BOMB: A story of scientists, saboteurs and spies

(As published in The Oak Ridger's Historically Speaking column on October 13, 2014)

As I was in the mountains watching the leaves change and could not attend the presentation by Steve Sheinkin at the American Museum of Science and Energy, I asked Carolyn Krause to write her impressions of the talk. I purchased the book and got to see enough of it before loaning it to Carolyn to be anxious to read it in its entirety. Thanks to Carolyn I now have an autographed copy!

Gordon Fee, who was also at the talk, told me enough to make me want to look more deeply into George Koval, an American born (in Iowa) spy for Russia during World War II. He was indeed assigned to Oak Ridge as a Special Engineer Detachment soldier. He was also transferred to Dayton, OH, on July 27, 1945.

On November 3, 2007, Koval received the posthumous title of *Hero of the Russian Federation* awarded by Russian President Vladimir Putin. The proclamation stated, "Mr Koval, who operated under the pseudonym Delmar, provided information that helped speed up considerably the time it took for the Soviet Union to develop an atomic bomb of its own".

The secret Koval is credited with providing "Clyde," his Russian handler, is about polonium, used as a neutron initiator for the atomic bombs. However, as Carolyn learned, Steve Sheinkin did not include Koval in his book. He had asked for the FBI file on Koval under the Freedom of Information Act, but was disappointed to find much of the most interesting parts crossed out.

Here is Carolyn's account of the talk by Steve Sheinkin.

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The story of the atomic bomb is an intriguing tale about scientists, saboteurs and spies. That's the impression I got from reading "Bomb: The Race to Build – and Steal – the World's Most Dangerous Weapon" by Steve Sheinkin. And that's the impression that Sheinkin gave in his talk Tuesday night, 10/7/14, at the American Museum of Science and Energy.

This narrative nonfiction book for young readers is about real people who seem to be speaking to the author as if he had interviewed each one. Yet most of his source material, including the quotations in the book, came from books and documents in the New York Public Library. The book reads like an adventure story and a spy thriller.

The intended audience is students in high school and middle school. Earlier in the day Sheinkin had addressed students at Oak Ridge High School and Oak Ridge's two middle schools. However, the book is a good read for adults, including Oak Ridgers who know little about the saboteurs and spies of World War II.

The 236-page "Bomb" (not counting photos, source notes and the index) has only seven pages on Oak Ridge's role. Yet Sheinkin may have selected the most exciting, yet little-known story about Oak Ridge: how Richard Feynman, a famous theoretical physicist and Nobel Prize winner, possibly saved Oak Ridge from nuclear disaster.

Robert Oppenheimer, the brilliant, skinny, chain-smoking director of the scientific side of the Manhattan Project, sent Feynman in April 1944 from the Los Alamos laboratory in New Mexico to the Y-12 Plant at Oak Ridge to work as a safety supervisor.

The concern was that too many uranium-235 nuclei might accumulate in water, take up free neutrons, fission and release more neutrons, leading to an explosive criticality accident. Feynman helped Oak Ridge engineers calculate the maximum amount of uranium of a particular enrichment that could be collected in one place without posing a danger.

The system of secrecy was so tight that Oak Ridge engineers who focused on the efficient separation of U-235 from U-238 in calutrons were unaware that the purpose of their work was to produce fuel for an

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atomic weapon being designed in Los Alamos. Feynman overcame the Army's objections to his insistence that the Y-12 directors understand how the bomb works so the rules the workers had to follow made sense.

Sheinkin wrote: "The Oak Ridge directors agreed to redesign the factory with this new information in mind. 'That was good,' said Feynman. 'The plant would have blown up if nobody had paid attention.' "

In his book, Sheinkin explained that bomb-grade uranium produced in Oak Ridge was sent to Los Alamos, where the gun-type atomic weapon was designed and built. But when he states in two places that a small amount of plutonium was sent to Los Alamos, he twice neglects to mention its source – Oak Ridge. Tests on that small amount led to the conclusion that a different weapon design (implosion type) was needed for the plutonium bomb.

In his talk, Sheinkin called Oppenheimer a classic nerd, noting that in middle school Oppenheimer would say, "Ask me a question in Latin and I'll answer in Greek." Many thought he was an absent-minded scientist who probably couldn't run a hamburger stand. But Oppenheimer proved himself an excellent leader of the Los Alamos lab.

Young readers of "Bomb" will learn a few scientific terms like fission, chain reaction, uranium-235, uranium-238 and plutonium. But many are more likely to be fascinated by the nerdy scientists who became spies.

Some of the Soviet Union spies were women, such as Ruth Werner and Lona Cohen. Some of the scientists were women, such as Lise Meitner and Leona Woods. But all of the saboteurs in the book were men.

They were the gutsy Norwegian snow-skiing, resistance fighters who jumped from British airplanes with parachutes; located dropped weapons and explosives, and blew up Germany's heavy water production plant in Norway. Later they blew up a ferry carrying containers of heavy water toward Germany, killing a number of passengers.

The Germans were planning to use heavy water as a coolant in an atomic pile built in a cave near the town of Haigerloch. German physicist Werner Heisenberg, who headed the project, was unable to create a self-sustaining chain reaction in uranium largely because the heavy water produced in Norway never arrived.

The most fascinating Soviet spies were Harry Gold, Klaus Fuchs and Theodore Hall. Gold was a chemist from Philadelphia who lived with his parents. A friend got him a job in a chemical plant and then persuaded him to print out documents that were handed over to the Soviet Union. Soon Gold was trapped into being a spy for the Soviet Communists.

Gold later received documents from Klaus Fuchs in New York City. Fuchs (rhymes with "books") was a German-born physicist and Communist who fled to England because the Nazis considered Communists their enemy.

Fuchs earned a Ph.D. in physics in England and worked at Columbia University with a British team. Fuchs then moved with the team to Los Alamos, where his expertise on implosion aided the design of the plutonium bomb. Fuchs could not maintain contact with Gold from Los Alamos because Army censors monitored phone calls and mail from the secret plant. But Gold contacted Fuchs when he was on vacation.

Ted Hall, a native of New York City who graduated from Harvard at age 18, worked at Los Alamos the same time Fuchs did. But neither one knew the other was a Soviet spy. Hall provided Soviet intelligence

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with details on the "Fat Man" plutonium bomb built at Los Alamos, as well as processes for purifying plutonium. But, unlike Fuchs, he was never charged with espionage.

Hall freely offered bomb secrets to the Soviets because he thought it unwise that only one country would have the atomic bomb. He fretted that the U.S. could become a fascist country capable of dominating the world as the lone possessor of nuclear weapons.

Published in 2012, "Bomb" received a Newbery Award, a Sibert Medal and a YALSA Award for Excellence in Nonfiction – all given by the American Library Association. It also was recognized as a National Book Award finalist.

One of Sheinkin's favorite stories is about Sen. Harry Truman. He had pressed hard to find out the purpose of the secret project that was receiving millions of dollars of funding. Secretary of War Henry Stimson told Truman he had no need to know.

Ironically, Truman became president in April 1945, when President Franklin Roosevelt died. After being briefed about the Manhattan Project, Truman had to decide when to detonate the two atomic bombs that forced Japan to surrender.

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Thanks Carolyn for an excellent review.

Further insight into spies during the Manhattan Project can also be found in a recent *Mysteries at the Museum* episode on the Travel Channel where Alan Carr, my counterpart as historian at the Los Alamos National Laboratory, is featured in a story about Ted Hall, maybe the most effective of the several spies. He was never prosecuted!

Another interesting note is that *Manhattan*, the WGN TV series about Los Alamos, used the same Richard Feynman story of the concern for nuclear criticality at Y-12 in their episode where "Charlie Isaacs" came to Oak Ridge and expressed concern for safe handling of nuclear materials here. Maybe Carolyn and I will write more about Richard Feynman, one of my favorite Manhattan Project characters.



Bomb, by Steve Sheinkin is written for young readers, but adults will find it an enjoyable and informative read

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Steve Sheinkin speaks at the American Museum of Science and Energy