

AN INTRODUCTION TO U.S. SCIENCE & TECHNOLOGY POLICY

*Advocating for Science in an Era of Extreme
Political Polarization & Alternative Facts*

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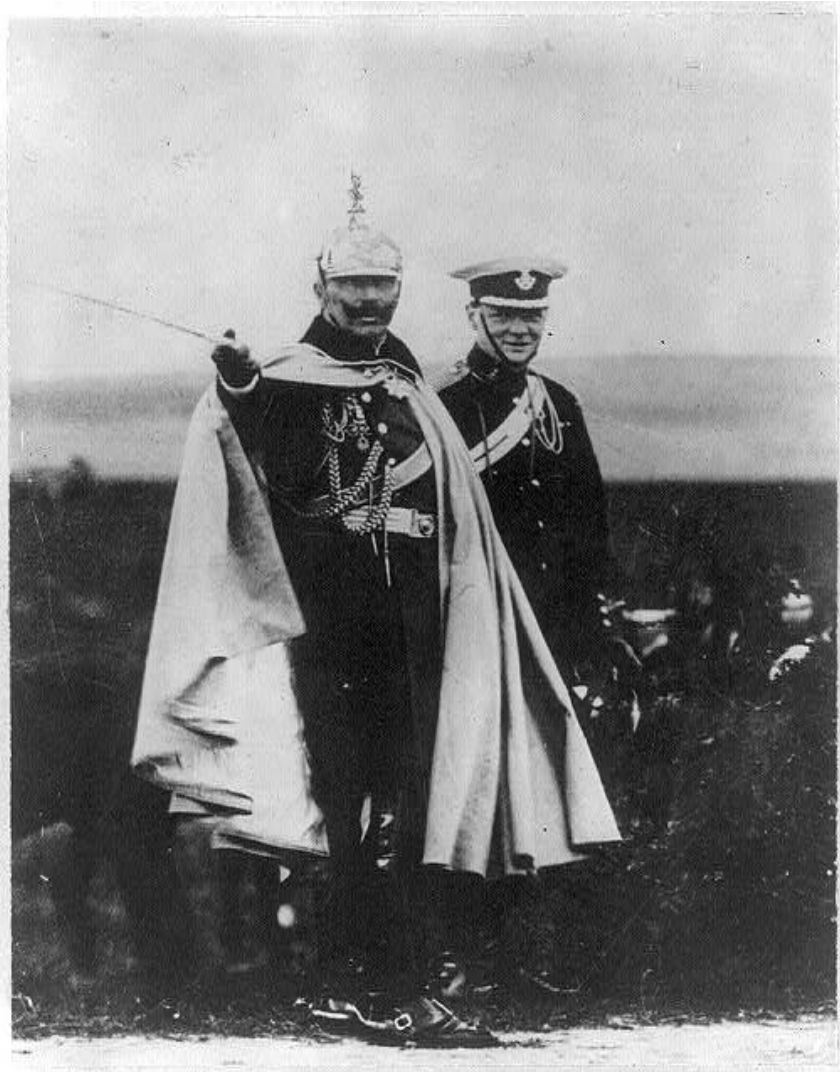
Vice President for Policy/Association of American Universities

AAAS CASE Workshop [#MakingOurCASE](#)

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Association
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OTTO VON BISMARCK

Chancellor of Germany from 1871 – 1890

“There are two things you don’t want to see being made -- sausage and legislation.”

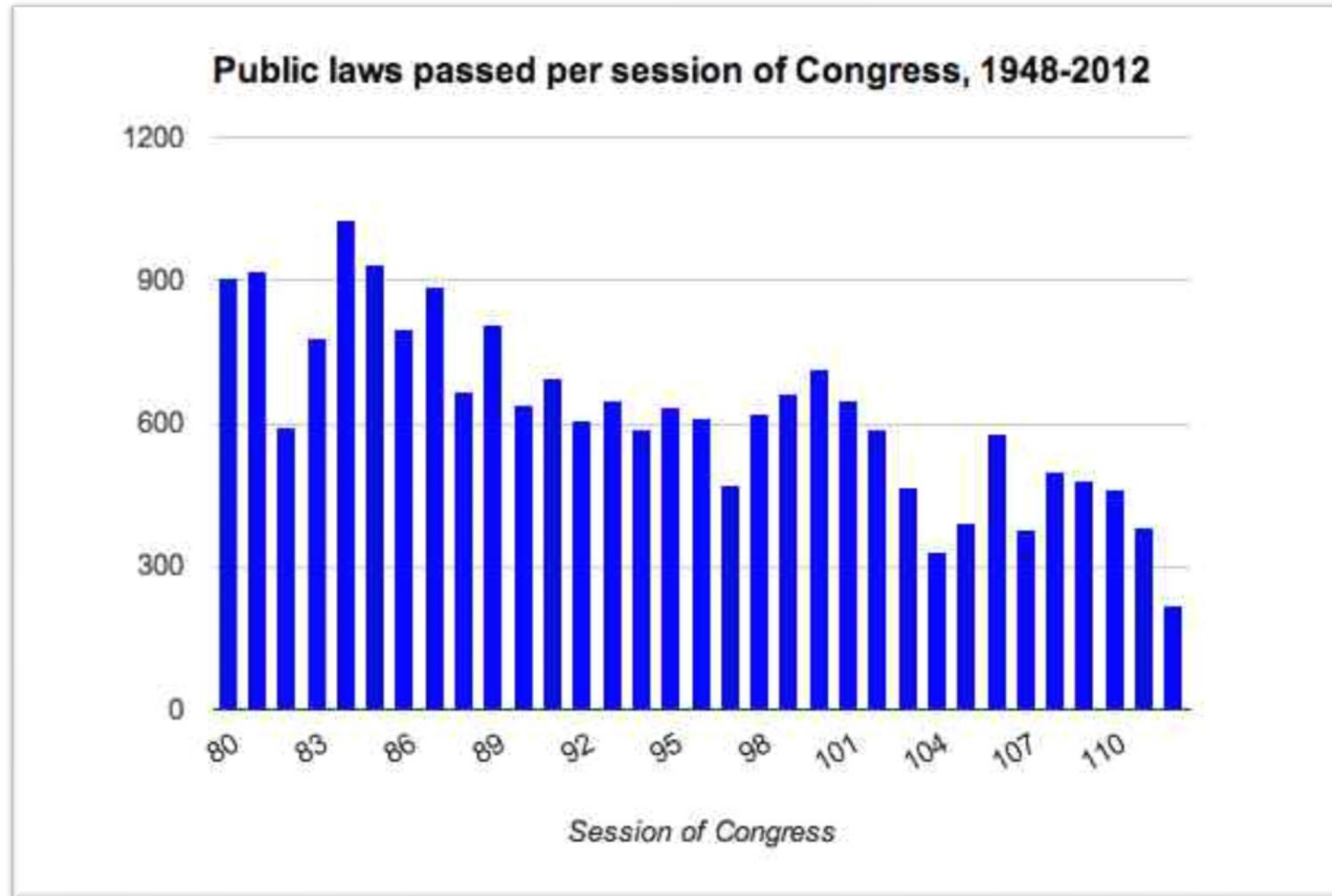
Welcome to Washington!!!



“In a real sausage plant, everybody is on the same team, trying to produce bratwurst or knockwurst. In the legislative sausage factory, at least half the people don’t want to make sausage. Or they want to make a different kind. For the last few years, Republicans have said, ‘We won’t make sausage unless we control the recipe.’ ”

–Alan Rosenthal, Professor of Public Policy , Rutgers University,
New York Times, “If Only Laws Were Like Sausages,” December 4, 2010

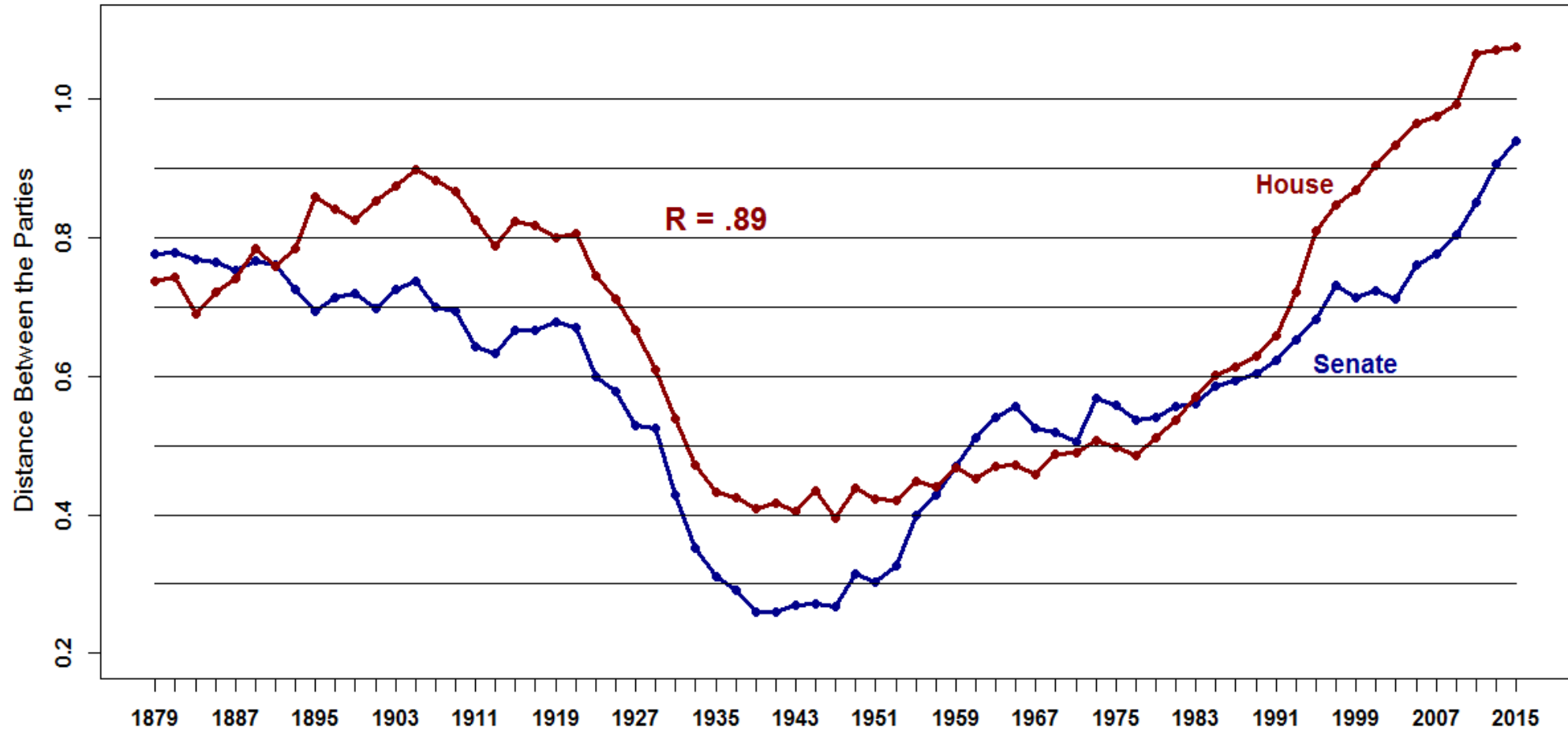
Legislative Productivity:



- 112th Congress (2011-2012): 284 Public Laws
- 80th Congress (1947-1948): 906 Public Laws
- 113th = 296 114th = 329 115th = 443

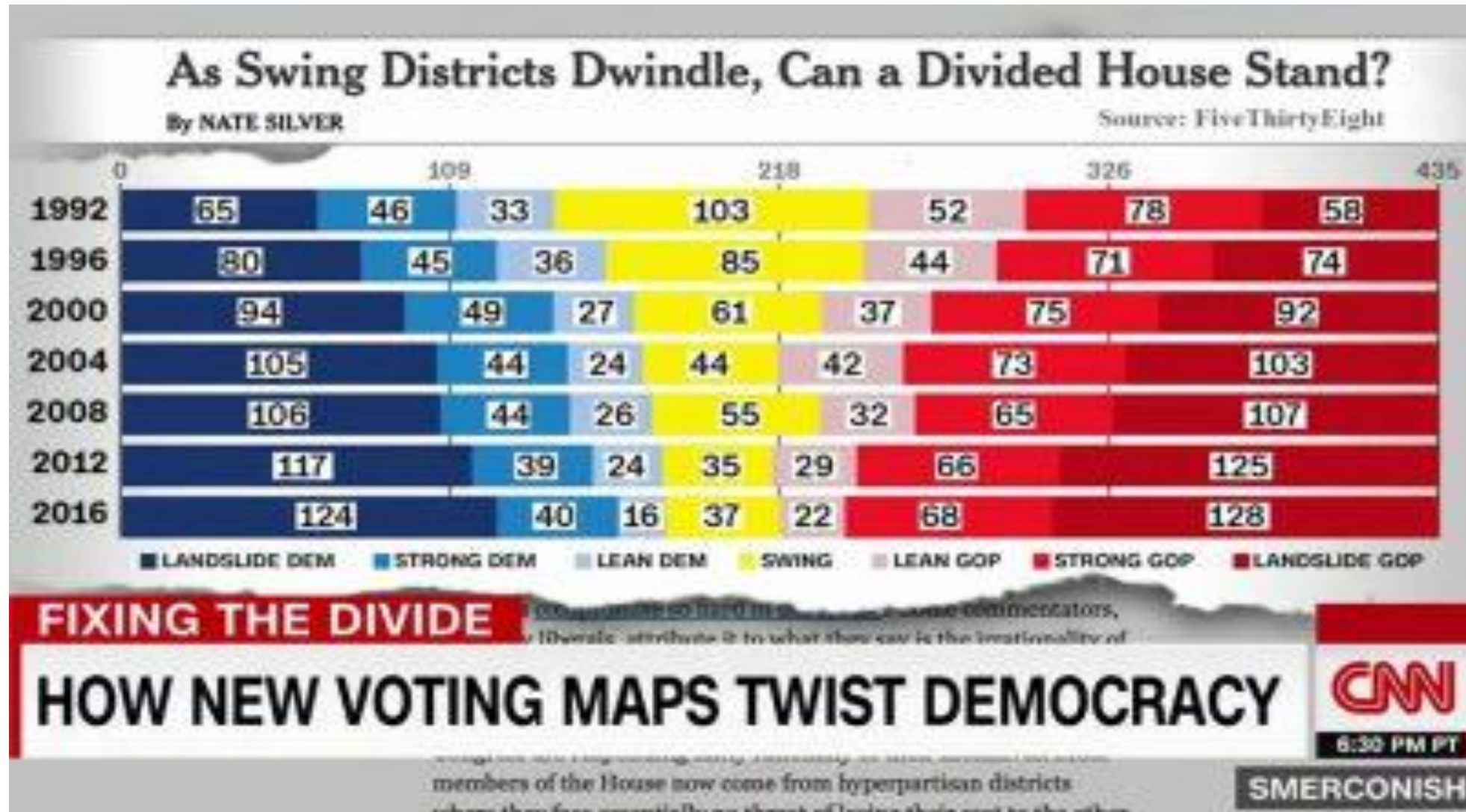
Party Polarization: 1879 - 2015

Party Polarization 1879-2015
Distance Between the Parties First Dimension



Polarized America/www.voteview.com

Number of Swing Districts at 20-year Low



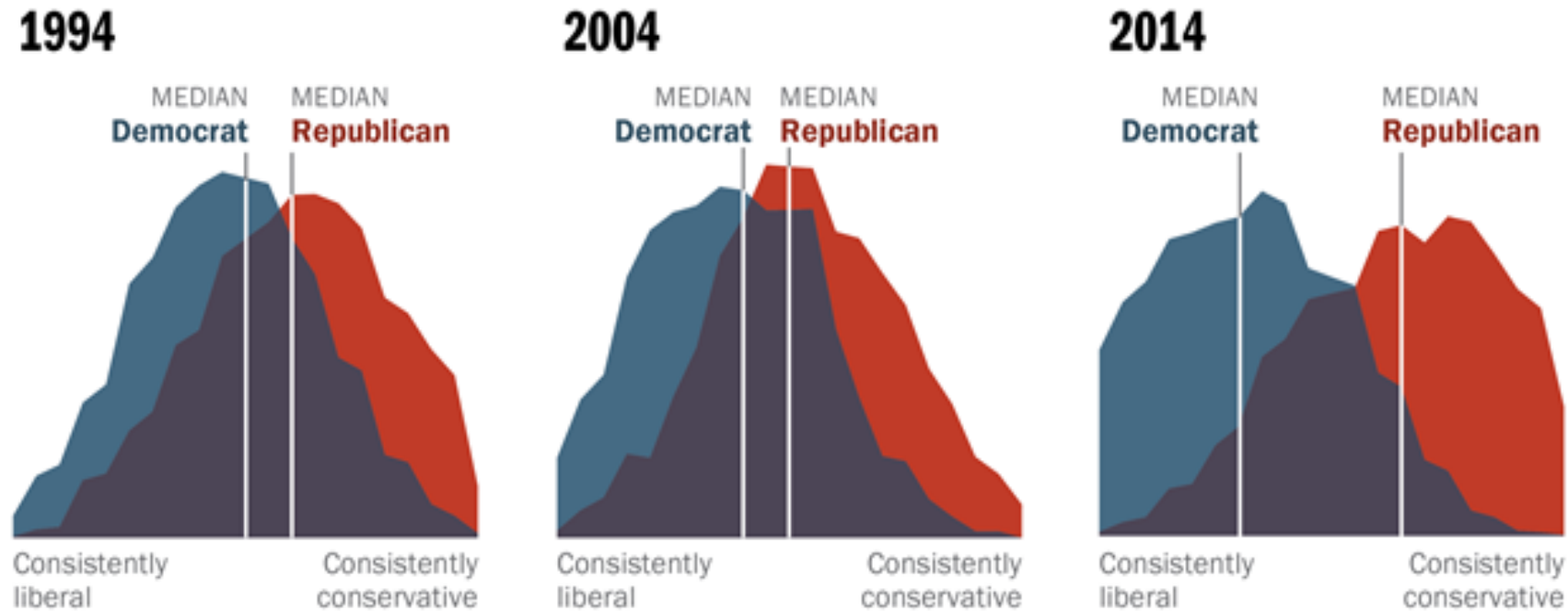
Source: Nate Silver

*Alt. Source - Cook Political Rpt. says # of swing districts down from 164 in 1996 to 72 in 2016.

Increasingly Polarized Public

Democrats and Republicans More Ideologically Divided than in the Past

Distribution of Democrats and Republicans on a 10-item scale of political values



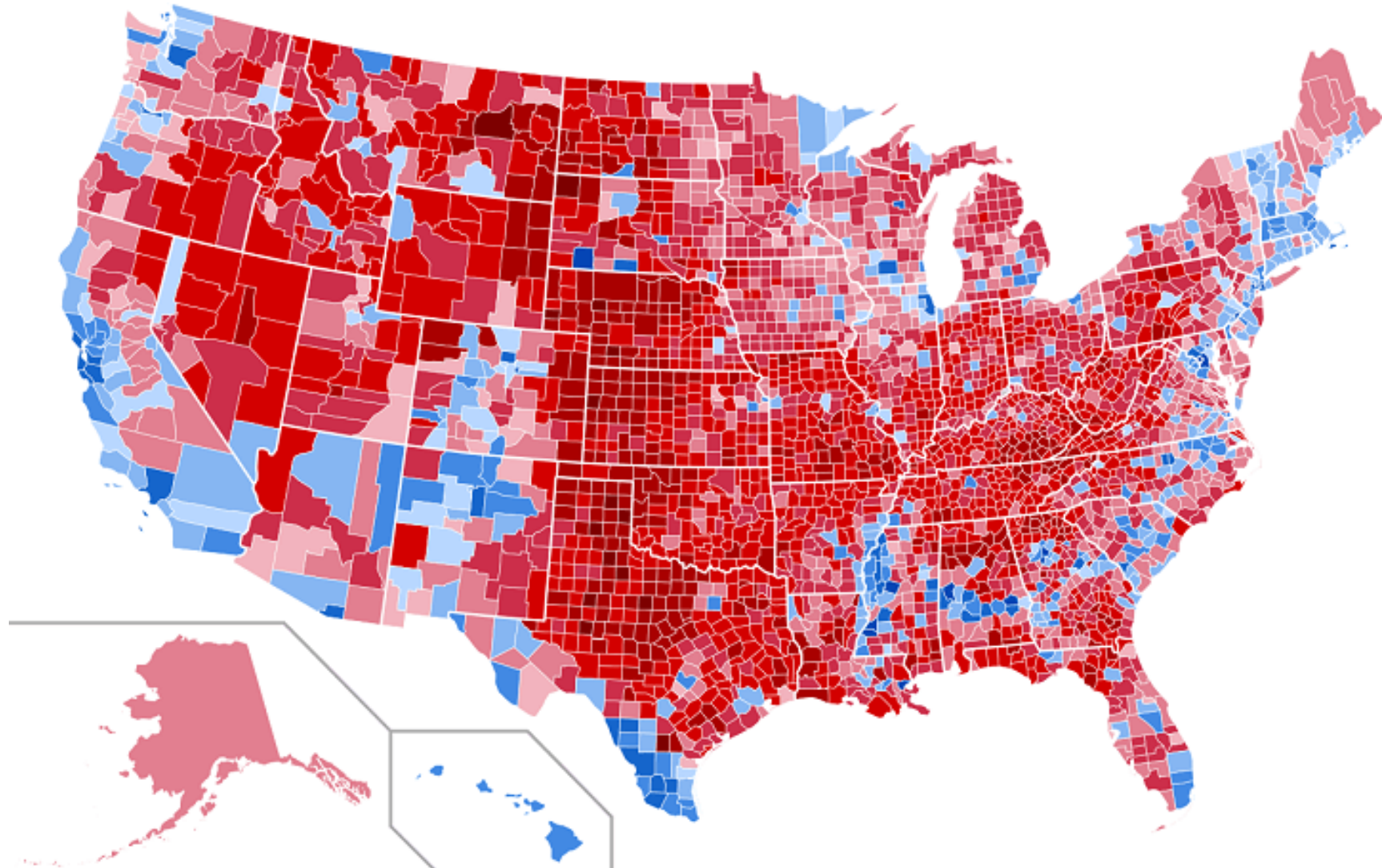
Source: 2014 Political Polarization in the American Public

Notes: Ideological consistency based on a scale of 10 political values questions (see Appendix A). The blue area in this chart represents the ideological distribution of Democrats; the red area of Republicans. The overlap of these two distributions is shaded purple. Republicans include Republican-leaning independents; Democrats include Democratic-leaning independents (see Appendix B).










PEW RESEARCH CENTER

Growing Urban-Rural Political/Culture Divide

Vote by County – 2016 Presidential Election



Whole Foods vs. Cracker Barrel Indicator

Election Year	Election Winner 	Whole Foods 	Cracker Barrel 	Culture Gap
1992	 Clinton (D)	59%	40%	19%
1996	 Clinton (D)	64%	41%	23%
2000	 Bush (R)	44%	75%	31%
2004	 Bush (R)	40%	79%	39%
2008	 Obama (D)	78%	35%	43%
2012	 Obama (D)	75%	29%	46%



Austin, TX



Lebanon, TN

SOURCE: David Wasserman, Cook Political Report



Top Fake News Of 2016

WHOA! Hillary Caught On Hot Mic Trashing Beyonce' With RACIAL SLURS!



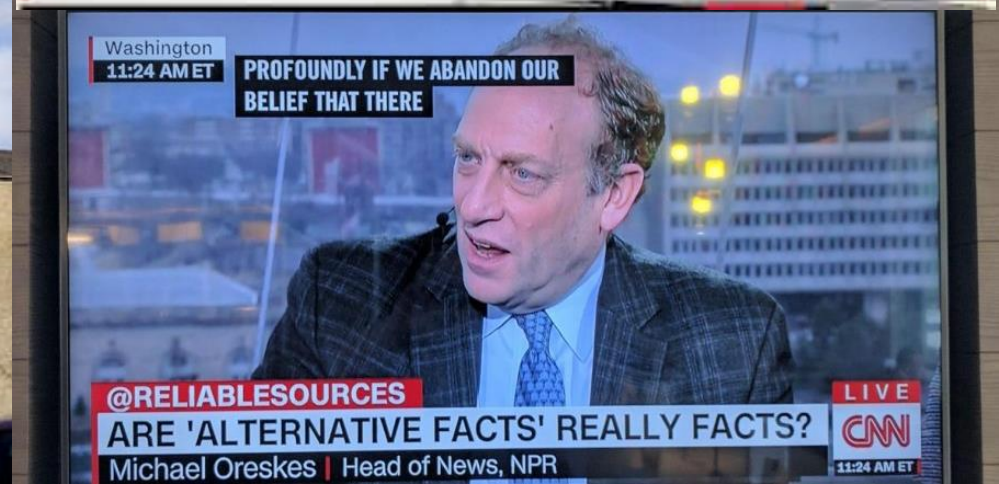
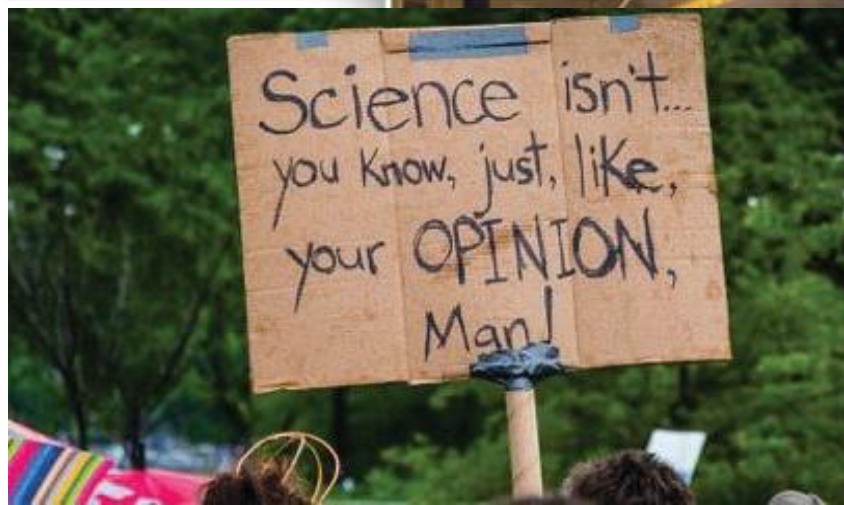
Police Find 19 White Female Bodies In Freezers With "Black Lives Matter" Carved Into Skin

SHARE Facebook Twitter G+ P

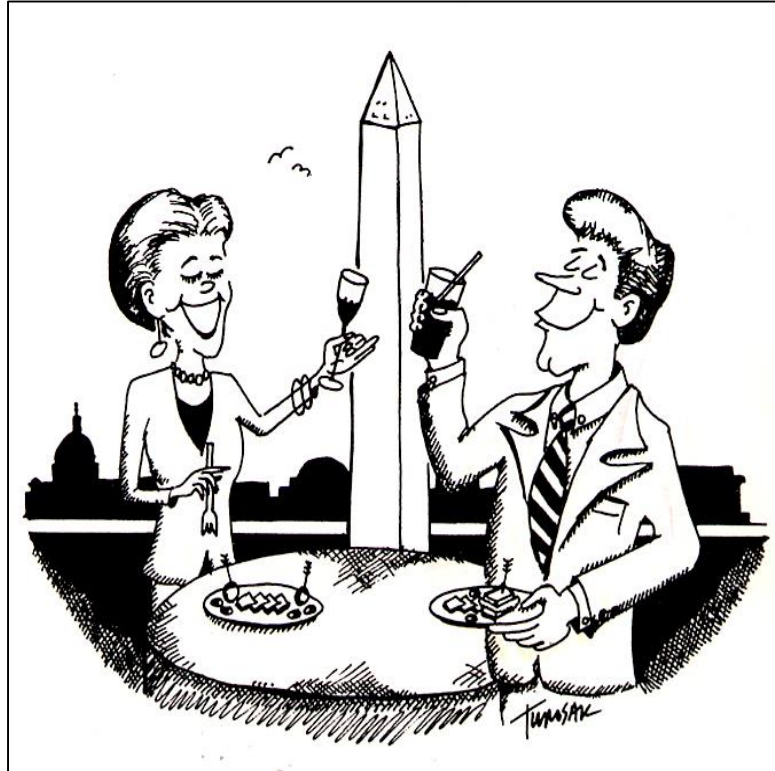
Woman arrested for defecating on boss' desk after winning the lottery

DAVE WEASEL

41-year-old woman had the winning lottery ticket worth over 3 million dollars last night, but showed up to work anyway on Monday to deliver one last...



Two Cultures: Politicians & Scientists



“I double majored in history and English and then went to Harvard law. How about you?”



ATLANTIC FEATURE © 1995 Mark Parisi. Used with permission.

Defining the Cultural Divide

Scientists

Numbers

Quantitative

Objective

Specialists

Facts/evidence

Hate to make promises

Technical

Ask why

Money = research

Think long term

Science page

Politicians/ Policymakers

Words

Qualitative

Subjective

Generalists

Public opinion

Love to make promises

Political

Ask why they should care

Money = getting re-elected

Think short term

Front page

What is “Science Policy”

“National science policy” refers to the set of federal rules, regulations, methods, practices, guidelines under which scientific research is conducted.

- *Beyond Sputnik: National Science Policy in the 21st Century*
Neal, Smith, McCormick, University of Michigan Press (2008)



Science Policy vs. Science for Policy

- “Policy for Science” – decision making about how to fund or structure the systematic pursuit of knowledge
- “Science for Policy” – the use of knowledge to assist or improve decision making
- Grey area between policy for science & science for policy

The Difference Between Science & Science Policy

Phillip A. Griffiths, "Science and the Public Interest," *The Bridge*, Fall 1993.

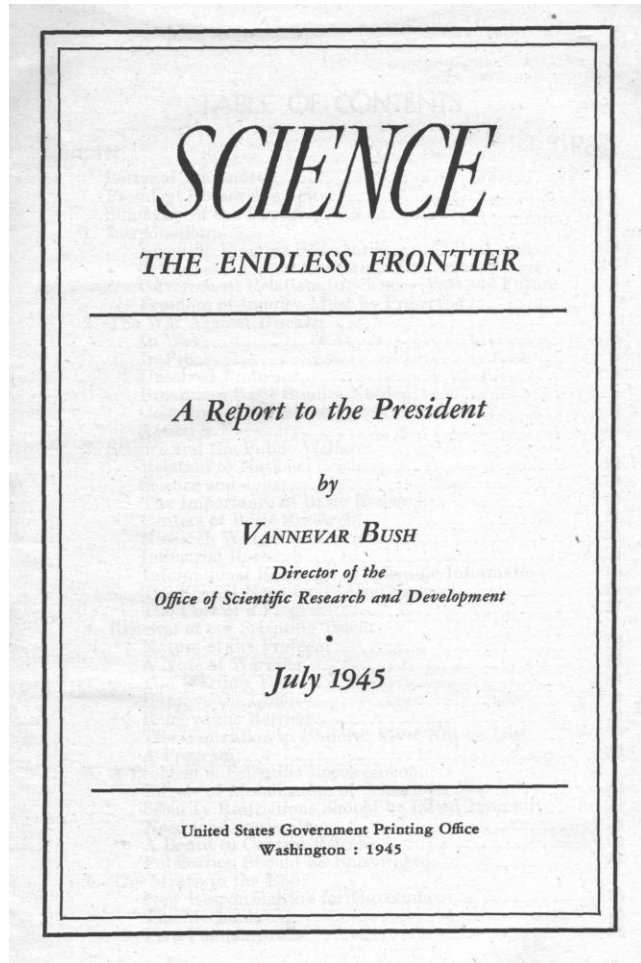
- While science is ideally value-free and objective...science policy deals with the effect of science and technology on society and considers how they can best serve the public. As such, it is highly visible, value-laden, and open to public debate.
- The subjective nature of science policy often makes it impossible to prove whether a specific policy is "right" or "wrong." Moreover, the evaluation of science policy outcomes is often driven by ideology as opposed to provable facts.
- This has led many in the scientific community to shy away from engagement in the policy process despite the impact it has upon their ability to conduct science.

The Role of Science in the Formation of Policy

- Science is only one input into the policy-making process. Many other factors such as economics, ethics, budgetary trade offs, and public opinion must and will be factored into final policy decisions.
- Science is not policy-prescriptive.
- While it is important to ensure that policymakers are informed by science, it is important to keep politics out of science.

History of U.S. Science and Technology Policy

Science - The Endless Frontier



“Science can be effective in the national welfare only as a member of a team, whether the conditions be peace or war. But without scientific progress no amount of achievement in other directions can insure our health, prosperity, and security as a nation in the modern world.”

Science - The Endless Frontier, July 1945

A History Lesson in U.S. S&T Policy: Vannevar Bush & Harley Kilgore

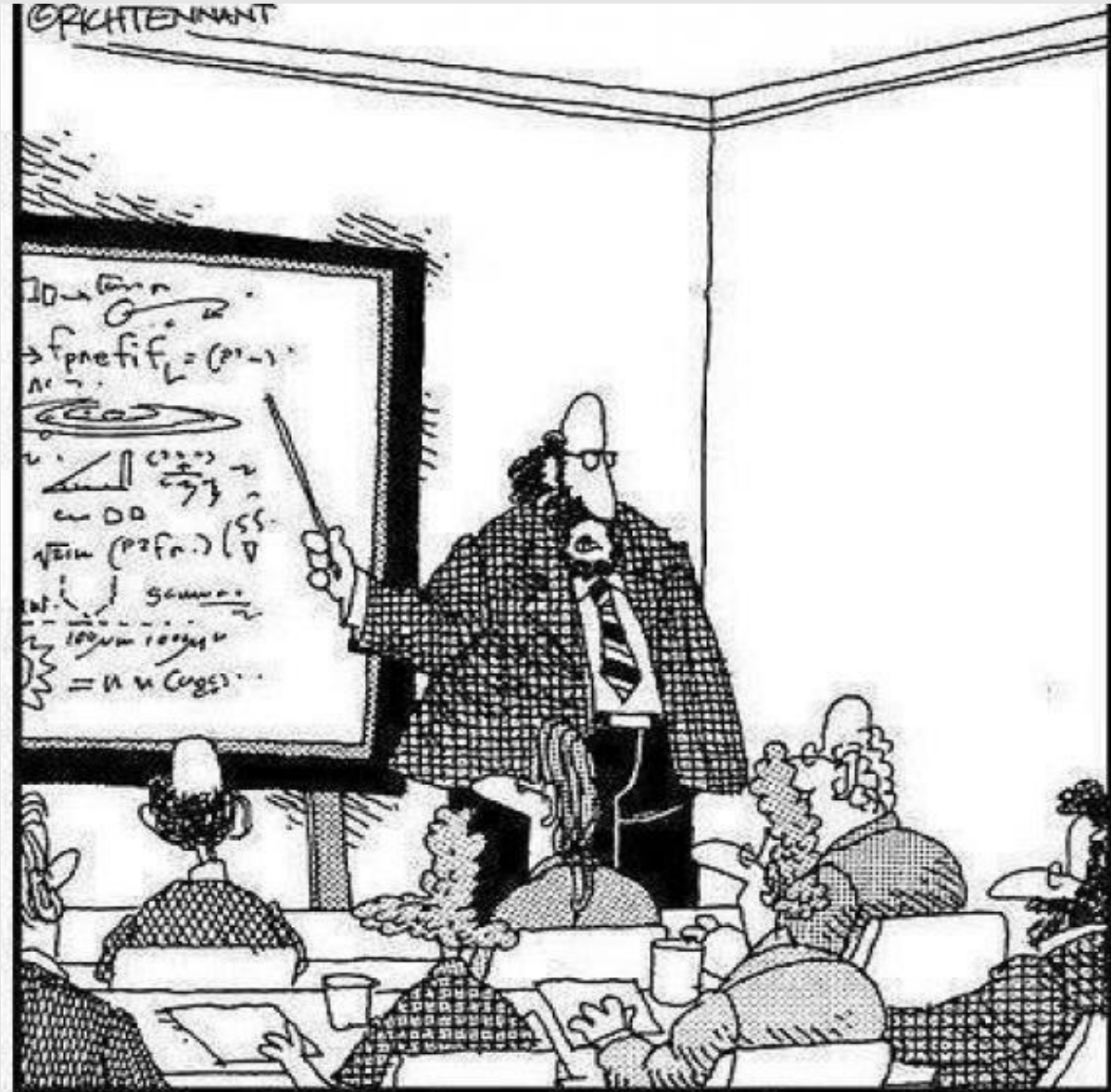


Historical Considerations: The Bush-Kilgore Debate

Issues in the Creation of the NSF

- Merit vs. Geographical Diversity
- Who Appoints the NSF Director
- Fundamental vs. Applied Research
- Who Owns the Intellectual Property
- Social Science Research

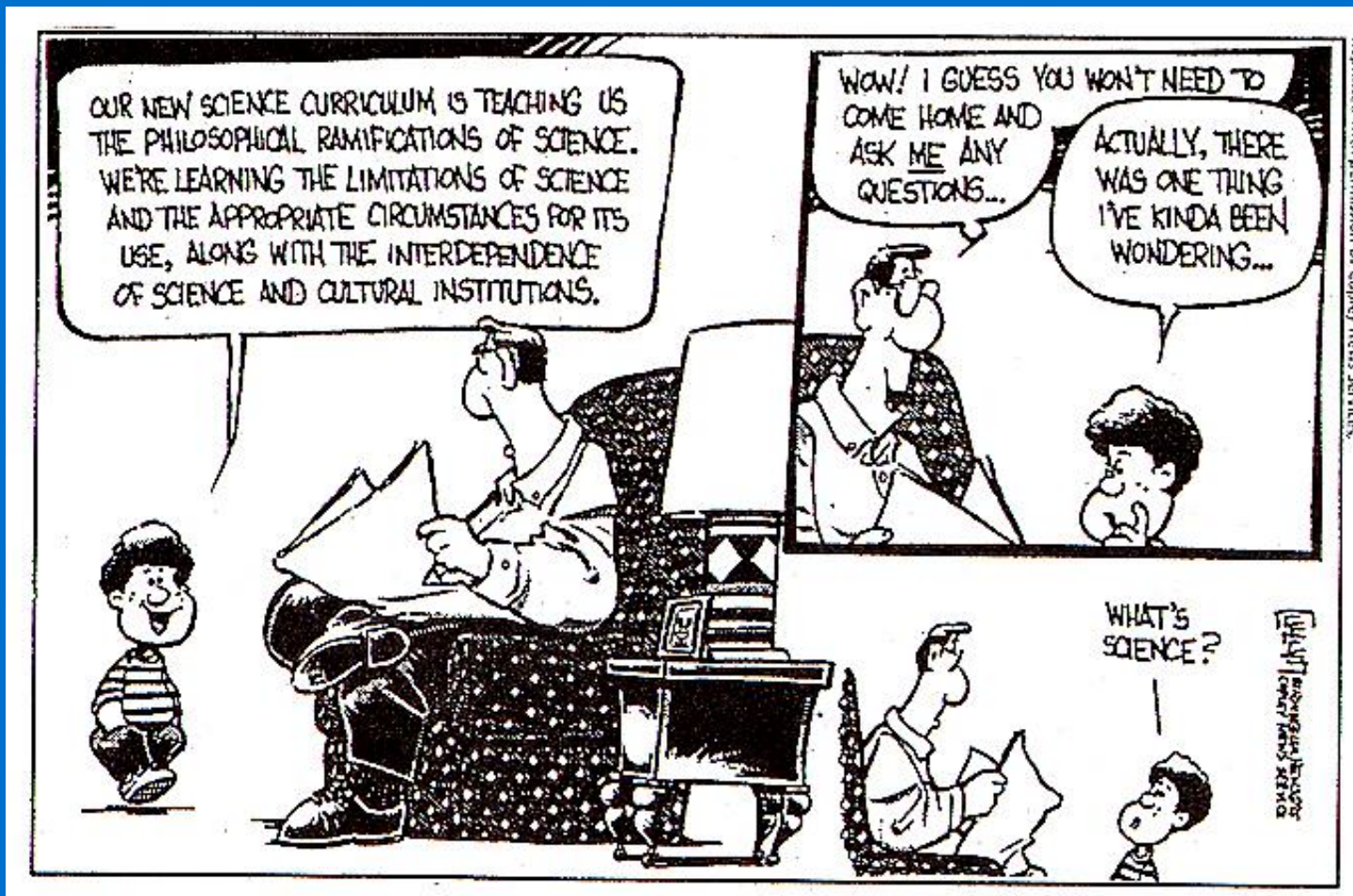
WHY UNDERSTANDING & ENGAGING IN SCIENCE POLICY MATTERS



“Along with ‘Antimatter,’ and ‘Dark Matter,’ we’ve recently discovered the existence of ‘Doesn’t Matter,’ which appears to have no effect on the universe whatsoever.”



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MANY
POLICYMAKERS
DO NOT
UNDERSTAND
SCIENCE



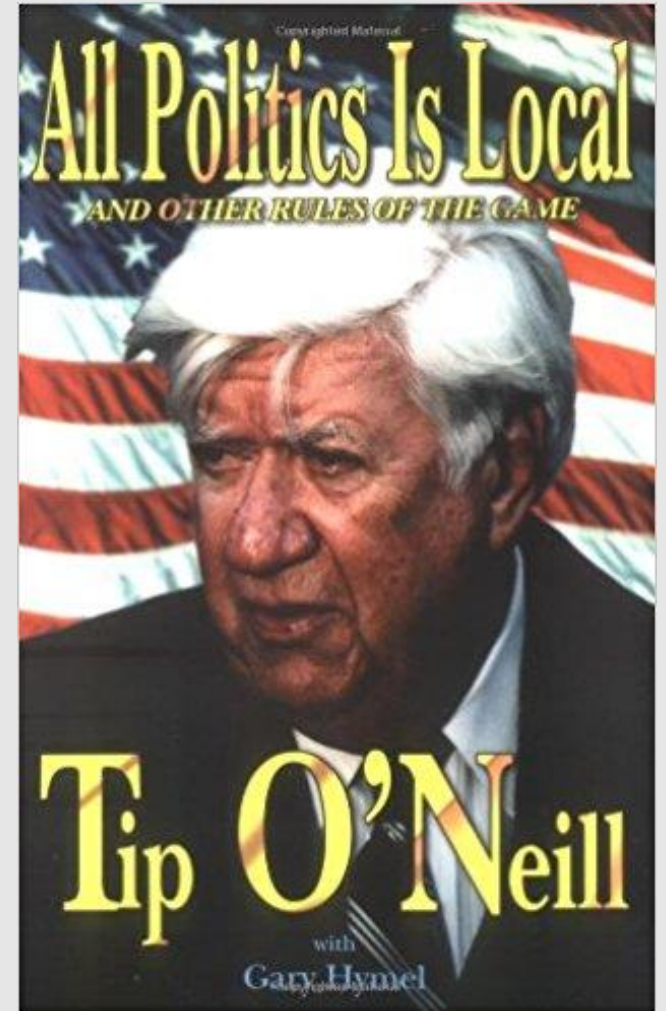
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Congress Profile

- Less than 5 percent of the 116th Congress have backgrounds in science or engineering.
- There are 1.5 physicists, 1 mathematician, 1 chemist, and 1 animal scientist in the 116th Congress (all in the House).
- There are 11 engineers, 16 physicians, 5 dentists, 3 veterinarians and 2 nurses in the 116th Congress.
- 214 have law degrees in the 116th Congress.
- In the 116th Congress, 17 members have no educational degree beyond a high school diploma and 6 have only associates degrees. Only 25 have doctoral degrees in any field.
- Good news: more STEM interested Freshman (e.g. Haley Stevens, D-MI).

Four Key Points to Remember for Effective Advocacy

- 1) All politics is local
- 2) All politics is personal
- 3) Data is good, but stories are better
- 4) The language you speak matters
- 5) While maps are good, tour guides are better



All Politics is Personal



**AUTOMOTIVE APPLICATIONS OF
BASIC RESEARCH**

Federally funded research laid the foundation for many technological advances contained in the modern car

- LCD Monitors
- Speech Recognition Technology
- Lithium-Ion Batteries
- Catalytic Converters
- Synthetic Polymers
- Shatterproof Windshields
- Power Windows
- Center Brake Light
- Semiconductors
- Airbag Deployment Sensors
- Remote Car Locks
- CD Players
- Extended Tire Life
- GPS
- Car Bumpers

Produced by the Association of American Universities, www.aau.edu, Sept. 2010

For more examples, see the “Why University Research Matters” at: www.aau.edu.

Federal funded scientific research helps soldiers in the field.

DOD Research: Empowering and Supporting Our Troops in Combat



a INDIVIDUAL FIRST AID KIT: Most soldiers carry a HemCon bandage, which stops hemorrhaging within minutes and was selected in 2004 as one of the "Army Top 10 Greatest Inventions." Research & development of the HemCon bandage was funded by the Army and performed by the US Army Medical Research and Materiel Command.

b INTERCEPTOR BODY ARMOR: Most soldiers wear a flexible and highly ballistic-resistant body armor system that protects them in combat. This lightweight armor is the result of materials (ballistic fibers and ceramic plates) and engineering design research sponsored by the Marine Corps, Army, and DARPA.

c JOINT PRECISION AIR DROP SYSTEM: Improved air delivery drops food and equipment closer to soldiers, increases the survivability of aircraft personnel and critical supplies, and makes humanitarian relief more efficient. This joint Army/Air Force research effort began in 2004.

d LASER DESIGNATOR: Soldiers' weapons are equipped with laser sights to increase their precision in the field. Initial laser research was started at Bell Labs in the 1950s and later sponsored by the Army and Air Force.

LUMINESCENT POLYMERS FOR EXPLOSIVE SENSING: DOD-sponsored research has recently identified nanotechnologies capable of detecting hidden improvised explosive devices (IEDs).

e MEAL, READY-to-EAT: Advanced processing techniques protect food rations from deteriorating in extreme environments. Nutrition technologies added to some rations enhance the physical endurance of soldiers. Biosensors and marker systems help detect contaminants in food. These advances were the result of research sponsored by the Army and conducted at its Natick Soldier Research, Development, and Engineering Center.

f NIGHT VISION GOGGLES: Image intensifiers employ the photoelectric effect, allowing soldiers to see images in very low levels of light. Current night vision technology is the result of several years of DOD basic and applied research.

g SOLDIER PERSONAL DIGITAL ASSISTANT: Soldiers in the field receive important situational awareness and information using a variety of technologies.

- **GPS:** Basic research funded over several decades by the Air Force, Navy, and the AEC (now DOE) led to the development of the global positioning system, which gives the specific location of a soldier anywhere in the world.

- **Wearable Soldier Radio Terminal:** This technology provides voice communications and links soldiers' personal digital assistants to FalconView, a new software that networks and maps soldiers on the battlefield. The research leading to this was funded by multiple contracts with various DOD sponsors.

- **Lithium Primary Batteries:** A lighter and longer-lasting power source for soldiers was developed as a result of basic research funded by DOE and applied research funded by the Army and DARPA.

h SOLDIER TRAINING: Gaming technology and the simulation of battlefield environments help prepare soldiers for deployment and provide them with theater mission training. The underlying technologies were developed from basic research funded by the Army and conducted by the Institute for Creative Technologies at the University of Southern California, starting in 1999.

i TRANSLATION DEVICES: Highly accurate voice recognition technology allows soldiers to generate and interpret speech in other languages. These translation devices have been used heavily by U.S. troops in Iraq. The original technology resulted from DARPA-sponsored research and is being improved by other DOD agencies.



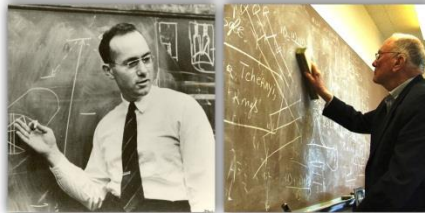
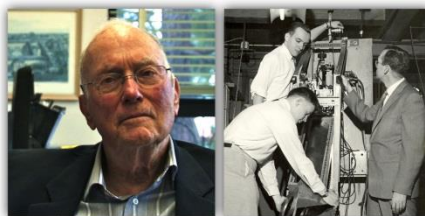
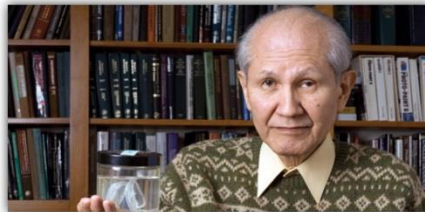
Tell A Story

Tell me a fact, and I'll learn. Tell me a truth, and I'll believe, but tell me a story and it will live in my heart forever.

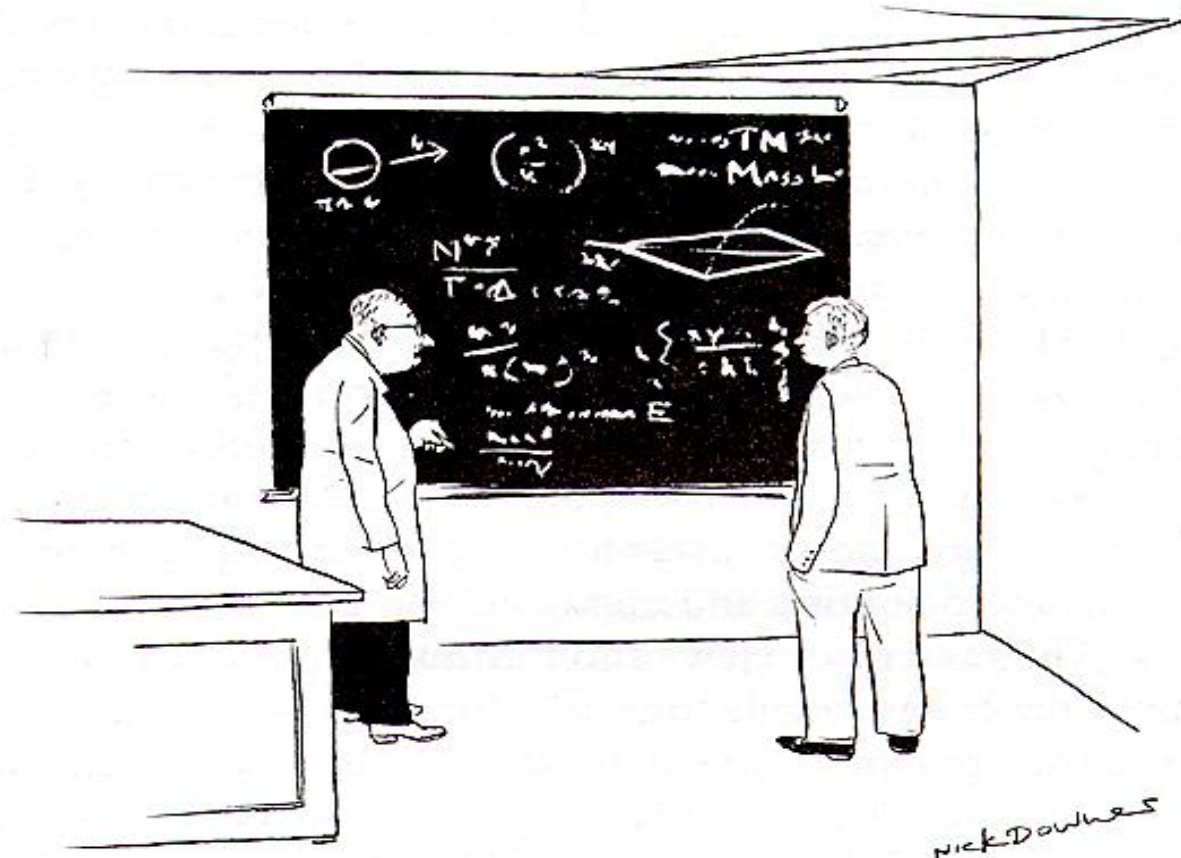
--Indian Proverb



THE
GOLDEN
GOOSE
AWARD



Language Matters: Overcoming the Curse of Knowledge



"IN LAYMAN'S TERMS? I'M AFRAID I DON'T KNOW ANY LAYMAN'S TERMS."

While Maps are Good, Tour Guides are Even Better!!!

1

University federal
relations officer

2

Scientific society
government
relations office

3

Congressional
Staff

- Personal Staff
- Committee Staff
- Local Staff

Why Effective Advocacy is Critical for the Research Community Right Now

- 1) Pressure on discretionary spending means potential cuts for key science agencies and programs...
- 2) ...and to thank Congress for recent funding increases.
- 3) Questions will be asked concerning if funding for science is being well spent.
- 4) Many in Congress are not familiar with science...
- 5) ...and graduate education.
- 6) To prevent laws and regulations that can harm scientists' ability to efficiently and effectively conduct science.
- 7) To help inform and shape public policy based upon evidence and scientific -- as opposed to alternative -- facts.

Thank you for your attention...



Contact Me



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ESEP: www.science-engage.org

Beyond Sputnik: www.sciencepolicy.us