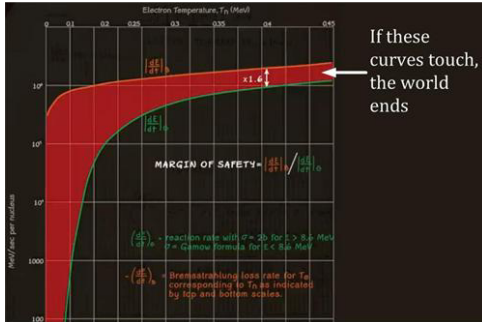


Apocalypse Math

20 July 2023

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After a hiatus of four years, Stephen Welch is back with some timely videos at Welch Labs¹ that just coincidentally occur around the time of the new movie release of *Oppenheimer*. They deal with the history of the physics behind the Manhattan Project at Los Alamos.

Going to school in the 1950s under the shadow of the atom bomb we were constantly aware of the threat, especially when we practiced bomb drills by hiding under our desks. We also watched the anti-communist witch-hunt hearings with the new technology of television.

Witnessing the inane accusations of Jim Jordan today brings back dark memories of the monotonous intoning of McCarthy trying to ferret out supposed communists in the federal government. That was also when I became aware that Oppenheimer, who had successfully guided the impossible task at Los Alamos, was now accused of being a communist. The same fate greeted William Friedman, who had broken the Japanese code Purple that was the Pacific analog to Enigma in Europe, and had essentially founded what became today's NSA. Apparently we have a long history of how the ignorant reward those who serve us best.

The Welch Labs four videos give a succinct and fascinating summary of the physics in the early 20th century that led to the creation of the bomb. The videos convey the evolving discoveries of atomic behavior and the numerous mathematical calculations that guided the physicists' understanding. Time and again theories and calculations had to be revised to explain each new phenomenon. This pattern followed some of the best physicists in the world into the Manhattan Project at Los Alamos. Of course, this pattern of trial and error is typical and essential to research and understanding, but it is a bit hair-raising when many lives are at stake.

The sense of groping in the dark with a powerful new force that might be released upon mankind culminates in the fourth video, *Oppenheimer's Apocalypse Math*. They try to calculate the chances of an atomic explosion in the atmosphere starting a fusion reaction that would turn earth's atmosphere into an incinerating plasma—thus ending the world! The figure above shows the plots of their calculations. The curves are unnervingly close; if they cross, it is all over. The fate of the world hung on the accuracy of this mathematics and physics and the capabilities of these human minds.

The videos are:

1. The Most Dangerous Rock in the World (<https://www.youtube.com/watch?v=y-FuqptTZow>)
2. Bohr solves mystery; invents bomb (<https://www.youtube.com/watch?v=3VoD3Lnv8YY>)
3. A speck of matter god did not welcome into creation (<https://www.youtube.com/watch?v=BptsHHD5yDg>)
4. Oppenheimer's Apocalypse Math (<https://www.youtube.com/watch?v=nD-Dco7xSSU>)

¹ <https://www.youtube.com/@WelchLabsVideo/videos>