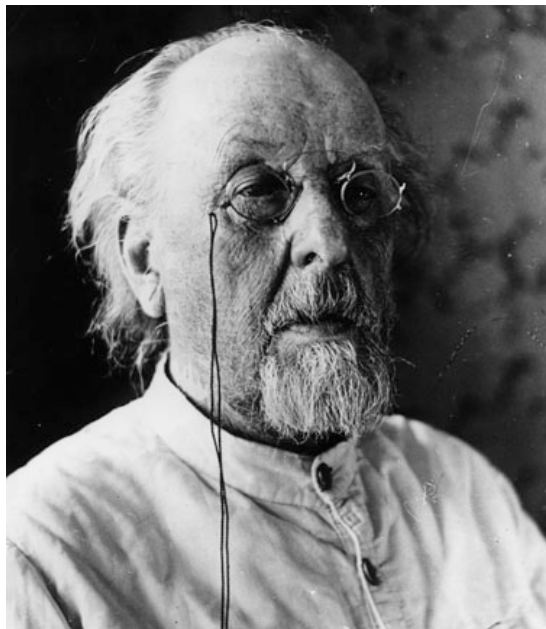


*The Earth is the cradle of humanity, but one can not live in a cradle forever!"*

- Konstantin Tsiokovsky



Konstantin Tsiokovsky  
(1857-1935)



Robert Goddard  
(1882-1945)

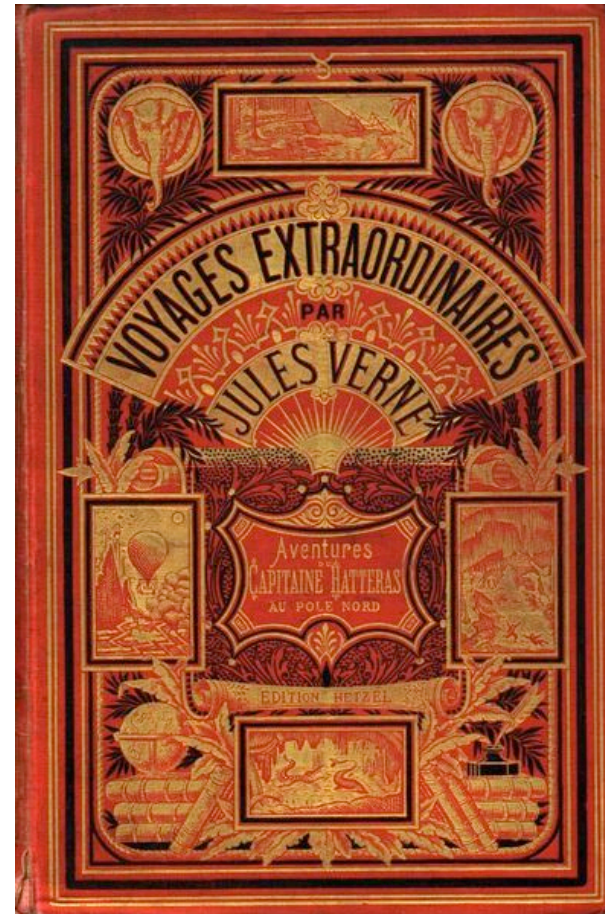


Herman Oberth  
(1894-1989)

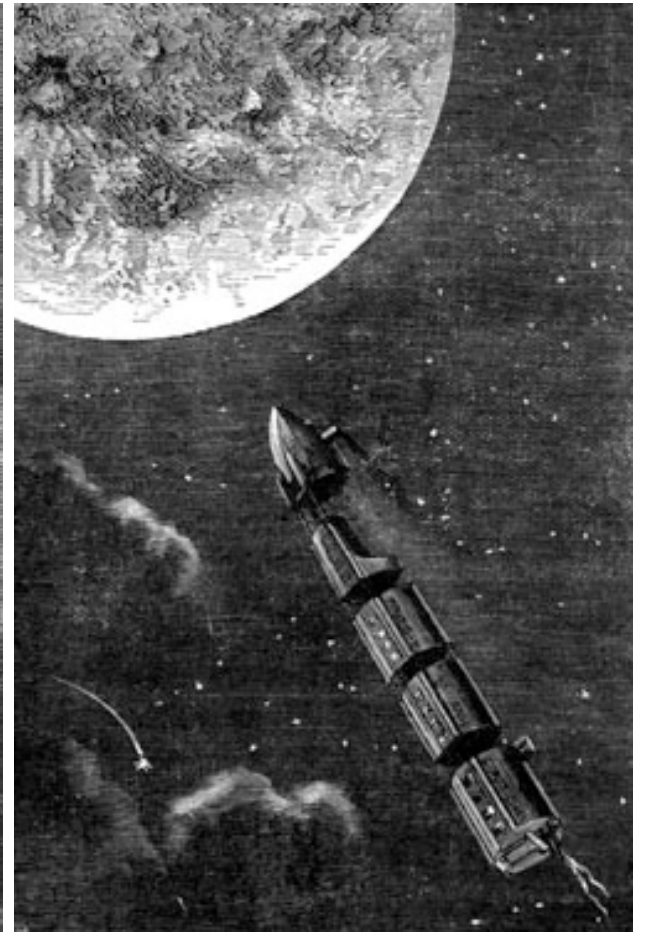
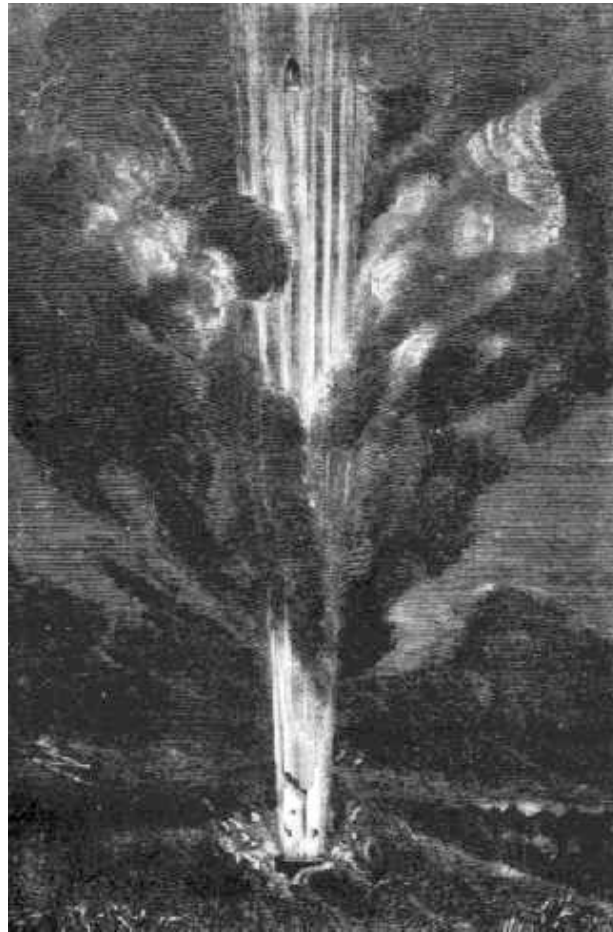
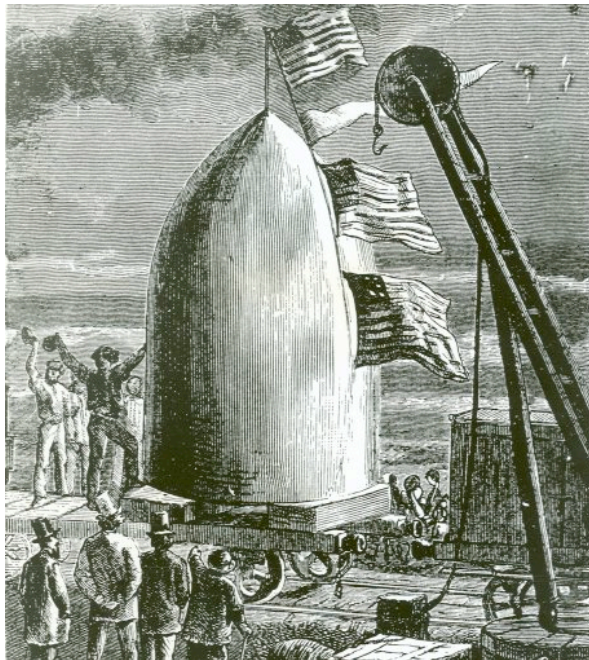
## Jules Verne



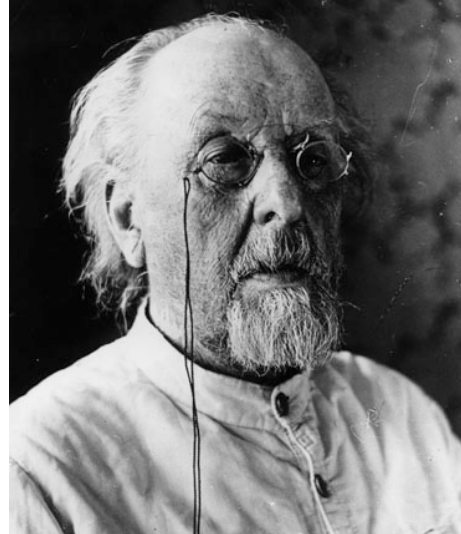
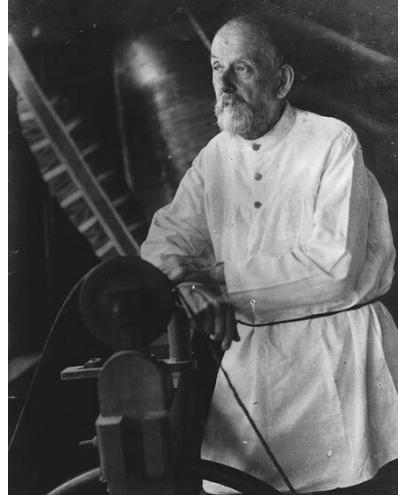
(1828-1905)







# Konstantin Tsiolkovsky





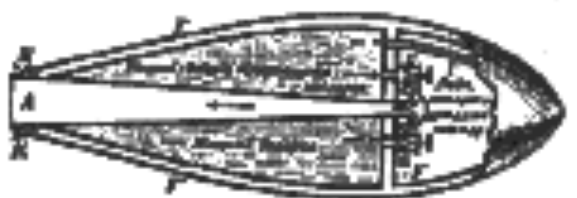
*"Men are weak now, and yet they transform the Earth's surface. In millions of years their might will increase to the extent that they will change the surface of the Earth, its oceans, the atmosphere, and themselves. They will control the climate and the Solar System just as they control the Earth. They will travel beyond the limits of our planetary system; they will reach other Suns, and use their fresh energy instead of the energy of their dying luminary." -Konstantin Tsiolkovsky*

In 1926 **Tsiolkovsky** defined his "**Plan of Space Exploration**", consisting of sixteen steps for human expansion into space:

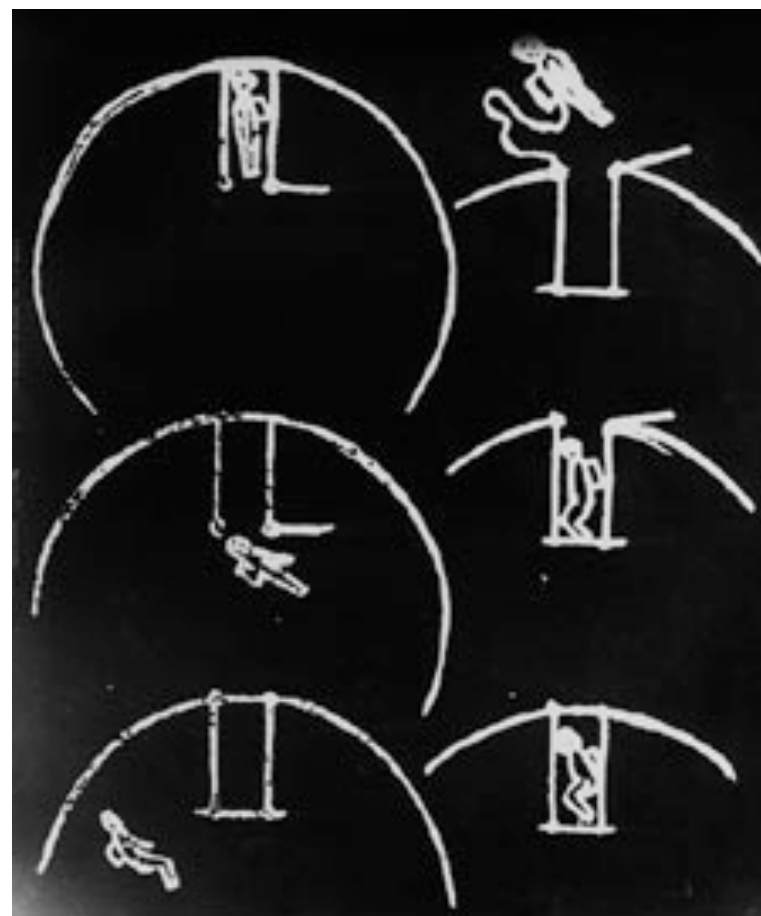
- 1) Creation of rocket airplanes with wings.
- 2) Progressively increasing the speed and altitude of these airplanes.
- 3) Production of real rockets-without wings.
- 4) Ability to land on the surface of the sea.
- 5) Reaching escape velocity (about 8 Km/second), and the first flight into Earth orbit.
- 6) Lengthening rocket flight times in space.
- 7) Experimental use of plants to make an artificial atmosphere in spaceships.
- 8) Using pressurized space suits for activity outside of spaceships.
- 9) Making orbiting greenhouses for plants.
- 10) Constructing large orbital habitats around the Earth.
- 11) Using solar radiation to grow food, to heat space quarters, and for transport throughout the Solar System.
- 12) Colonization of the asteroid belt.
- 13) Colonization of the entire Solar System and beyond.
- 14) Achievement of individual and social perfection.
- 15) Overcrowding of the Solar System and the colonization of the Milky Way (the Galaxy).
- 16) The Sun begins to die and the people remaining in the Solar System's population go to other suns







Tsiolkovsky Rocket Designs

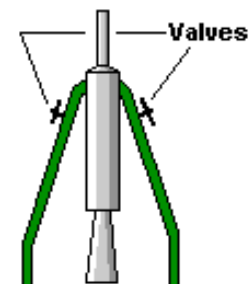






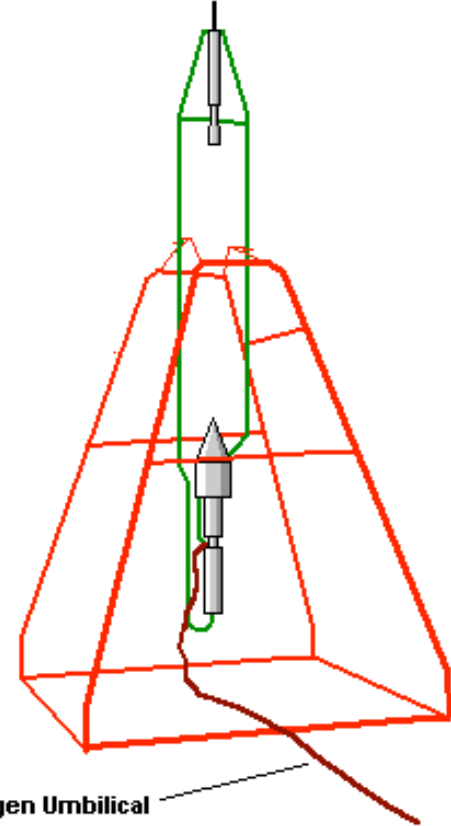
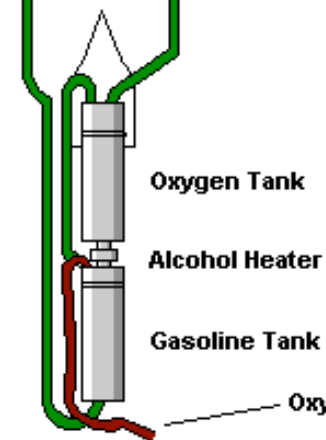
## Robert Goddard



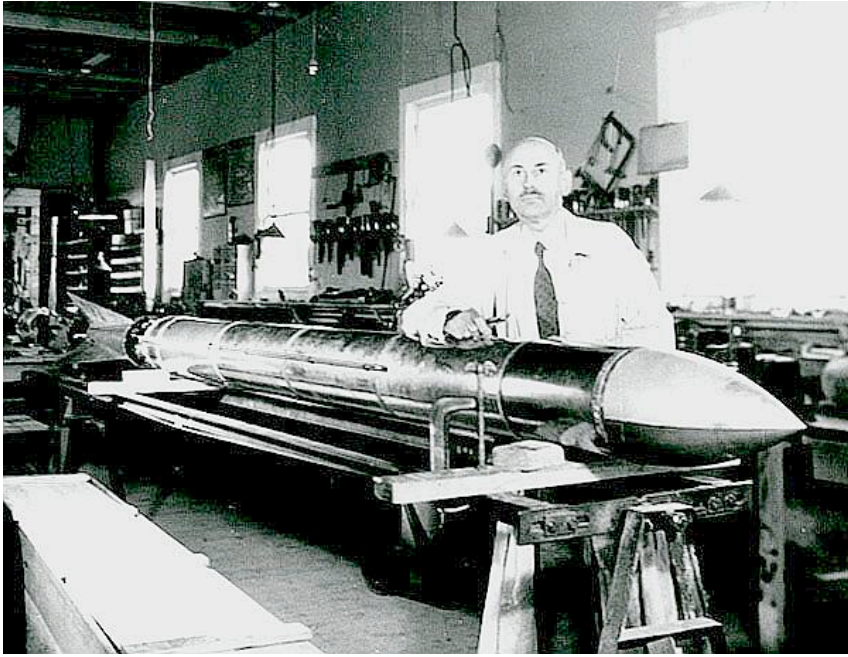


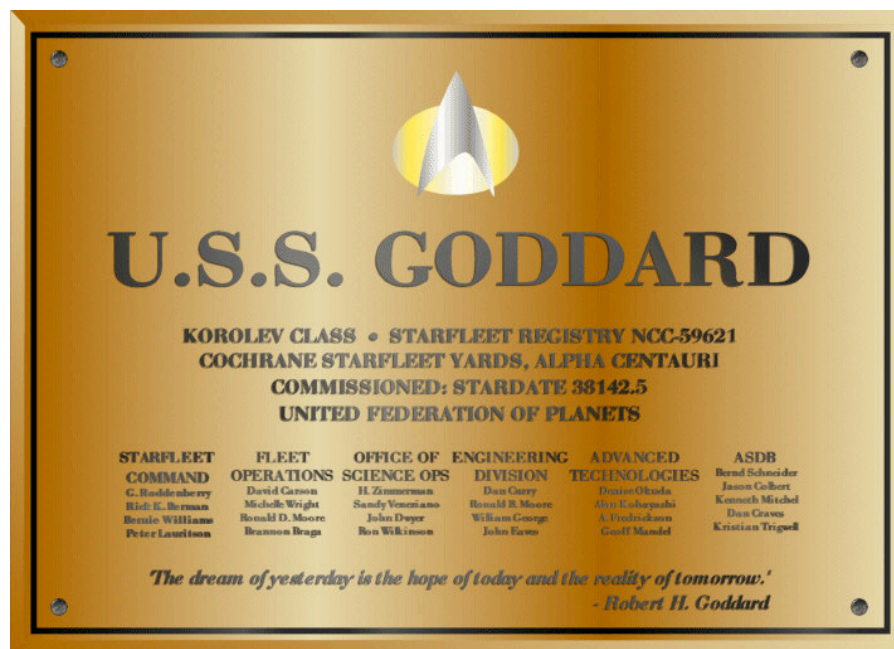
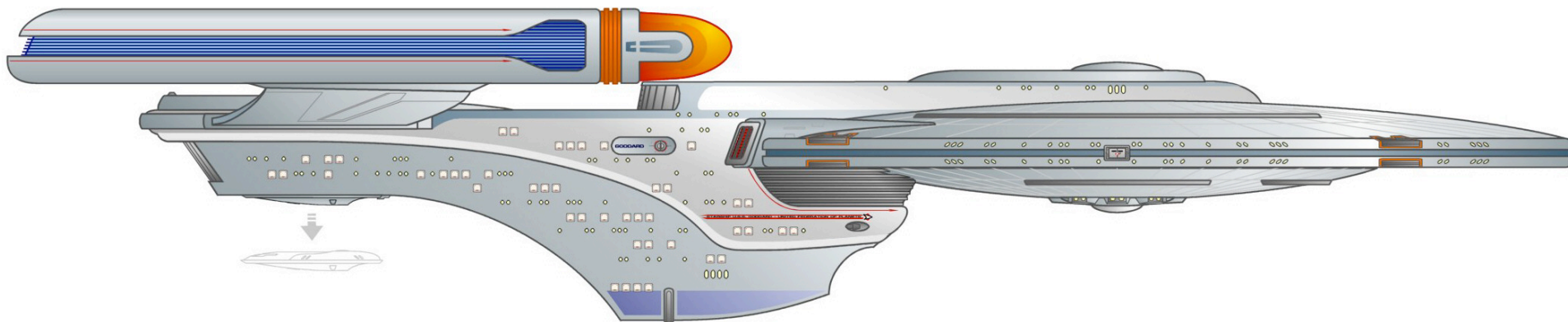
**Robert Goddard's First  
Liquid-Fuel Rocket - 1926**

**Rocket in Launching Frame  
Total Height About 4 m**





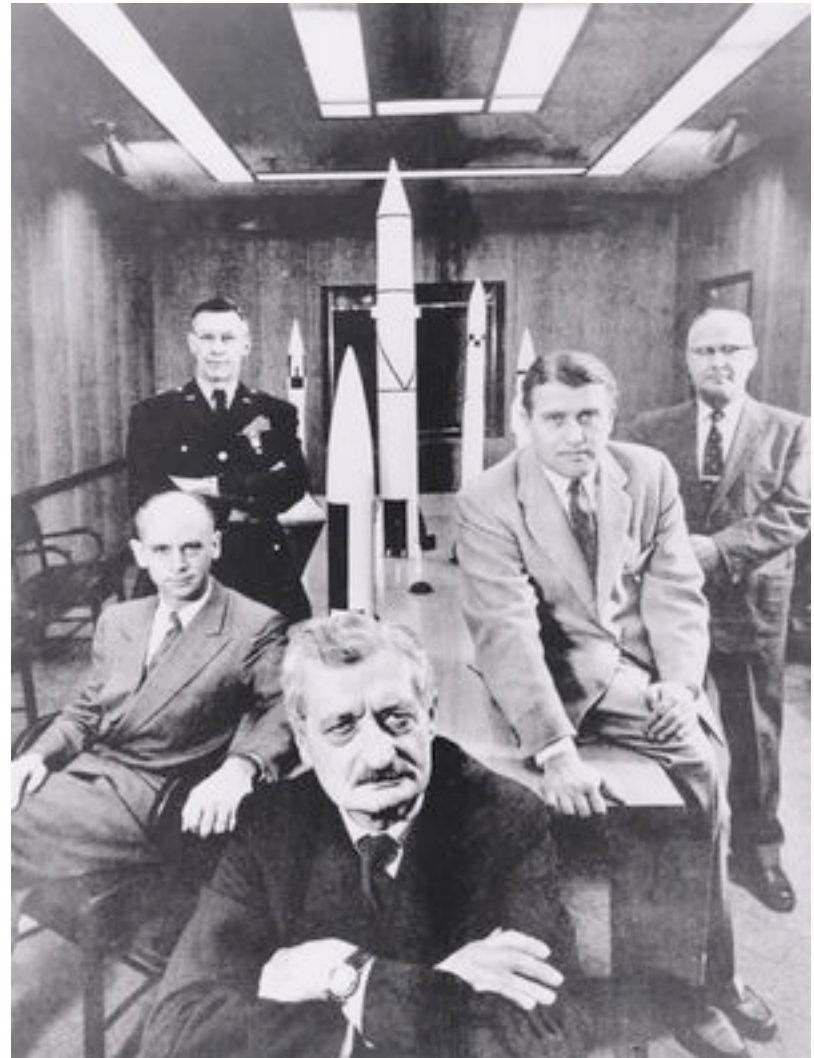
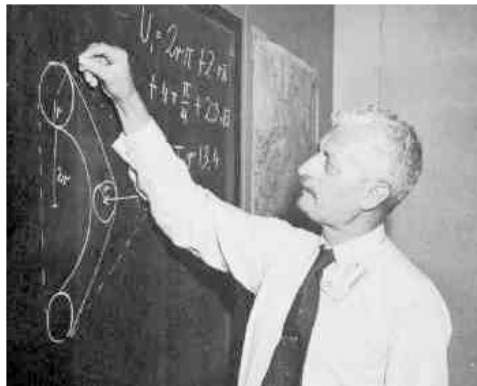


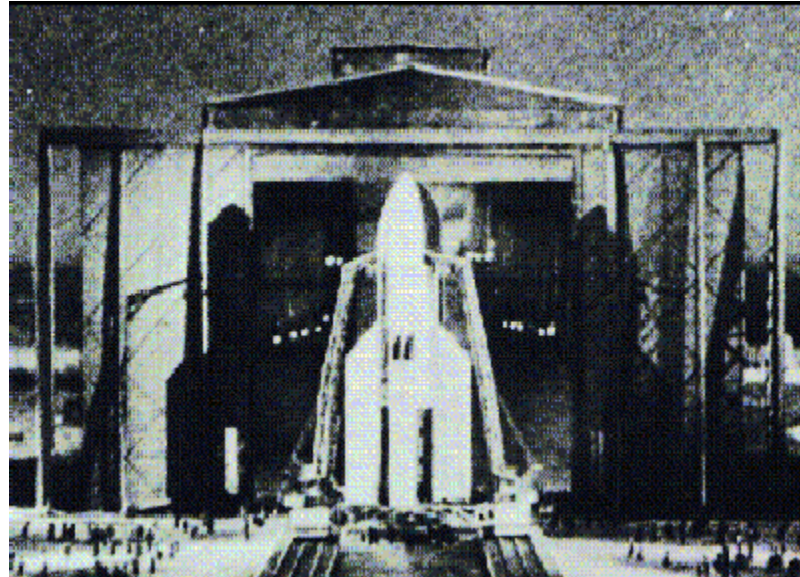




## Hermann Oberth











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STAR TREK  
OBERTH-Class Starship





Only Oberth got to see all of this and the Space Shuttle in the 1980s.



