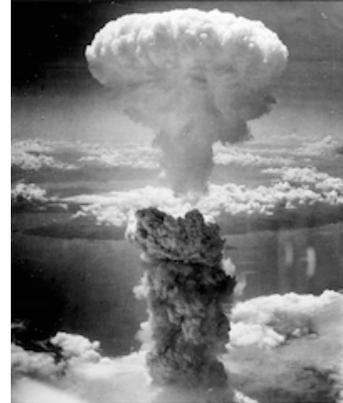
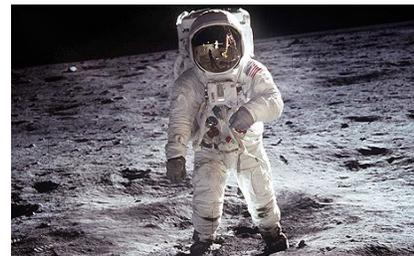


D. The Industrial and *Advanced* Industrial Periods of Technology

1. As we have seen, the transition from steam power to the use of oil/gasoline for power created a new phase of history. In a sense, we are still in it. We still use cars and planes, which rely on oil/gasoline. Thus, in a sense, we live in an “industrial” society.
2. However, in a different sense, we live in a more advanced time. It is not a complete break from the industrial past, like the move from steam to oil. If we had advanced that far, perhaps we could call our time a “*super*-industrial” period. What it does involve is the addition of new technologies to the same ones that have existed for a century now.
3. The *three* technologies that make the “advanced” industrial period unique are:
  - a) nuclear power
  - b) space exploration
  - c) computers
4. The first of the milestones of the period of advanced technology is the use of the atomic bomb in **1945** as part of World War II.
5. This technological milestone marks an evolution towards a whole new level of power generation, as demonstrated by the size of the explosions created by the bombs that use this kind of power. A single atomic bomb can destroy an entire city. An atomic power plant can generate the electricity for one with greater efficiency than any other form of power.
6. Unfortunately, the science of atomic energy has stalled for now. Atomic power is generated using a process called “fission,” which creates nuclear waste as a byproduct. This is an environmental concern. And the potential for radiation to harm humans and the environment when a fission reactor malfunctions or is damaged makes most people view this form of energy unfavorably.
7. A form of nuclear power called “fusion” will eventually be developed that can overcome the limitations and environmental problems associated with fission. If and when we get there, we probably *will* reach a super-industrial stage of development. This is truly something to look forward to.
8. One area of human endeavor that will benefit enormously from the invention of nuclear fusion is space exploration and space travel.
9. Human beings began to develop rockets during World War II, and thereafter, space exploration proceeded with remarkable progress until **1969**, when Neil Armstrong became the first man to walk on the moon.
10. This is a tremendous milestone, and wonderfully symmetrical in a way. The Steam Engine was invented **c.1769**, the transcontinental railroad was completed in **1869**, and man first walked on the moon in **1969**.
11. However, as with nuclear power, space exploration has stalled. Modest efforts are underway to take the next step: manned space travel to Mars, but it has been nearly 50 years since the greatest accomplishment in the field of space exploration took place.

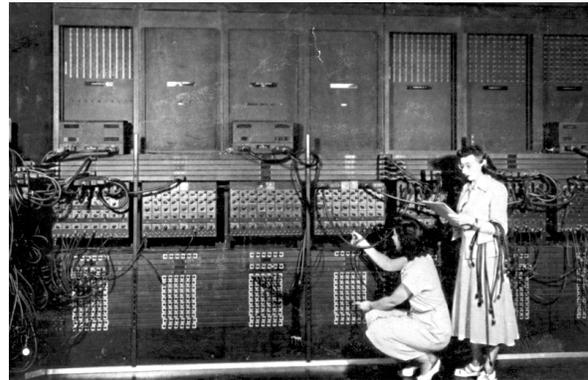


The use of the atomic bomb in **1945** signaled the beginning of a new era of technological development.



Space exploration has largely stalled since the amazing feat of placing a man on the moon in **1969**, but new private ventures hint at renewed space exploration, and the eventual *normalcy* of space travel.

12. The one technology that truly distinguishes our advanced society from any previous time is *computers*. This technology, driven by private innovation, has advanced by leaps and bounds and continues to push forward.
13. In **1946** a government project to calculate how to position artillery pieces (modern “cannons”) in times of war more efficiently led to the design of the most famous early computer called the “ENIAC” (Electronic Numerical Integrator and Computer). It was 130 feet long and weighed 30 metric tons. It was nicknamed a “Giant Brain”. It could perform mathematical calculations 2400 times faster than a person.
14. Since that time, computers have advanced with incredible speed. The most amazing modern computer, the *smartphone*, is 40,000,000 times smaller than the ENIAC, but 1700 times *more powerful*.
15. Since the atomic bomb was invented in **1945** and the ENIAC was developed in **1946** we will use these two dates as a tandem anchor fact to mark the transition to *advanced industrial civilization*. Here’s what that looks like on the timeline:



“Programmers” work to configure the ENIAC to perform a mathematical calculation. It was large and clunky by our standards, but once configured, it could perform a complex mathematical calculation 2400 times faster than a human being.

