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## How Science Makes America Great

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## How Science Makes America Great

The proposed Federal Budget cuts funding for NIH, NSF, and CDC by 16% each and for the EPA by a whopping 31%. Ouch! The situation seems ironic because of President Trump's slogan "Make America great again!", which I agree with wholeheartedly. In addition to being a scientist, I also love history (especially military history) and science is at the top of my list of what has made the United States great. Let's look at a few examples:

**Life expectancy** - - since 1900 life expectancy in the United States has risen from 50 to 85. The quality of life has improved too. The reasons include water purification and sewage treatment plants, vaccines, antibiotics, monoclonal antibodies, vitamin pills, clean air (no smog), and safer working conditions.

**Industry** - - one way to identify growth stocks is to look for the amount companies spend on Research and Development (R & D). That's science. The more a company spends on R & D, the better are its long term prospects. A list of achievements might include: permanent magnets\* and telephones, light bulbs, electric motors, nylon, synthetic rubber, plastics, computers, Bt corn\*, and fiber optics.

**World War II** - - justifiably we celebrate the bravery and sacrifice of the Greatest Generation, but our scientists also beat their scientists. Consider: codebreaking, penicillin, radar and sonar, combating fungal infections in the tropics\*, the landing craft designed by Andrew Higgins, applied mathematics and the convoy system, and for better or for worse, the atomic bomb and atomic power.

The American scientific community is the envy of the world. Just look at the number of Nobel Prizes awarded to US based researchers. How did the United States develop the people, facilities, and funding to achieve this scientific prominence?

A key ingredient is **universal education**. Our public schools are intended to educate everyone, not just the rich, the nobility, or those who had achieved a certain test score by age 11. This approach is equitable and it also keeps many late bloomers and eccentrics in the pool, so that their talents can blossom. One of the best examples is the Morrill Act

of 1862, which established Land Grant Universities right in the middle of our Civil War! UNL is a proud Land Grant University, intended to provide a cost effective education for all citizens of the state in a research-based environment. Nebraska has the advantage that people who grow up on farms make great scientists, being self-reliant with a great start understanding nature by having grown up in a genetics laboratory. UNL's Beadle Center is named for our Nebraska-born, farm-raised Nobel laureate George Beadle, who used fungi to show how genes work in all forms of life. A self-reinforcing consequence of this open approach to science in the United States is that we attract the best and the brightest from throughout the world. They come here, and they often stay here, raise their kids here, and help make the innovations that make the US a leader. Let's hope it stays that way.

The University of Nebraska is governed by an elected Board of Regents (BOR). During my term as UNL Faculty Senate President I got to observe and interact with the BOR. From my faculty perspective, I admired their collective approach to keeping college affordable, fulfilling the goals of a Land Grant University in a fiscally responsible manner, AND viewing the University as the economic driving force for the state. Science has economic impact. My own contribution many years ago was figuring out why some center pivot irrigation systems, made of stainless steel, collapsed of their own weight after only a year or two of use. The culprit was microbial corrosion carried out by a fascinating group of bacteria called the sulfate reducing bacteria. We recognized the problem, and solved it.

Why do we do it? I'm in science because it is rewarding. It is invigorating to discover how nature works. Scientists may act individually and in relative obscurity, but collectively we really do benefit society. Topics with \* indicate the contributions of my grandfather, my father, and myself. I view science as a family value, with a little pioneer spirit.

— Nickerson, K.W. 2017. Science makes America great. *Lincoln Journal Star*, Community Column, July 13, 2017.