

# Oppenheimer and the atomic bomb essay



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## Julius Robert Oppenheimer and the Atomic Bomb

J. Robert Oppenheimer was a brilliant physicist and known as the Father of the Atomic Bomb. A charismatic leader of rare good qualities and commonplace flaws, Oppenheimer brought an uncommon sensibility to research, teaching, and government science. After help creating the atomic bomb with the Manhattan Project he was banned from the U. S. Government during the McCarthy Trials. He opposed the idea of stockpiling nuclear weapons and was deemed a security risk. Oppenheimers life reveals the conflict between war, science and how politics collided in the 1940s through the 1960s. His case became a cause "celebre" in the world of science because of its implications concerning political and moral issues relating to the role of scientists in government.

Oppenheimer, the son of German immigrants, who had made their fortune in textiles, had the resources available in his family to further his education at a young age. At age ten Oppenheimer's grandfather brought him some rocks to identify and as a result Oppenheimer became very interested in geology. This led him to study other sciences at a young age. By age six he had the vocabulary of an adult. He could speak well and understood the meanings of the words and where they came from. He excelled in mathematics and was computing numbers at a high school rate while in the second grade. People referred to him as a boy genius. Oppenheimer was from a Jewish family who did not believe in the Orthodox ways.

They had no temple affiliation, but did attend the Felix Alder Ethical School during grade school until high school. This school shaped many of

Oppenheimers ideas regarding morality and political views that would later affect his life.

He studied at Harvard and was good in the classics, such as Latin, Greek, chemistry and Physics. He had published works in poetry and studied Oriental philosophy. He graduated in 1925, it took him only three years, and went to England to do research at Cavendish Laboratory at the University of Cambridge. He didnt like it there and left at the end of 1925. A man named Max Born asked him to attend Gottingen University where he met prominent European physicists. Oppenheimer studied quantum mechanics in Europe in the 1920s. He learned from Ernest Rutherford, one of the pioneers of atomic theory; and from Werner Heisenberg and Paul Dirac, pioneers of quantum mechanics. He received his doctorate in physics while in Europe. He and Max Born developed the Born-Oppenheimer Method. The Born-Oppenheimer Approximation states that since nuclear motion is much slower than electron motion the electronic wavefunction, or energies, can be calculated assuming a fixed position of the nuclei and nuclear motion can be considered assuming and average distribution of electron density. On returning to the US, Oppenheimer pursued his study of Dirac's theory of the electron - proposing the existence of an anti-electron (equal in charge but positively, not negatively, charged) - a " positron", first seen by Carl Anderson in 1932. During the 1930s, Oppenheimer held positions at both the University of California, Berkeley and at the California Institute of Technology, enabling him to gather together a team of highly talented, young theoretical physicists. Berkley was known as the center of American Quantum Physicists at the time, because of Oppenheimers work.

In 1939 he took quantum mechanics into astronomy, proposing that the largest stars could collapse into “black holes” from which not even light could escape.

In the early twenties new scientific theory about the atomic structures was being discovered. He worked on quantum theory and trained an entire generation of United States born physicists. His method of teaching was very difficult and most students failed his classes, but they still took them and eventually passed them. He became interested with politics during the rise of Nazism in Germany in 1936, and he was also concerned over the Great Depression in the U. S. He sided with Spain in their civil war and became friends with many communists as a result of this. His brother, Frank oddly enough was a communist. Oppenheimer organized anti-Fascist organizations and was a known communist, but didn't officially join the communist party. Do to Stalins influence and oppression in Russia, Oppenheimer withdrew his communist support. In 1939 Oppenheimer married Katherine Harrison. They had two children, one boy and one girl.

As World War Two began in Europe in September 1939, Albert Einstein (a Jewish refugee from Nazi Germany as well as world-famous scientist) wrote to US President Roosevelt to warn of Nazi attempts to develop the atomic bomb. Roosevelt responded by ordering the Manhattan Project, development of the atomic bomb. From an initial budget of \$6, 000 the Project grew to cost \$2, 000, 000, 000 (in 1945 dollars – approximately \$50 billion now). From a small US research effort in 1939, the Project in 1943 involved hundreds of scientists from the US, United Kingdom, Canada, Australia and

other Allied countries - along with many Jewish scientists who had fled persecution in Nazi-occupied Europe.

To head the key bomb assembly installation at Los Alamos was the leading US physicist, J Robert Oppenheimer. The installation was located at Los Alamos because Oppenheimer knew the remote location as a holiday spot to “ get away from it all”. This is a government Laboratory that still exists today. The scientists succeeded. On 16 July, 1945 the Project team exploded the first test bomb at Alamogordo, 400 km south of Albuquerque, New Mexico. The explosion was equal to 20, 000 tons of TNT. Oppenheimer said, “ I have become Death, the destroyer of worlds.” Oppenheimer was working on the separation of Uranium-235. People like Edward Teller, Hans Bethe, Enrico Fermi, Seth Neddermeyer, and John von Nuemann were just a few of the people that came to Los Alamos. Richard Feynman also worked for Oppenheimer there. Heading up the project for the military side was General Leslie R. Groves. Groves choose Oppenheimer, because he was an effective organizer at Los Alamos due to his ability to quickly understand scientific ideas and his personal charisma was unmatched. Oppenheimer welcomed the chance to support the war effort and to finally play a major role in the scientific world. And he found the project “ technically sweet”. People marveled at how he seemed to understand any concept instantly. Almost everyone considered him to be their intellectual superior. He had the greatest memory anyone had ever seen. He seemed to keep all aspects of the Manhattan Project in his head, along with an impressive knowledge of the arts and literature.

In 1945 they succeeded in getting a developed bomb. On 6 August, 1945 the people of Hiroshima, and three days later the people of Nagasaki, felt the force of Oppenheimer's words. Six days later the Japanese surrendered and the War was over. Development of atomic weapons was not. Oppenheimer resigned in October, 1945.

A valuable lesson in history would be learned in time over this incident. "The physicists have known sin; and this is a knowledge they cannot lose", J Robert Oppenheimer, 1947. Germany surrendered that same year. He became Head of the Institute for Advanced Studies at Princeton University. He also was on the committee for the Atomic Energy Commission. In 1949 he opposed the use of a newly developed Hydrogen Bomb. Oppenheimer served as Chairman of the General Advisory Committee of the US Atomic Energy Commission (AEC) from 1947 to 1952. After the Russians exploded their own bomb in 1949, Edward Teller, one of Oppenheimer's former Manhattan Project scientists, proposed the US develop the Super, the hydrogen bomb. Oppenheimer and the General Advisory Committee opposed it. Atomic bombs were powerful enough. At the time Senator Joe McCarthy led the House Committee on UnAmerican Activities in a witch-hunt to expose all the "Communist" Americans "threatening" national security not only in Government but anywhere, even in Hollywood (some film directors and screen writers were "blacklisted" and could not work there for many years). Oppenheimer became suspect because of his opposition to the Super and because members of his family were alleged to have Communist sympathies. He was tried by a security hearing but found "Not Guilty of Treason". Nevertheless, in 1953, President Eisenhower dismissed

Oppenheimer, blacklisting him to deny him any government work. Scientists around the world protested about his trial, but to no avail.

In 1953, he was deemed a security risk. He was put on the stand at the McCarthy Trials. Here is an excerpt of the trial question and answer testimony:

Oppenheimer testimony

Robert Oppenheimer later discussed the reason for the test date in his Security Hearing in 1954. Oppenheimer was being questioned by his attorney Lloyd Garrison:

Q: As the work progressed, you began to get goals and deadlines, I suppose, against which to produce the bomb, if you could?

A: The deadline never changed. It was as soon as possible. This depends on when we were ready, when the stuff was ready, and how much stuff we needed.

Q: Wasn't there a particular effort to get it done before the Potsdam Conference?

A: Yes, that was of course quite late. After the collapse of Germany, we understood that it was important to get this ready for the war in Japan. We were told that it would be very important — I was told I guess by Mr. Stimson — that it would be very important to know the state of affairs before the meeting at Postdam at which the future conduct of the war in the Far East would be discussed.

Q: Discussed with the Russians?

A: I don't want to overstate that. It was my understanding, and on the morning of July 16, I think Dr. Bush told me, that it was the intention of the United States statesmen who went to Potsdam to say something about this to the Russians. I never knew how much. Mr. Stimson explained later that he had planned to say a good deal more than what was said, but when they saw what the Russians looked like and how it felt, he didn't know whether it was a good idea. The historical record as it is published indicates that the President said no more than we had a new weapon which we planned to use in Japan, and it was very powerful. I believe we were under incredible pressure to get it done before the Potsdam meeting and Groves and I bickered for a couple of days...

Source: United States Atomic Energy Commission, In the Matter of J. Robert Oppenheimer: Transcript of Hearing Before Personnel Security Board, Washington D. C., April 12, 1954, through May 6, 1954, pp 31-32.

Oppenheimer replied to the media that As long as men are free to ask what they must, free to say what they think, free to think what they will, freedom can never be lost and science can never regress. He was fired from the Atomic Energy Commission for his alleged alliance with communist Russia. But the Federation of American Scientists finally came to his defense. They ended up proving that the F. B. I used illegal phone taps and had doctored evidence against him. No one listened to them, until he was later cleared by President Johnson.



Kennedy also acknowledged Oppenheimer's greatness. Oppenheimer became the symbol of a scientist, who, while trying to resolve the moral problems that arise from scientific discovery, becomes the victim of a witch-hunt. This was the first case that a scientist's work could be used for immoral causes that he or she did not support. He spent the late years of his life trying to work out ideas regarding science and society. Ironically, he never won a Nobel Prize, which he was very concerned about winning to prove to himself and the world he was a great scientist. In 1963 Lyndon B. Johnson reinstated him and his reputation in the United States.

He immediately received the Enrico Fermi Award of the Atomic Energy Commission. He retired at Princeton in 1966 and died of cancer later that year. So in the end of his life Oppenheimer lectured to the world on science and education until his death. He gave the most attention to the issue of the nuclear arms race and tried to prevent it from happening, but was silenced by a government that disagreed with his ideas.

Oppenheimer resembled Just and Feynman in many ways. He most mimicked their scientific style through the political and non-scientific factors. Oppenheimer and Feynman were both Jewish. Because of this they both faced an initial prejudice due to their religion. Just was a black scientist so he had an initial prejudice placed on him. They all faced a barrier at the beginning of their scientific careers. Just could never clear the racist hurdle, because the trend in America was to neglect minorities at this time. A black scientist in America that could possibly be well respected was unheard of. Just became bitter at the American system of science and left for Europe.

Unlike Oppenheimer and Feynman, they stayed and cleared their initial prejudice hurdle. Once they cleared it they were accepted.

Oppenheimer was so intelligent people were mystified and afraid of his intellect they accepted him as a brilliant scientist. Feynman also was like this; he was very intelligent and proved to his colleagues that he was capable of greater achievements. Both of these men frightened their colleagues with their capacitance for knowledge. Just couldnt be accepted as a person. His colleagues accepted him as a scientist, but his family was shunned from the community in which he lived. Feynman and Oppenheimer were accepted as people and scientists. Just was just a scientist to be exposed by his colleagues as a black wonder, not a human being.

Oppenheimer was a trusting husband to his wife Katherine. Unlike Just who was a womanizer that had various affairs with white women in Europe. For a Black man this was seen as a huge mistake in the United States. He could have been lynched or killed in a hideous display of murder. Feynman had a wife, but liked to flirt with other women. He was a typical womanizer, but still had a somewhat faithful relationship with his wife. Oppenheimer had moral support from his wife like Just and Feynman. In all these cases having women in their lives made their science better.

Oppenheimer had willingly dedcided to work for the government. He did not know that his discoveries would be used in a negative way. He knew he was building a bomb and thought that nuclear war was evitable, but wanted to work out peace agreements instead of fighting. Oppenheimer had moral problems with the expansion of the bomb and he felt uncomfortable being

known as the father of the atomic bomb. Just worked for a government laboratory in Woods Hole, Massachusetts. He did his own work and research to benefit his knowledge. He really didnt care how his science was used in practical application; he just wanted acceptance.

Many of his embryology ideas became in common use. Feynman worked with Oppenheimer at Los Alamos Laboratory on the bomb project. He felt guilty about what he had done, but not to the point that Oppenheimer felt. Feynman liked his work their, but felt like his career didnt mean anything after the bomb project. There wasnt a challenge that excited him after the Manhattan Project. Basically, Oppenheimer realized that his knowledge was being used for corrupted purposes and didnt like it. Therefore he was tried as a communist during the McCarthy Trials. Feynman missed the challenge of the science he was doing. He too conversed with known communist spies, but he didnt know it personally. Feynman was sneaking around all the time writing coded messages and doing weird things. He would get away on weekends with the aid of an Englishmen named Fukes. He turned out to be a communist spy, without anyone ever knowing about it. Feynman didnt mind the work and why he was doing it. He saw it as a challenging job.

Oppenheimer realized what he was doing and disagreed with the moral justification of it. So Feynman and Oppenheimer were very similar in their political behaviors in unrelated ways. Just wanted a fair shake in life and became so angry with the system he left the country and didnt want to come back to it. He would have liked his ideas to be used on a wide scale and have them accepted. Just had to deal with people back stabbing him in order to debauch his theories and ideas. I feel Oppenheimer was most shaped by his

non-scientific factors in his life compared to Ernest Just and Richard Feynman.

Robert Julius Oppenheimer was a great scientist that was shaped from a religious upbringing and considered by many as a genius of his time. His deep religious upbringing is what led him to his moral temperament and allowed him to see the devastation the bomb would do before it was even dropped.

He stood his ground on his faith and morality in supporting his views. Even though he knew he would be incriminated in the Red Scare, he felt it necessary to stand firm in his beliefs. Like Just he too was backstabbed by a former colleague, Teller, when it came time for an important decision that affect many people. He is long remembered as the scientist who fought against his scientific knowledge and moral upbringing in order to create a world he thought would best for human society. Even though he was slowed down by the Red Scare, he fought through it and had his reputation blemished until Johnson reinstated him as an American Icon of science and discovery. Oppenheimer was a genius, scientist and a noble American.

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