

Week 5 - The Soviet Atomic Bomb

1. The Soviet Union
 - Messy messy history
 - 1922: Union of Soviet Socialist Republics created, originally 6 then 15 by 1940
2. Stalinism
 - Lenin dies in 1924: **Joseph Stalin** wrestles for power, achieves it by exiling (and killing) rivals (e.g. Trotsky)
 - 1930s: **Stalin's Great Terror**
 - GULAG prison labor system
 - Exploit prison labor
3. Soviet Union and WWII
 - Nazis explicitly anti-Bolshevik
 - Hitler and Stalin sign non-aggression pact in 1939
 - Both seize Poland
 - Hitler ends pact in 1941 and attacks USSR with *Blitzkrieg*

ENORMOZ: The Soviet bomb project

4. Detecting ENORMOZ
 - Georgii Flerov co-discovers spontaneous fissioning of uranium-238, submits article to Physical Review in 1940
 - No one cites his work
 - Finds out that **nobody** is publishing on fission at all! Fermi, Szilard, Oppenheimer, Bohr have dropped off the map!
 - This is evidence of secret regime
 - He writes to Stalin
5. Beginnings of the Soviet Project
 - USSR can't afford bomb project during WWII
 - Physicist Igor Kurchatov ("The Beard") put in charge of coordinating meager research program and interpreting espionage information
 - They acquire German resources at the end of the war
6. Soviet Atomic Espionage
 - Klaus Fuchs: (Ideological Spy) German communist physicist, fled to UK, put on fission work
 - Volunteers info to USSR — wants to help their war effort against Nazis
 - Part of UK delegation to Los Alamos
 - Quiet and unassuming — worked on explosive lenses, neutron initiators, gaseous diffusion, hydrogen bomb
 - Attended all Los Alamos colloquia Doesn't know anything about Hanford or reactors
 - **Doesn't want to tank the US, he just wants the USSR to succeed too**
7. Other "major" spies
 - Harvard undergraduate **Theodore Hall**; physicist, "volunteer," youngest scientist at Los Alamos
 - Likely Ego Spy but claims for Ideological Spy
 - **David Greenglass**: machinist at Los Alamos, member of the Army
 - He helped put the lenses together and got an idea about the stuff
 - Recruited by **Julius Rosenberg**
 - Ideological Spy mainly
 - **George Koval**: trained as Soviet intelligence officer, becomes health physics offer at Oak Ridge
 - Why are Jews mainly the spies?
 - Just that Jewish communities are heavy communist presence
 - Advocating for workers rights
 - Arguing for anti semitism
 - Lines up with what they want

- MOSCOW \leftarrow SOVIET EMBASSY \leftarrow COURIER \leftarrow SPIES
 - If the spies are caught, then they can't give anyone up since they only talk to their own courier
- 8. Project begins in earnest
 - After Hiroshima, Stalin orders full-speed invasion of Japan and full-speed ahead on bomb project
 - Puts **Lavrenty Beria** in charge of overall project
 - NKVD (KGB) spy chief, architect of the 1930s Terror purges, serial rapist, torturer — terrible, scary guy
 - Why NKVD? Spies + GULAG
- 9. Beria's Conundrum
 - Who does Beria trust?
 - Not the Americans
 - Not the German/Austrian scientists
 - Not the Soviet scientists
 - Not the Soviet spies
 - What's a paranoid spy master with nearly unlimited resources to do?
- 10. "Beria School of Management"
 1. For every technical problem assign two isolated groups of scientists to work on it — confront them whenever they differ on conclusions
 2. Don't tell almost any of the scientists about the espionage information — present it to them as data from another Soviet lab, use it both as a guide and "check" on research
 3. Every major scientist is assigned a security officer with a gun — to keep the secrets and guarantee hard work — and an understudy
- 11. Smyth Report as overall plan
 - Has a great template for what kinds of plants to build, what methods worked, and how much work it involves
 - Soviets immediately translate to Russian
- 12. Making the Soviet atomic bomb
 - Biggest problem: not enough **uranium** in USSR; learn to use low-grade ores — *uranium set the time-table, not information*
 - Replicating ENORMOZ (Manhattan Project): make equivalent of Los Alamos, Hanford, Oak Ridge, secret cities
- 13. Copying or re-invention?
 - Soviet bomb project worked to replicate American facilities, experiments, and bomb design... but almost no scientists on project realize they're "copying"
 - Soviets had to re-confirm **every single fact** that led to the development of the bomb and its materials
 - Lots of bomb work is not about written-down "secrets" but in **tacit knowledge**: experience and judgment
- 14. "First Lightning" August 1949 (Nagasaki)
 - Test was more organized than Trinity: effects tests as well, long time planning, not as rushed or desperate
 - Scientists elated: rewards commensurate with what punishments would have been
 - How much time did espionage save them? A year at most, maybe less

"Joe-1"

15. How long till USSR gets a bomb?
 - Groves: 1960-1965
 - Bush: 1950
 - Conant: 1950-1960 years
 - Estimates require many assumptions about USSR resources, capabilities, and will, as well as when they started
 - US had almost zero foreign intelligence on USSR atomic work until 1950
 - Estimates based on Manhattan experiences

16. Murray Hill Area
 - Groves tries to limit Uranium market
 - By making it hard to get to, that's why he thinks USSR won't have the bomb until 15 years
 - Plan out where the Uranium area and monopolize all the known Uranium reserves
17. "Joe-1": September 1949
 - American planes began searching for radioactivity in the air off of USSR boundaries in early 1949
 - In September 1949, they detect fission products and determine that it is likely a bomb
 - Truman decides to say USSR set off bomb to show that the US is still in control
 - US didn't know that the spy rings were successful, they thought that USSR kind of made their own bomb
18. Did Truman really think it was a bomb?
 - He never said "bomb," only said that it was an "atomic explosion"
 - "I am not convinced Russia has the bomb. I am not convinced that Russians have achieved the know-how to put the complicated mechanism together to make an A-bomb work. I am not convinced they have the bomb." (Jan. 1953)
 - Eisenhower's State of the Union (Feb. 1953):
 - "We have incontrovertible evidence that Soviet Russia possesses atomic weapons."