ASTR 4800 - *Space Science: Practice & Policy*

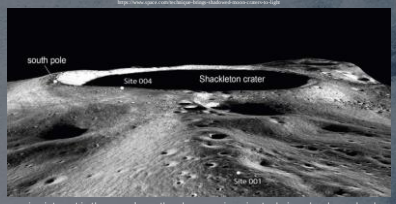
Today: Beginnings of the Space Race – The USSR Before Sputnik

- Reading: Part II of McDougall, Chapters 3-5 on "America Before Sputnik"
- HW #1 due Sep. 12.


1

SPACE IN THE NEWS: New Technique Brings Moon's Shadowy Polar Craters into the Light

Kiley Beckwith



With the increasing interest in the moon's south pole, a new imaging technique has been developed that detects photons reflected by the surrounding mountains on the moon's shadowy craters and captures images of the craters with a Narrow Angle Camera.

2

The Soviet Union after the Revolution of 1917

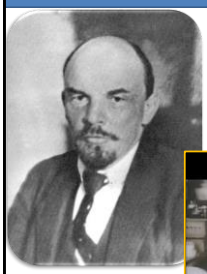
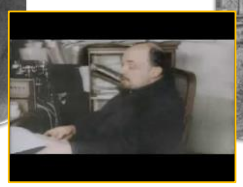
Czar Nicholas II & Family

Council of People's Commissars

3

V. Lenin (1870-1924)

"Dictatorship of the Proletariat"


4

Class Exercise

Based upon your reading in McDougall, compare and contrast the political and economic systems in America and Russia in the early 20th century.

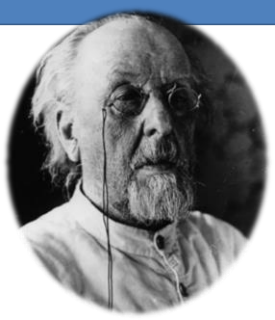
5

Comparison of Soviet & American Systems in the Early 20th Century

Characteristic	U.S.S.R.	U.S.
Economy	Socialist/Communist	Capitalist
Political/CEO	Totalitarian/Dictator	Democracy/President
Commerce	Collectives	Private industry
Income level	Very poor	Wealthy
R&D	Little technology	Advancing after WWII
International relations	Isolationist	Isolationist

6

Konstantin E. Tsiolkovsky
1857-1935



- Considered the father of human space flight.
- First academic treatise on rocketry (1903).
- Calculated escape velocity from Earth (25,000 miles/hr or 11.2 km/sec).
- Proposed multi-stage rocket.
- Designs for space stations, airlocks.

"The Earth is the cradle of humanity, but mankind cannot stay in the cradle forever."

7

How was rocketry consistent with the Bolshevik philosophy?

- Technology needed to survive and compete with the West (Lenin's lesson from WWI).
- But Soviets were ideologically opposed to free exchange of ideas!
- Centralized R&D was seductive feature of Soviet system (command & control).

8

Josef Stalin
(1878-1953)


1935


1925

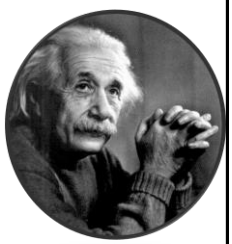

1929

Stalin stifled autonomy thru terror & by training a new generation of loyalists. *How was research possible in this environment?*

9

Einstein's view of USSR in 1932

"At the top there appears to be a personal struggle in which the foulest means are used by power-hungry individuals acting from purely selfish motives. At the bottom there seems to be complete suppression of individual and freedom of speech. One wonders whether life is worth living under such conditions."



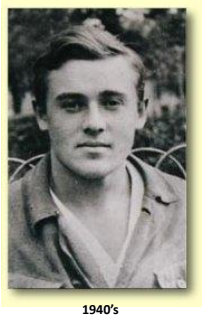
10

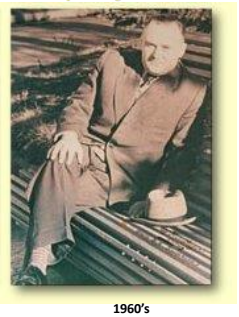
The U.S.S.R. after WWII

Allies to Cold War Adversaries

11

Sergei Pavlovich Korolev
(1907-1966)
Developer of Sputnik & 1st human space flight


1940's


1960's

12

What was the impact of German V-2 rockets after the war?

- Von Braun began the U.S. space program at White Sands, NM.
- What did the Soviets get?
- The role of Korolev.
- Military implications to deliver H-bombs via ICBMs.

13

How did Russian paranoia & the need to catch up drive rocket technology development?

- Tension between "borrowing" and developing technology
- Lack of competitive stimulus
- Risks of failure
- Scarcity of skilled labor
- Organization separation of R&D and production

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