

**Week 5: The Soviet Atomic Bomb — Video**

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."