



ASTR 4800 - Space Science: Practice & Policy
 Today: **Science – The Endless Frontier**

Homework for Monday:

- HW #1 is due on Monday, Sep. 12.
- Read: Beyond Sputnik, p. 7 and Chapter 5.

ASTR 4800 – Space Science: Practice & Policy

1

Space in the News: SpinLaunch wants to radically redesign rocketry. Will its tech work?
 Ryan Roberts

Question:
 Is radical new research better conducted in the private, or public sectors?




- \$80,000,000 Private investment
- 20-30 launches per day
- Powered by renewable energy
- \$1000/lb launch (SpaceX ~750/lb)
- Requires satellite redesign



2




Science, the Final Endless Frontier

Garrett Lycett

3

Some Background


- Prior to WWII, research in the hands of a few corporations, who had all the rights to the results
- Research contracts were often won through bidding
- WWII showed this could benefit from an update, but people disagreed on how
- This controversy led to the Science, the Endless Frontier paper and today's system



4

Peer Review

Scientists are beholden to their colleagues to check their work before it can get published.



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Sen. Harley M. Kilgore

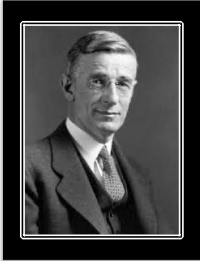
- New Deal Democrat from WV
- Championed the direct involvement of government and public oversight of scientific progress and grants



6

Vannevar Bush

- Respected engineering consultant
- Heavily involved in the Manhattan Project and OSRD — effectively FDR's science advisor
- Championed widening access through free flow of ideas and limited oversight only by "disinterested" scientific experts



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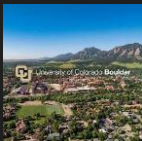
Conflict

- Legislation drafted multiple times by both sides
- Kilgore and Bush worked together to draft a bill, but Bush was unhappy with the result
- Bush wielded his clout with Science, the Endless Frontier to try and pass his version of the bill, but it failed anyway!
- Refurbished compromise in 1947 vetoed by Truman due to concerns over lack of accountability
- NSF compromise in 1950, research responsibility divided among multiple agencies

Both Kilgore and Bush thought social sciences should be involved, but this was unpopular at the time, only being added to the NSF 40 years later. Why do you think it was such a sticking point?

8

Science, the Endless Frontier



(Obligatory SKO BUFFS)

Motivation:

- Science has a strong record of improving society
- ALL science is a fundamental cornerstone of thriving democracy
- Not all scientific endeavors are within the reach of the private sector
- The government and private sector can only justify direct funding for applied research
- Universities can close the gap


9

Class Exercise

Vannevar Bush recommends the subdivision of his proposed government foundation into subgroups based on its proposed duties. In reality these subdivisions ended up more in the hands of their parent institutions. What are the pros and cons of this system?

10

Critical Points



Military still needs funding in peacetime!

Research is expensive, so partnerships must be made where possible to attract talent, including internationally.

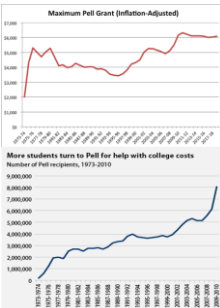
Free flow of ideas — lift wartime classifications

Funding and information flow needs to be stable and coordinated between organizations

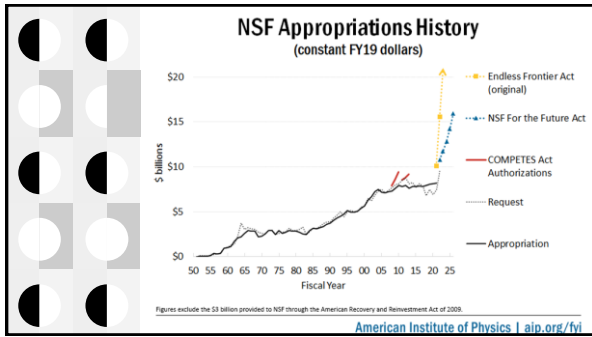
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How to Support Science?

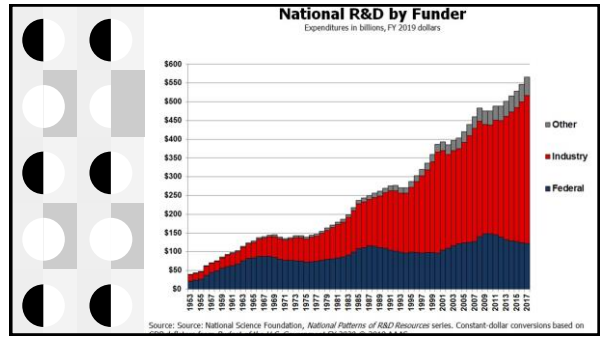
- Merit-based funding, but have some geography-based funding to build up weaker institutions
- Education!! But — "There is never enough ability at high levels to satisfy all the needs of the nation; we would not seek to draw into science any more of it than science's proportionate share." - Ministry of Education Committee
- Important to start by putting soldiers back into higher education



12



13



14