Annotated Bibliography

Primary Sources

Einstein, Albert. “The Complaint of Peace.” *Einstein on Peace*, 1988, p. 355, isites.harvard.edu/fs/docs/icb.topic1385132.files/Readings/Einstein.pdf. Accessed 15 Mar. 2017.

This primary source article is written by Albert Einstein and decades later appears in a selections of Einstein writing book edited by a Princeton University economist and forward by renowned Bertrand Russell. “The Complaint of Peace” also appears on a Harvard website. It is reliable. In my paper, I use a quote from pages 246-7 to prove Einstein, forever a pacifist, made global peace efforts.

Einstein, Albert. *Einstein Archives Online.* 2 August 1939. (Archival Call Number: 39-468).

This is an original letter written by Albert Einstein on August 2, 1939 letter to President Franklin D. Roosevelt. His letter is archived in the Albert Einstein Archives, so it is credible. In order to access these archives, I wrote an email to the appropriate address in Israel. I received a reply back with a digital copy of the Einstein’s original letter. This primary source proves that immediately after the discovery of designing the first nuclear reactor in the Columbia University labs, the physicists realized the potential for harm if this information was in the wrong hands, for example the Nazis. I intend to use it in my paper as the lead in to the Einstein–Szilard letter sent to the White House addressed to President Franklin D. Roosevelt on August 2, 1939 (also has an October 11, 1939 date

due to the day Roosevelt acted on this information) which warned that Germany might develop atomic bombs. The letter proposed the United States should start its own nuclear program and set in motion the Manhattan Project which developed the first atomic bomb. This important source proves that Einstein never foresaw the harmful use of his theories. I will quote from it in my paper and reproduce the first page on my website.. The letter is called the Einstein-Szilard letter. This is because Einstein sent the letter to President Roosevelt, but Szilard wrote it. Leo Szilard was a Jewish Hungarian-born physicist who fled mainland Europe in the 1930s and settled in England. He often worked with Einstein, and their collaboration is an example of the international efforts that existed during the buildup to the Atomic Age.

Einstein, Albert. *Einstein Archives Online.* 10 September 1945. (Archival Call Number: 56-894).

The September, 1945 letter to Robert J. Hutchins, the president of the University of Chicago, is an original primary source. This typed letter is written by Einstein himself. It shows Einstein's first reaction to the news about Hiroshima and Nagasaki atomic bombs and predicts the Cold War on the 1950-60's. In his typed 1945 letter, Einstein says, "For me the problem is a purely political one" (Einstein 1). I will use it in my paper to lead into the Cold War after WWII , show pacifist Einstein's international political efforts toward governmental solutions to war and to educate the general public. Einstein warns that as long as nations demand unrestricted sovereignty we shall undoubtedly be faced with wars fought with bigger and technologically more advanced weapons. Einstein thinks the most important task of intellectuals is to make this clear to the general public

and to emphasize over and over again the need to establish a well-organized world government. They must advocate the abolition of armaments and of military secrecy by nations.

Einstein, Albert. *Einstein on Politics His Private Thoughts and Public Stands on Nationalism, Zionism, War, Peace, and the Bomb.* Edited by Rose, David E. and Robert Schulmann, Princeton University Press, 2007.

Editor David Rose has edited more than seventy published books, both fiction and nonfiction. “Dave appreciates the interdependence of clear writing with clear thinking.” During the war, Rose flew 34 missions in Lancaster bombers and then became a producer for the respected BBC. Robert Schulmann was editor of the Collected Papers of Albert Einstein and director of the Einstein Papers Project and therefore is a respected source for Einstein information. This primary source of a collection of Einstein’s writings is reliable. Because Albert Einstein was also very political, although a pacifist most of his life, I will use several original writings to show historical context and his political views and give historical context from WWI through the 1950’s. In Einstein Archives 28-001: CPAE 7, Doc. 14e dated November 13, 1918, Einstein writes “On the Need for a Legislative Assembly”. Here Einstein shows his political beliefs, in democracy and need to create a legislative assembly. Indeed, one year after this speech, a legislative-representative system and elections triumphed, not long after the armistice in Europe. That milestone was soon dashed and Einstein, a supporter of the German

Democratic Party of liberal, middle-class, was labeled a Communist and anarchist by a shoddy German newspaper confusing Einstein with someone with a similar name, but not before the damage to Albert Einstein's reputation was done. My quote gives historical context about the political repression after WWI. Despite Einstein and other pacifists' efforts, political repression only increased under the Nazi Party until the end of WWII. The political situation worsened and economic strife continued through 1921, making funding for scientific research scarce. In "The Plight of German Science: A Danger for the Nation", Einstein writes in 1921 about the need to exchange scientific ideas too. "If scientific research crumbles, the intellectual life of the nation shuts does and, with it, numerous possibilities for future advancement" (Einstein 91). In 1945, Einstein gives a speech at the fifth Nobel anniversary dinner held at the Hotel Astor in New York called "The War is Won, but the Peace is Not" (Einstein 382) which also becomes a famous quote. In 1946, Einstein is appointed chair of the Emergency Committee of Atomic Scientists (ECAS) and campaigns for an international framework for the control of nuclear energy. Here is what he says in a New York Times interview titled "The Real Problem is in the Hearts of Men", New York Times Magazine, 23 June 1946; N & N 1960, 383-388: "a new type of thinking is essential if mankind is to survive and move to higher levels… In previous ages a nation's life and culture could be protected to some extent by the growth of armies in national competition. Today we must abandon competition and secure cooperation… Modern war, the bomb, and other discoveries or inventions, present us with revolutionary circumstances" (Einstein 383). Pacifist Einstein

goes on to say: “We are still making bombs and the bombs are making hate and suspicion” (Einstein 385). Einstein’s organizational answer is education. “This belief of physicists promoted our formation of the Emergency Committee of Atomic Physicists, with headquarters at Princeton, N.J., to make possible a great national campaign for education on these issues, through the National Committee on Atomic Information” (Einstein 387).

Orwell, George. “You and the Atomic Bomb.” *George Orwell’s Library,* 19 Oct. 1945, p.1, orwell.ru/library/articles/ABomb/english/e_abomb. Accessed 21 Feb. 2017

Pen name George Orwell, for Eric Arthur Blair, was a respected English novelist and critic known for his political stances on social injustice, opponent of totalitarianism and supporter of democratic socialism. This chilling look at the future was written two months after atomic bombs were dropped over Hiroshima and Nagasaki, Japan by world renowned author George Orwell. It was first published in London’s *Tribune on* October 19, 1945 and later reprinted in ‘The Collected Essays, Journalism and Letters of George Orwell’ — 1968. It is said “You and the Atomic Bomb” laid the groundwork for his famous novel, *Nineteen Eighty-Four*. Orwell’s essay from the Orwell library is a reliable source. I use a quote at the beginning of my paper to show the public’s fear and confusion over the dropping of an atomic bomb.

Roosevelt, Franklin D. “Albert Einstein and the Atomic Age,” *Einstein and the Bomb*, 1988, p. 256, isites.harvard.edu/fs/docs/icb.topic1385132.files/Readings/Einstein.pdf. Accessed 15 Mar. 2017.

This October 19, 1939 letter is from President Franklin D. Roosevelt and is written from The White House, so it is credible. It is printed in a book edited by a Princeton University economist, Otto Nathan, forward by renowned Bertrand Russell. It is on the Harvard University site too. President Franklin D. Roosevelt acted at once to Albert Einstein’s earlier letter, warning him the Nazi’s might be making a bomb. Eight days after receiving Einstein’s letter, the President writes from The White House: “I found this data of such import that I have convened a board consisting of the head of the Bureau of Standards and a chosen representative of the Army and Navy to thoroughly investigate the possibilities of your suggestion regarding the element of uranium” (Roosevelt 1). I use this original, presidential letter in my paper.

Secondary Sources

“Albert Einstein – Father of the Atomic Age.” Biography.com, 2017-TV-14 3:44, . Accessed 21 Feb. 2017.

Biography.com is a respected website from A&E Television Networks, LLC for information about famous people, so it is a credible, educational company. This secondary source webpage is title “Albert Einstein – Father of the Atomic Age”,

therefore here is proof that Albert Einstein is called Father of the Atomic Age. On this site, there is a good summary of the Nazi era through to the final firebombs that ended WWII. In my paper, I use quotes about Einstein's title as the Father of the Atomic Age and his biographical background. In my paper, I use this source as proof that Einstein is a product of the Enlightenment, because he was uninhibited by the dictates of religion in his scientific explorations. German-born Albert Einstein is an example of European exceptionalism, because he was considered to be the genius of his time. This source has a summary of how Einstein's theories led to the Manhattan Project that developed the atomic bomb, although pacifist Einstein did not take a direct part in the implementation of the project. In fact, he took global steps to curtail the use of the a-bomb by founding the Emergency Committee of Atomic Scientists with fellow Jewish physicist, Leo Szilard. Physicists from around the world took international efforts toward peace.

Brain, Denis. *Einstein A Life.* John Wiley & Sons, Inc., 1996

Author Brian Denis is a journalist, reporter for the Irish News Service and author of many books, so he is a reliable source. This historical book is a valuable secondary source for political context and historical background. I use it to show the social climate in Europe during the rise of the Nazi party, how intellectuals were treated by the Nazis, "fake news" and Nazi propaganda. In my paper, I quote the story how Einstein became a refuge and the burning of his books back in Nazi Germany.

"The Burning of Books." *The History Place The Triumph of Hitler*, 2001,

www.historyplace.com/worldwar2/triumph/tr-bookburn.htm.

This secondary source has provided educational informational about landmark events in history for students since 1996. It including an entire section of "The Triumph of Hitler." It is a reliable source and from it I use a picture of the book burnings in Berlin. In 1930's Germany, intellectualism was decried and books from private homes and public libraries are burned. "Propaganda was rampant and its chief, Joseph Goebbels, gave the book burning an official stamp of approval by climbing to a rostrum, his face flushed by the flames, to yell, "Intellectualism is dead. The German national soul can again express itself" (Brain 246).

"Cold War international politics." Encyclopædia Britannica, 2017, www.britannica.com/event/Cold-War. Accessed 19 Jan. 2017.

This source is the respected The Encyclopædia Britannica, published by Encyclopædia Britannica, Inc. The Britannica is the oldest English-language encyclopedia still in production, first published around 1768. This educational research institution is a credible source, and my quote is written by The Editors of Encyclopædia Britannica. In my paper, I use this source to define what the Cold War is because I never studied it before. "Cold War**,** the open yet restricted rivalry that developed after World War II between the United States and the Soviet Union and their respective allies. The Cold War was waged on political, economic, and propaganda fronts and had only limited recourse to weapons. The

term was first used by the English writer George Orwell in an article published in 1945 to refer to what he predicted would be a nuclear stalemate between “two or three monstrous super-states, each possessed of a weapon by which millions of people can be wiped out in a few seconds”” (Cold 1).

David, Saul. “How Germany lost the WWI arms race.” *BBC*, www.bbc.com/news/magazine-17011607. Accessed 12 Apr. 2017.

The BBC is a major educational and news outlet in England. Writer Saul David is Professor of War Studies at the University of Buckingham. Therefore, this is a reliable source, from which I use two photographs and many quotes about the weapons industry that grew up during WWI and WWII. According to this article, England’s newly re-geared economy toward weapon making is the reason the allies won WWI and WWII. “The new ministry set about building munitions factories across the country, and transforming the civilian economy to one completely geared towards war” (David 1). “The manufacture of munitions played an even bigger role in World War II… In World War II, the Allies dropped 3.4 million tons of bombs across Europe and Asia” (David 1).

Devons, Samuel. “I.I. Rabi: Physics and Science at Columbia, in America, and Worldwide.”

Alumni Magazine, Summer, 2001, www.columbia.edu/cu/alumni/Magazine/Summer2001/Rabi.html. Accessed 30 Nov. 2016.

This historical article appeared in the Alumni Magazine for one of the most prestigious universities in the world, so it is credible. It is educational, research information about the international diplomacy efforts of Columbia University Professor Rabi during WWII, and afterwards via his international conference on "The Peaceful Uses of Atomic Energy". Rabi is considered a “Living Legacy” and there is “a standing ovation for Rabi after he teaches his last class” (Devons 1). In my paper, I use information for historical context about the importance of European physicists until American gained prominence in the 1930’s. There are many quotes about the early stages of developing the a-bomb by physicists who were refugees and immigrants from Europe. War became an industry of weapon-making all around the world. This quote is symbolic of the increase in the weapons industry and lifestyle changes of workers to support it at the beginning of World War II. “Rabi's-and Pupin's-wartime transformation was swift and effective. In November 1940, Rabi closed down his molecular beam laboratory in Pupin and transferred his energies to radar development” (Devons 1). Like Einstein, physicist I. I. Rabi suggested an organization method to assume WWII did not happen again.

"'Fat Man' Atomic Bomb." National Museum of the US Air Force, 22 Apr. 2015, www.nationalmuseum.af.mil/Visit/MuseumExhibits/FactSheets/Display/tabid/509/Article/196220/fat-man-atomic-bomb.aspx.

The clue that this source is credible is the museum's title: National Museum of the US Air Force. I will use a U. S. Air Force photo in my project. From this source, I found the specs on the bombs that ended WWII, used in my paper.

Fessenden, Marissa. "The Health Effects of the Atom Bomb Are Still Being Studied: Studies of Hiroshima and Nagasaki survivors influence worldwide radiation standards, even 70 years later." *Smithsonian.com*, www.smithsonianmag.com/smart-news/how-bombings-hiroshima-and-nagasaki-still-inform-health-today-180956185/. Accessed 6 Apr. 2017.

This secondary source is the prestigious science magazine, named after the famed museum, and the author is a science journalist and frequent contributor to this educational publication. Therefore, it is a credible source. In my paper, I use quotes about the effects of the two atomic bombs on the Japanese people. "The atomic bombs' immediate effects devastated both cities and killed between 150,000 and 246,000 people. But the psychological toll of radiation may be one of the most enduring parts of the bombs' legacy" (Fessenden 1). "Studies with 94,000 survivors through an American-Japanese partnership called the Radiation Effects Research Foundation, RERF, indicate that the risk of most cancers doubles with a doubling of radiation exposure" (Fessenden 1).

Galison, Peter. “The Einstein Revolution,” edX, Inc. HarvardX, Mar. 2016, online-learning.harvard.edu/course/einstein-revolution?keywords=physics. Accessed 23 Dec. 2016.

edX is an educational website for top academic institutions. The author of this HarvardX course is Peter Galison. He is the Pellegrino University Professor in History of Science and Physics at Harvard University. He received his Ph.D. from Harvard in Physics and the History of Science in 1983. His publications include *Image and Logic: A Material Culture of Microphysics* and *Einstein's Clocks, Poincaré's Maps: Empires of Time*. His most recent co-authored book is titled *Objectivity*. This is a credible source. This is an online course from Harvard Online is called “The Einstein Revolution”. This link is a 14-week online course, assuming the viewer puts in about 5-7 hours/week. It covers the life and work of Albert Einstein, the changing role of physics in the 20th and 21st centuries, Einstein's engagement with relativity, quantum mechanics, Nazism, nuclear weapons, women physicists, philosophy, fascism, socialism the arts, and technology. I watched this course for historical context from 1920- 1950, because I never studied that social history time period before. From these lessons, I garnered historical context for my paper from these specific lessons: for example, in 1920’s pre-Nazi times, physicists, artists, and philosophers intermingled internationally, but eventually intellectuals and artisans were discriminated

against by the rising Nazi Party. The site gives accounts of their lives on the run as the Nazi power grew.

"The Vienna circle also had to flee. Carnap made it to the United States, barely escaping with his life. Otto Neurath got across the English Channel in a rowboat. Moritz Schlick was assassinated in 1936. Philipp Frank made it to the United States, but it was really a brutal time. At one point, Neurath wrote that Bertolt Brecht had come over, and that everybody was gathering what little money they could make, and put together some form of an escape route, but many it already landed in some of the worst concentration camps" (Galison 1).

At the end of Lesson 7, it talks about women physicists and international efforts to make nuclear weapons: "These discoveries [of nuclear fission by Lise Meitner] quickly cascaded in work that was done in the United States and Britain…And [they] led, in very short order, to the creation of nuclear weapons programs in Germany and in the United States" (Galison 1).

Green, Nancy V. and Eric Ward. "The Atomic Age: The Discovery and Evolution of Nuclear

Science." A Linde Hall Library Online Exhibition Linde Hall Library, atomic.lindahall.org/timeline.html. Accessed 21 Feb. 2017.

This gallery exhibition was on display at the Linda Hall Library, Kansas City, MO from October 6, 2010, to March 11, 2011. It was curated by Nancy V. Green and Eric Ward. A public library is a reliable source. There are different dates for the beginning of the Atomic Age. This educational link from a library organization gives a start date of 1895. For my project, I use the entire timeline in an appendix, and paraphrase from it starting with the year 1940, because that is the year when the components for building the a-bomb was begun. I will pay particular attention to physicist Fermi who was at Columbia University not long after he escaped fascist Italy and before he went to Chicago. Not long after Fermi was at Columbia, The Manhattan Project began.

Gutfreund, Hanoch and Renn, Jürgen. *The Road to Relativity The History of Meaning of Einstein's "The Foundation of General Relativity" featuring the Original Manuscript of Einstein's Masterpiece*. Princeton University Press and The Hebrew University of Jerusalem, 2015.

This source is credible because the manuscript was written by Albert Einstein. Additionally, the commentary places Einstein's remarkable handwritten theory in historical and scientific context. The commentary is by two Einstein experts. One is Theoretical Physicist Hanoch Gutfreund, a professor emeritus at the Hebrew

University of Jerusalem. Professor Gutfreund has held the Andre Aisenstadt Chair in theoretical physics since 1985. The first Board of Governors of this prestigious university included Albert Einstein, Sigmund Freud, Martin Buber, and Chaim Weizmann. Also, Hanoch Gutfreund is academic director of the Albert Einstein Archives. The other Einstein expert is Jürgen Renn, Director at the Max Planck Institute for the History of Science in Berlin. For my project, I used a quote from the very first paragraph of the first chapter, "Einstein's Intellectual Odyssey to General Relativity" because it shows how revolutionary Einstein's Special Theory of Relativity was for its time. This same theory lead to the Atomic Age. "Einstein's famous 1905 papers shook the foundations of classical physics" (Gutfreund 7). I also use information on page 11 about Einstein's educational opportunities, a product of the scientific revolution and Enlightenment.

"I.I. Rabi Scholars Program." Columbia College, 2017, www.college.columbia.edu/academics/rabi.

This secondary source is the website of prestigious Columbia University. Therefore, it is a reliable source. From it, I use a picture of Professor I. I. Rabi from a page about his scholarship fellowships for outstanding students. Theoretical Physicist Israel Isaac Rabi was a Columbia University Professor and Nobel laureate for his 1944 discovery of nuclear magnetic resonance. His leadership on the Manhattan Project, diplomacy efforts, and frequent European trips were crucial to a successful, collaborative effort. After WWII, he used the

same skills on his international conference, "The Peaceful Uses of Atomic Energy". There was “a standing ovation for Rabi after he teaches his last class” (Devons 1). At Columbia, the Rabi Scholars Program was established in memory of I. I. Rabi.

“Little Boy and Fat Man.” *Atomic Heritage Foundation*, 2017, www.atomicheritage.org/history/little-boy-and-fat-man.

The Atomic Heritage Foundation is a non-profit dedicated to preservation and interpretation of the Manhattan Project and *Atomic* Age. From this prestigious site, I use a photograph of one bomb that ended WWII. “Little Boy was the name of the atomic bomb dropped on Hiroshima, Japan on August 6, 1945, by the bomber plane *Enola Gay*, piloted by Colonel Paul Tibbets” (Pickover 388).

Marks, Robert B. *The Origins of the Modern World: A Global and Environmental Narrative from the Fifteenth to the Twenty-First Century.* 3rd ed., Rowman and Littlefield, 2007.

This historical college book is written by Whittier College’s Richard & Billie Deihl Distinguished Professor of History. As it is a Social Studies reading assignment for a CSS class, it must be reliable. In my paper, I use this secondary source for quotes about how World War II ended, M.A.D., and I.C.B.M.s.

Mindich, Talia. “8 Things you didn’t know about Franz Ferdinand.” *PBS Newshour*,

www.pbs.org/newshour/updates/8-things-didnt-know-franz-ferdinand/. Accessed 13 Apr. 2017.

This publication is the prestigious PBS Newshour and Talia Mindich is a regular contributor to PBS and the Washingtonian, writing social education articles. Hence, this is a reliable source. From it, I will use a primary source illustration on my website depicting "The assassination of Franz Ferdinand and his wife, Sophie Chotek, on their state visit to Sarajevo" (Mindich 1). It is the famous illustration that was published in the French newspaper Le Petit Journal days after the assassination. This original work of art helped spread the horror of the shooting of the heir to the Austro-Hungarian Empire. For many, this assassination was the beginning of the end of Habsburg rule, the Austro-Hungarian Empire and Imperialism; Franz Ferdinand and his wife were driving through Sarajevo, part of the Austro-Hungarian Empire in summer 1914, when they were shot by a local Serbian. WWI started not long afterwards, when Austro-Hungary declared war on Serbia.

"The Nobel Prize in Physics 1938," *Enrico Fermi Nobelprize.org*, 1938,

www.nobelprize.org/nobel_prizes/physics/laureates/1938/fermi-bio.html.

This secondary source is the website for the prestigious Nobel Prize organization, so it is reliable. From it, I use a photograph of Enrico Fermi who won the 1934 Nobel Prize in Physics. In my paper, I use historical content. The 1930's political

climate in Germany and Italy was very anti-intellectualism and many physicists feared for their lives. Many of the physicists working on the early stages of the a-bomb escaped Europe and settled in England and America. Italy's top physicist, Enrico Fermi, escaped Mussolini's fascist government and settled first at Columbia University where in 1939–1940, he worked with other physicists including Einstein and CU Chemistry Professor Urey (1934 Nobel Prize for Chemistry for his discovery of the heavy form of hydrogen known as deuterium) on a federally funded project to find suitable graphite for Fermi's uranium assembly—the beginning stages toward making an a-bomb.

Norton, John D. "How Hume and Mach Helped Einstein find Special Relativity." *University of Pittsburgh*, 2005, <pdfs.semanticscholar.org/e4f5/fc1378af01ca10cfa1423ce77d2cef2270b2.pdf>. Accessed 18 Dec. 2016.

This secondary source website is an academic institution and a forum for scholarly/research information. The writer of this science and philosophy article is a distinguished professor in the Department of History and Philosophy of Science at the University of Pittsburgh. Therefore, it is credible and I use it in my paper. This article explains how theoretical physicist Albert Einstein "connected all the dots" when mathematicians and others could not. It is important because gave Einstein the edge in his revolutionary discoveries and shows the interconnectedness of different fields of studies. Einstein looked to the nature of

the concepts of two philosophers, Hume and Mach, when inventing his physics theories. It is no secret that Albert Einstein was inspired by philosophers: "Einstein's avowal of intellectual debts to Hume and Mach have long been recognized and examined" (Norton, 2). Theoretical physicist Albert Einstein was inspired by selective parts of these philosophers' writings, in particular their accounts on the nature of concepts, to think "outside-the-box" in formulating his revolutionary theories. When this acknowledged genius applied Hume's and Mach's views on concepts to scientific theories, Einstein found a new path to rethink early 20th century physics. This radical way of thinking is the creative edge theoretical physicist Einstein had over mathematicians who worked on parts of the theory. In 1915, "He [Einstein] informed [philosopher Moritz] Schlick that he [Einstein] studied Hume's "treatise on understanding,"" shortly before finding relativity theory" (Norton, 20). Philosophers were discriminated against by Nazis.

Pickover, Clifford A. *The Physics Book: 250 Milestones in the History of Physics*. Barnes & Noble, Inc., 2013.

The author of this secondary source book is a respected writer of numerous math and science resource books. In addition, Clifford Pickover is Editor-in-Chief of the *IBM Journal of Research and Development*, so his book is credible.
One quote I use from the Chapter "1945: Little Boy Atomic Bomb" to give background information one bomb that ended WWII. I use this quote in my paper to inform or remind the reader of the closing events of WWII and introduce them

to the atomic bomb. The destruction caused by such nuclear fission by *Little Boy* marked the end of World War II in Japan. “Over a period of time, as many as 140,000 people were killed – roughly half due the immediate blast and the other half due to the gradual effects of the radiation” (Pickover 388).

Schweber, Silvan S. “Einstein and Nuclear Weapons.” *Einstein for the 21st Century His Legacy in Science, Art, and Modern Culture*, Edited by Galison, Peter L. and Gerald Holton and Silvan S. Schweber, Princeton University Press, 2008.

This historical book is a collection of articles by world renowned physicists include Harvard Professor Peter Galison. The author of the article “Einstein and Nuclear Weapons” is an American theoretical physicist and science historian. Silvan S. Schweber is Professor of Physic and Emeritus Richard Koret Professor in the History of Ideas at Brandeis University. In 2011, he won the Abraham Pais Prize for History of Physics. This secondary source is reliable. In my paper, I will use this quote that shows the steps toward building a nuclear bomb and it is not on the timeline found elsewhere. The early stages of building the bomb happened in Columbia’s Pupin labs, by primarily physicists who had escaped Europe.

I use also a quote that the Nazis might have the capability to develop a-bombs and Einstein’s reaction to learning from fellow Jewish physicist Szilard that “his experiments establishing secondary neutron emissions in fission and of his calculations indicating the possibility of a chain reaction in a uranium pile moderated by graphite, Einstein exclaimed: ‘That never occurred to me! [*Daran*

habe ich gar nichts gedacht]'" (Schweber 75). Einstein never thought about the harmful effects of his experiments.

Shara, Dr. Michael M. "Peace and War The Manhattan Project." Einstein's Revolution, www.amnh.org/exhibitions/einstein/peace-and-war/the-manhattan-project/. Accessed 15 Jan. 2017.

This source is the American Museum of Natural History, so it is a credible, educational organization. It is a major U. S. museum website and contains educational research information. In my paper, I used this site for many facts, including proving 1938 Germany could build an a-bomb. These details prove why the world had reason to be concerned that the Nazi knew how to build an atomic bomb: "In 1938, three chemists working in a laboratory in Berlin made a discovery that would alter the course of history: they split the uranium atom. The energy released when this splitting, or fission, occurs is tremendous--enough to power a bomb. But before such a weapon could be built, numerous technical problems had to be overcome" (Shara 1).

Shara, Dr. Michael M. "Peace and War Nuclear Arms Race." Einstein's Revolution,

www.amnh.org/exhibitions/einstein/peace-and-war/nuclear-arms-race. Accessed 15 Jan. 2017.

This source is the American Museum of Natural History, so it is a credible, educational organization. It is a major U. S. museum website and contains educational research information. “Einstein Revolution” curator lists facts about the escalating nuclear arms race. In my paper, I use facts about the Cold War that lasted for four decades and proof of Einstein’s peacemaking efforts from page 1.

Strayer, Robert W. *Ways of the World*. 2nd ed., Bedford/St. Martin, 2013.

Robert W. Strayer has his Ph.D. from University of Wisconsin. In Ethiopia, Strayer taught high school world history and at varied universities around the world. He received the Chancellor's Awards for Excellence in Teaching and for Excellence in Scholarship. In my paper, I use quotes from this secondary source textbook about the global environmental impact of the nuclear arms and energy from page 1169.

“Trinity Test - 1945.” *Atomic Heritage Foundation,* 2017, www.atomicheritage.org/history/trinity-test-1945.

The Atomic Heritage Foundation is a non-profit dedicated to preservation and interpretation of the Manhattan Project and *Atomic* Age. From this prestigious site, I use information in my paper about the world’s first nuclear device, the

‘Gadget”. It was detonated in the New Mexico desert as a test, a prototype of the Fat Man bomb dropped on Nagasaki, Japan. Some date this nuclear test as the beginning of the Atomic Age.

Vujovic, Dr. Ljubo. “Albert Einstein (1879 - 1955).” Tesla Memorial Society of New York Website, www.teslasociety.com/einstein.htm. Accessed16 Jan. 2017.

This article was written by the Secretary General for the respected Tesla Memorial Society of New York, so it is a credible organization. It is an institution in honor of famed Serbian-American inventor Nikola Tesla. The site has an educational article about the early stages of the Atomic Age which I use in my paper. For example, from page one, there are facts about the early stages of The Manhattan Project in Columbia’s Pupin Hall that prove how international it became, despite its naming after the island in New York City. In my project, I use many photographs, including one of Albert Einstein (1879-1955), the mastermind behind the quintessential equation, who created his Special Relativity theory in 1905. Most people credit Albert Einstein as the Father of the Atomic Age (Albert 1). Many do not know Einstein was a lifetime pacifist, for which he was heavily discredited in the Nazi propaganda during the 1930’s. While history records Einstein as a genius, the Nazi’s called their fellow German a “puffed up bit of vanity” (Brain 244) and raided Einstein’s home while on a trip to America. At age 54, Einstein found himself a refugee and ended up making Princeton, NJ his hometown. “It was a great occasion for Princeton. As science writer Ed Regis

noted, “Virtually overnight, Princeton was transformed from a gentleman’s college town into a world center for Physics”” (Brain 251). I also use a photograph relating an atomic bomb explosion to $E=mc^2$. From this source, I also use an image of the Einstein–Szilárd letter to President Franklin D. Roosevelt. “In 1938, three chemists working in a laboratory in Berlin made a discovery that would alter the course of history: they split the uranium atom” (Shara 1). In reaction, Einstein wrote a letter to **“**President Franklin D. Roosevelt to alert him of the possibility of a Nazi bomb and to galvanize the United States to create its own nuclear weapons” (Albert 1).