AFTER OPPENHEIMER

"Now, I am become Death, the destroyer of worlds."

J. Robert Oppenheimer[1]

"In our new age of terrifying, lethal gadgets, which supplanted so quickly the old one, the first great aggressive war, if it should come, will be launched by suicidal little madmen pressing an electronic button. Such a war will not last long and none will ever follow it. There will be no conquerors and no conquests, but only the charred bones of the dead on an uninhabited planet."

William L. Shirer

Today I watched the movie *Oppenheimer*. It was a sobering account of the *Manhattan Project*—a massive, secret government-sponsored undertaking that employed more than 130,000 people and cost nearly two billion dollars (more than $30 billion in today's dollars)—to develop an atomic bomb during World War II. Over 90 percent of the cost was for building factories and producing fissile materials, with less than 10 percent going toward development and production of the actual weapons.

My youngest sister Katy and my first cousin Tom went with me to watch the movie. The day before, Tom and his wife Felicia drove Ima and I around Lebanon, Ohio—we are staying with Tom and Felicia while our house is being finished—and we went by the elementary school I attended so many years ago. The thing I remember most about the school was the regular exercises our classroom had in the event of an

[1] Oppenheimer's famous quote is from the *Bhagavad Gita*, a 700-verse Hindu scripture written in Sanskrit, and centers on a dialog between the great warrior prince (Arjuna) and his charioteer Lord Krishna (an incarnation of *Vishnu*). Hindu thought has a non-linear concept of time, and the great god is involved not only in the creation, but also the dissolution of creation. In the quote above, "death" literally translates as "world-destroying time." The meaning of the passage which so appealed to Oppenheimer: no matter what Arjuna does, everything is in the hands of the divine. See, James Temperton, "'Now I Am Become Death, the Destroyer of Worlds.' The Story of Oppenheimer's Infamous Quote," *WIRED* (Science), Jul. 23, 2023. For an article describing the adverse response in India concerning Director Christopher Nolan's combination of a sex scene with the sacred Hindu text, see Naman Ramachandran, "'Oppenheimer' Sacred Text Reading Sex Scene Raises Hackles in India: 'This is a Direct Assault on Religious Beliefs of a Billion Tolerant Hindus,'" *Variety,* Jul. 23, 2023.

emergency: a sudden tornado, or a nuclear attack. We were taught to huddle under our desks and move away from the windows. That was the days of fallout shelters, civil defense shelters, movies about nuclear war—the ever-present fear of extinction.

We don't do that anymore.

Why?

It certainly isn't because the threat of nuclear annihilation has lessened. Putin's bomb-rattling, North Korean threats, Xi's aggressive policies, and—quite honestly—the utter incompetence of our own political leadership (in both parties), makes this world more dangerous than ever. So why aren't we equipping our population, especially our children, with survival skills in the event of a nuclear holocaust? When was the last time you participated in such a drill? Do you know where your nearest civil defense shelter is located? Is there one? Do you have the goods stored away to survive a nuclear winter?

The uncomfortable truth is that the government has made a policy decision to allow ordinary American citizens to fend for themselves. Senior government officials will be whisked away to elaborate underground facilities. The elites have their own survival plans. What about you?

The movie *Oppenheimer* provoked these thoughts and stimulated these memories (as well as the political commentary). Bottom line: the world changed dramatically with the success of the *Manhattan Project* and the increased role of physicists, scientists, and technicians in the process of waging war. It is impossible to stuff the Genie back into the bottle.

By any standard of measure, the *Manhattan Project* was one of history's remarkable achievements. The origin of the program traced back to a letter by Albert Einstein to then President Franklin D. Roosevelt warning that new developments in physics opened the prospect of a new superweapon and that scientists in Nazi Germany were well on their way to developing such a weapon.

The movie largely focused on the herculean effort of physicist J. Robert Oppenheimer to gather a top-secret team of US, British and Canadian physicists and engineers to produce the world's first nuclear

weapons. Oppenheimer was the director of the Los Alamos National Laboratory that designed the actual bombs. In addition, the movie focused on the subsequent McCarthy-era investigation of Oppenheimer and his fellow left-leaning scientists and educators and—in typical Hollywood fashion—included a couple gratuitous sex scenes (the real Oppenheimer was a bit of a womanizer). As portrayed in the movie, the project was under the direction of Major General Leslie Groves of the US Army Corps of Engineers.

Historically, the project began modestly in 1939, when it took over from its earlier British counterpart "Tube Alloys." From 1942-1946, two types of bombs were developed: a relatively simple gun-type fission weapon using a rare isotope uranium-235 and a more complex plutonium implosion-type weapon. Most of the uranium enrichment was done at Oak Ridge, Tennessee; for the plutonium, reactors were built at Oak Ridge and at Hanford, Washington. Much of the preliminary work was done by agents who rounded up German personnel and documents associated with the German project.

Allied propaganda convinced the Japanese populace that we had numerous Hiroshima and Nagasaki-type bombs: in fact, at the time, we only had two such devices.

In a decision to save millions of American lives—Stalin hoped that invading the Japanese home islands would seriously "bleed" the Americans—President Truman dropped the "Little Boy" (uranium device) on Hiroshima and the "Fat Man" (plutonium device) on Nagasaki to force Japan out of the war. (By the way, Truman does not come off well in one of the movie scenes).

More to the purpose of this missive, the movie chased me back to my notes from an advanced Russian History class during my tenure as Visiting Professor at the College of the Ozarks. My thought was to write a missive on what happened after the time period covered by the movie.

Today it is hard for us to imagine the complicated strategy of the post-WWII bipolar "Cold War" world where the U.S. and the Soviet Union competed at all points for regional and global dominance. The term has come to denote a period from 1945—after the Axis Powers were defeated in World War II—to the fall of the Soviet Union (some

put dates at 1947-1991). It is called the "Cold War" because there was no "hot" war or large-scale fighting between the two superpowers (the US and its NATO allies, and the USSR and the Warsaw Pact); although there were major "proxy" regional wars in Korea, Vietnam, and Afghanistan.

The two-word couplet "Cold War" was first used by English writer George Orwell in an essay "You and the Atomic Bomb" in the British paper *Tribune* on 19 Oct 1945 and again in early March 1946 when he said Russia was beginning a "cold war" against Britain and its empire. In the U.S., a Democratic Party speechwriter injected the term into modern political jargon in mid-April 1947. It also was the title of a book by newspaper columnist Walter Lippmann. Others point to a speech by Winston Churchill in 1946, delivered in Fulton, Missouri, calling for an Anglo-American alliance against the Soviets, who he accused of establishing an "iron curtain" from the Baltic to the Adriatic.

Back to the *Manhattan Project.* Despite the official secrecy surrounding the project, Soviet spies managed to penetrate the program. Soviet intelligence efforts were accelerated after Hiroshima and Nagasaki, with much of their efforts targeting the wartime German nuclear project and, of course, the *Manhattan Project*. Aided by a network of spies headed by German theoretical physicist Klaus Emil Julius Fuchs (1911-1988), who worked at Oppenheimer's site at the Los Alamos Lab, by 1945 the Soviets obtained rough blueprints of the first U.S. device. Stalin—the wartime dictator of the Soviet Union—made the development of an atomic bomb his highest priority, pushing through the Soviet top-secret program in 1943-1949.

The Soviet scientific nuclear research was directed by physicist Igor Kurchatov (1903-1960). Using intelligence obtained from the *Manhattan Project*, Kurchatov—Oppenheimer's Soviet counterpart—supervised the quick development and testing, roughly based on the Allied plans. As a result, the USSR conducted its first nuclear device weapons test (device RDS-1, code named "First Lightning") at Semipalatinsk in Kazakhstan in late August 1949. Kurchatov himself died after being exposed to radiation in the Chelyabinsk-40 accident (a more serious incident than Chernobyl in 1986).

Another name associated with the Soviet Union's nuclear weapons program was Soviet physicist and Nobel Peace Prize laureate, Dr. Andrei Sakharov (1921-1989). Sakharov worked under Kurchatov and Igor Tamm to develop the atomic bomb and then, based largely on the Teller-Ulam device, played a key role in developing the Soviet Union's first megaton-range hydrogen bomb (the *sloika* or layered cake device), tested in 1955.

The military logistics of the Soviet bomb program was managed by NKVD head Lavrentiy Pavlovich Beria (1899-1953), the ruthless Georgian Bolshevik who was Stalin's longest-lived and most influential secret police chief.

After the war, there were suspicions in the U.S. that leftist-leaning officials had helped provide information to facilitate the Soviet research program. (The movie, in my view, did a good job capturing this tension).

In recent years, we have learned more about the fierce competition between Western Allied nations and Soviet special teams in the closing days of World War II to sweep up Nazi scientists and technocrats involved in Nazi Germany's missile, biological, chemical, and nuclear weapons programs. Several books have now appeared concerning *Operation Paperclip***,** a secret program in which more than 1,600 German scientists, engineers, and technicians (many of whom were former registered Nazi Party members), were recruited and brought back to the U.S. by the government in the post-war period. Among these scientists was Wernher von Braun and his rocket team. The U.S. program was an outgrowth of a Joint Chiefs of Staff initiative originally called *Operation Overcast* in late July 1945, with the idea to use Nazi "wonder weapons" to shorten the war against Japan. To that end, JCS established the *Joint Intelligence Objectives Agency (JIOA)* to supervise the operation. It was renamed *Operation Paperclip* in November 1945. (The name derived from the practice of Army officials who attached a paperclip to the folders of those German rocket experts and other scientists they wanted to employ). In early September 1946, President Truman formally approved the project in a secret directive.

Operation Paperclip was designed to gain a postwar military advantage over the USSR. For its part, the Soviet Union was even more

active. During *Operation Osoaviakhim,* for example, headed by Ivan Serov, in the early hours of October 22, 1946, Soviet military and intelligence units forcibly (at gunpoint) transported to the Soviet Union over 2,500 German "specialists"—scientists, engineers, and technicians—from the Soviet occupation zone of Germany and the Soviet sector of Berlin. Around 4,000 family members were taken also, ostensibly as war reparations.

All in one night.[2]

I realize that much more could be written on what followed the *Manhattan Project.* We are still living with the unintended consequences, geostrategic implications, and scientific "fallout" of that amazing event.

Hopefully, I have stimulated your interest in the topic.

I definitely encourage you to watch the movie.

[2] A good listing of sources concerning Operation Osoaviakhim can be found in the *Wikipedia* article on the topic, including a couple CIA reports.