistance.

In recent years we have delivered many speeches and written many papers in trying to tell the story of the atom's progress and promise. At best these could only be fragments of the complete story that we felt had to be told. The opportunity, therefore, to write a book that would assemble these fragments into a larger and more comprehensive picture of man's relationship to the atom was indeed welcomed. And as it was being written, the events of the day—the growing environmental and energy crises, the social and economic unrest and uncertainties based largely on man's apprehensions and concerns over his physical conditions—led us to feel our book might bear an increased significance in terms of these events.

These apprehensions and concerns cover many topics related to nuclear developments; and, while we have touched on as many of these as we could in one book, we have not attempted to go into great detail. For example, we have not tried to offer detailed rebuttals to specific arguments on the health and safety aspects of nuclear power. To do so would involve excessively technical explanations with which we did not want to burden our reader. Instead we hope we have provided the reader with the necessary background and stimulus to investigate such topics further. And in our bibliography we have provided a list of books, articles, and papers which are available for such a purpose.

We felt similarly about the complex subjects of weapons testing, arms limitation, arms control, and disarmament as they relate to the atom. If no detailed discussion of these subjects is present, it is not due to a lack of importance we attach to them, but, on the contrary, to the fact that they are so important that they warrant separate treatment and more thorough discussion than we could include here. Again, to assist the reader who wishes to pursue these topics further we have included in our bibliography a list of references to which he may turn.

Another decision we had to make was to select the technical level of our writing. To reduce the complex subject of nuclear energy to the primer level would have been unfair to the intelligent though

nontechnical reader; we wrote at a higher level of sophistication. We have added a glossary of terms at the end of the book to aid those unfamiliar with nuclear jargon.

The reader will find that our book is not devoted exclusively to things nuclear. Since we are believers in the future—a future we believe will be highly technological—we have presented a few examples of how inventions in other sophisticated scientific fields will relate to the advances being made in atomic energy. For example, unusual words such as "teleoperator," "aquaculture," "NAWAPA," and "cyborg" will appear as we discuss that future in which man and machine will work together symbiotically and constructively.

In our discussions of the myriad peaceful applications of the atom we make a number of projections into the future. These should be regarded not so much as actual predictions but rather as illustrations of what might occur if all health and safety considerations and the problems of public understanding can be completely resolved. We do not believe that nuclear technology will achieve its true potential in the absence of public acceptance. All aspects must be, and we believe will be, debated pro and con, including considerations of the problems and hazards connected with alternate approaches. As the result of this process the atom will find its proper and deserved place in helping to meet and solve problems in our society.

Glenn T. Seaborg
William R. Corliss

April 1971

Illustrations

PART I

ATOMIC TOOLS