ESSAYS ON SCIENCE AND SOCIETY

Taking Responsibility

Joseph Rotblat

trained in nuclear physics and later specialized in radiation biology. He was awarded the Nobel Peace Prize in 1995, with the Pugwash Conferences on Science and World Affairs, "for their efforts to diminish the part played by nuclear arms in international politics and in the longer run to eliminate such arms."

My enthusiasm for science stems from horrid experiences during the First World War. I was nearly six when it broke out, and it completely changed our family fortunes: from being well-off to penury; to hunger, squalor, and disease. Seeking escape from the grim reality, I read avidly, mainly science fiction. Jules Verne fired my imagination. I dreamed that science would become the means to alleviate the miseries of life and to eradicate the scourge of war. Thus, my lifelong outlook on science was formed: it should push forward the frontiers of knowledge but also serve human welfare.

The odds against my becoming a scientist were immense. I had to work for a living and was thus unable to attend school, the normal path to University. Nevertheless, I taught myself, reading science textbooks, mainly in physics.

I was 20 when I heard about the Free University of Poland in Warsaw, where a school certificate was not an entrance requirement, and classes were in the evenings. I enrolled for the physics course, and upon its completion in 1932, was offered a post as an assistant in the Physics Department. The salary was barely enough to get by, but I was in seventh heaven: at long last, I had the opportunity to do scientific research.

The year 1932 was the annus mirabilis in physics, the start of spectacular advances in the new subject of nuclear physics. My laboratory was very poorly equipped: we had only 30 mg of radium as the source of radiation. But by making up for scarcity with skill, we were able to compete with Fermi's team in Rome, which had a gram of radium. Among our main achievements was the discovery of the inelastic scattering of neutrons.

In February 1939, I was working on the scattering of neutrons by uranium, when I read the paper by Meitner and Frisch on the discovery of fission. It occurred to me (as it did to others) that several neutrons should be emitted at fission, and it did not take me long to confirm it experimentally. This opened fateful possibilities: a chain reaction leading to the release of nuclear energy for peaceful purposes, but also to the atom bomb.

Work on a weapon of mass destruction went totally against my scientific ideals. I knew, however, that these ideals would be eradicated if, by the acquisition of the bomb, Hitler won the war.

Throughout the summer of 1939, I agonized over this dilemma. My scruples were finally overcome by the outbreak of the Second World War. By that time I was in Liverpool on a year's research fellowship, working with James Chadwick. In November 1939, I put to him that we should start research on the feasibility of the atom bomb. My rationale was that the only way to prevent Hitler from using the bomb, and winning the war, was for us too to have it and to threaten retaliation. It was never my intention that the bomb be used; we needed it to prevent its use.

After the research work in Britain established the scientific feasibility of the bomb, several of us were invited to join the Manhattan Project in Los Alamos. When, near the end of 1944, I learned that the German atom bomb project had been abandoned, I immediately resigned and returned to Liverpool.

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I learned about the "success" of the Manhattan Project when the BBC announced the destruction of Hiroshima. The use of the bomb on a civilian population shocked me deeply, and had a decisive influence on the rest of my life.

First, disgust about the misuse of science led to a radical change in the direction of my scientific research. I wanted to ensure that my work would be of direct benefit to people. The remaining 30 years of my academic life were spent on the medical applications of physics, at St. Bartholomew's Hospital in London.

My second decision arose from the fear—soon to be substantiated—that the use of the atom bombs on Japan would lead to a nuclear arms race and to the dire threat to humanity that a nuclear war entailed. It was vital to alert the general public, and especially the scientific community, about the new dangers and the need to avert them. I was one of the eleven signatories of the Russell-Einstein Manifesto (and now the only survivor), which called on scientists to take action. The outcome was the setting up of the Pugwash Conferences on Science and World Affairs.

During the Cold War, Pugwash's main task was to halt the arms race and to prevent the outbreak of a nuclear war. Our contributions toward this were recognized by the award—jointly to Pugwash and myself—of the Nobel Peace Prize in 1995. Our subsequent main objective has been the elimination of nuclear weapons. But we have also realized that this is only part of the story: To ensure the survival of the human species, we have to abolish war altogether.

I am increasingly concerned about the role of science and technology, both in day-to-day life and in the destiny of humankind. Whether directly through the development of new military capabilities, or indirectly through the uneven distribution of the benefits of new technologies, the future of civilization and the very existence of the human species is imperiled. Scientists bear much responsibility for this danger and must take steps toward its removal. Ethical considerations must become part of the scientist's ethos.

My childhood dream about science has become reality to a large extent. On the whole, we are now much better off, and most of the betterment is due to advances in science and technology. But these very advances have also increased the dangerous outcomes of a war. A war-free world may seem utopian, but the alternative is unacceptable.

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