

THE RESEARCH SCIENCE AND THE SHAPING OF MODERN LIFE REVOLUTION



A VIEWING AND DISCUSSION
PROGRAM IN
AMERICA'S LIBRARIES

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Session 1 Atomic Age The Atomic Age

The invention of nuclear weapons is the hallmark of a period of enormous significance often called the "atomic age." Although centered roughly on the last half of the twentieth century, it has a long history. The ancient Greeks speculated on the ultimate constituents of matter, which they called "atoms." The discussion resumed in the seventeenth century with the stirrings of what became modern chemistry. By the end of the nineteenth century, with an expanded knowledge, scientists felt fairly comfortable that they understood this basic building block. Their confidence was shaken, however, with the discovery of radioactivity in 1896 and the special theory of relativity in 1905. Both showed that the atom, thought to be unchangeable, actually decayed from one element into another, and that matter was not permanent. Not lost upon the scientists was the fact that the process of radioactive disintegration emitted large amounts of energy.

Over the next three decades the nucleus of the atom was revealed, quantum mechanics was invented, and nuclear fission in uranium was discovered. Fission, or the breaking apart of a nucleus, drew much attention, for it was immediately and widely recognized that if an expanding chain reaction that sequentially split uranium nuclei could be fashioned, both bombs and reactors were possible.

Scientists in the United States, who formerly had little influence in society and whose preference was for curiosity-driven research, within a few years found themselves part of a huge, well-funded, federal effort to make both bombs and reactors. The scientists were no more militaristic than they had ever been, but they feared that Hitler's scientists might make a bomb first, enabling Germany to win World War II. They thought in terms of deterrence, not actual use of the weapon.

The United States began a nuclear weapons program, the Manhattan Project, with Britain and Canada joining in. This effort culminated with the bombing of the Japanese cities of Hiroshima and Nagasaki in early August, 1945. Most Americans remain convinced that the atomic bombs ended the war and saved the lives of troops who otherwise would have been lost in a land invasion. Controversy remains, though, over the necessity for these actions. Domestic politics, egos, scientific curiosity, economics, international power politics, and morality are argued to this day.



Before (top) and after (bottom) mosaic view of Hiroshima, Japan. †

aberration it was a century ago.

The scientists themselves saw no reason to apologize for making nuclear weapons - the alternative of a Nazi victory was worse - but recognized that they were naive to think that the military would allow them to decide upon the bombs deployment. Most regretted use of the bombs against civilians. Over succeeding decades, many struggled for arms control treaties.

The atomic age, thus, means a number of things, including creation of awesome weapons of mass destruction, recognition by governments that science is too important to be left to the scientists, establishment of "big science" - large projects staffed by numerous teams of specialists blessed with federal largess, and the emergence of scientists into national politics as advisors, advocates, and critics of government plans. The social responsibility of scientists is no longer the



Major General Leslie R. Groves, in charge of the Manhattan Project. †

The atomic age also embraces civilian uses of the atom, primarily the employment of nuclear reactors to generate electricity, but also as propulsion plants for ships, energy sources for space travel, and earth-moving explosives for the construction of harbors and canals. Few of these applications have been successful, largely because of their potential dangers, cost-ineffectiveness, and the difficulty of disposing of radioactive waste.

Will the atomic age be only a half-century blip on the enormous pageant of history? Though historians usually make poor futurologists, my predictions are that nuclear weapons will become even less viable because of the incomparable destruction they cause. Nuclear reactors, on the other hand, are likely to enjoy a renaissance as waste disposal problems are resolved, fossil fuel deposits diminish and prices rise, and reactor emissions are recognized as contributing far less to global warming than burning coal and oil. We must hope that neither weapons nor reactors will prove to be Faustian bargains, which humanity may not win.

Further Reading:

- Boyer, Paul. *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age*. (New York: Pantheon Books, 1985)
- Rhodes, Richard. *The Making of the Atomic Bomb* (New York: Simon & Schuster, 1987)
- Rhodes, Richard. *Dark Sun: The Making of the Hydrogen Bomb* (New York: Simon & Schuster, 1995)
- Smith, Alice K. *A Peril and a Hope: The Scientists' Movement in America, 1945-47* (Chicago: University of Chicago Press, 1965)



"Trinity" explosion at Los Alamos, Alamogordo, New Mexico.†

Video:

- *Day After Trinity*, 88 minutes, Pyramid Media (1981)

† Still Picture Records LICON, Special Media Archives Services Division (NWCS-S), National Archives at College Park, 8601 Adelphi Road, College Park, MD 20740-6001 PHONE: 301-837-3530, FAX: 301-837-3621, EMAIL: stillpix@nara.gov

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