

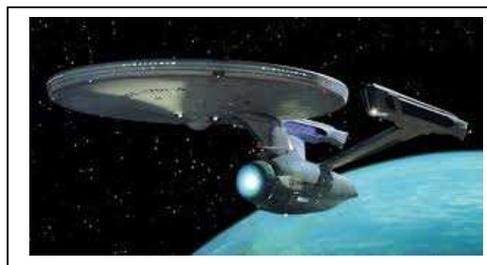
Seeking Tilden's Principles as Inspiration for American Youth in Everyday Life

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In one of the most vivid memories of my childhood, I'm nine years old and sitting on the floor watching the living room television at about 10 pm. It's July 20, 1969. My dad is sitting in a chair, also with his eyes glued to the ghostly black-and-white images on the screen. Both of us are thoroughly captivated by a live broadcast from the moon—Neil Armstrong is taking the first steps by a human being on the lunar surface. Forty-five years later, I still remember my feelings of awe and wonder as I watched this unbelievable but true event unfold in front of my young eyes.

The 1960's and early 1970's were a time when a young boy or girl could easily be inspired to pursue a life in science. The amazing accomplishments of NASA's Apollo program were in the news everyday. In school, my teachers, especially Mr. Czarnecki in the sixth grade, helped me understand this amazing news, and the more I understood, the more excited I became about wanting to be a part of it. Many kids, including me, dreamed of one day becoming astronauts and flying to the moon or Mars. Although reality was inspirational enough for us, we also had the optimistic vision of future space travel as presented on *Star Trek*. Every boy I knew wanted to be Captain Kirk, Mr. Spock, or Dr. McCoy.

The real-life feats of NASA and the seemingly tangible dreams of even greater things to come inspired me to pursue science as a career. Although I never became an astronaut, I eventually earned a degree in biology and worked as a laboratory and field biologist—while using my Schmidt-Cassegrain telescope to maintain an amateur interest in the stars and planets.



After gaining a variety of practical experiences in biology (my favorite of which was collecting and analyzing Great Lakes zooplankton aboard an EPA research vessel), I switched over to writing and editing in the fields of science, nature, technology, and medicine. In 2010, I formed my own corporation specializing in science and medical writing and editing. I doubt if I would have ever gotten into these professional areas without the spark of scientific curiosity that was lit in my youth by both Apollo and Mr. Czarnecki.

In retrospect, I now realize that I was exposed to the major elements of Tilden's Interpretive Principles—provoke, relate, reveal, address the whole, message unity, tangibles, intangibles, and universal concepts—not as part of an exhibit design or an interpretive presentation at a museum, but as part of the real, everyday world of my life at the time.

My attention and curiosity were **provoked** by the exciting news of astronauts exploring other worlds. I was able to **relate** this news to my life simply by going outside and looking at the moon with my own eyes. Yeah, that was a real place up there where those astronauts were walking around right now! And the super cool plastic models I built of the Saturn V rocket, Command Module, and spidery Lunar Module made me feel like I was a part of the whole wonderful adventure. A profound “wow!” factor was **revealed** to me as soon as I witnessed Armstrong and Aldrin bounding across the moon, and it was reinforced with every TV news broadcast and newspaper report of subsequent Apollo missions. The theme of an optimistic future of human space exploration was **addressed as a whole** by all of the Apollo lunar missions. Even the failed Apollo 13 mission did not interfere with this theme, because Apollos 14, 15, 16, and 17 were all successful. In fact, there seemed to be a **unity of this message** of grand cosmic possibilities everywhere I looked—including the space news I saw on TV, the teachings I received at school, the NASA-inspired toys my parents bought for me at stores, the trip my family took to Cape Kennedy, and the pop culture (such as *Star Trek*, *2001: A Space Odyssey*, and even *I Dream of Jeannie*) I was exposed to.

The facts of these things were **tangible** for me. The feelings of hope and excitement they inspired were **intangible** but no less real. The idea of historic human accomplishment through science and technology was certainly a **universal concept** that even a child could grasp.

Hard to get turned on today

Perhaps I’ve turned too old and grumpy, but I have a hard time finding elements of Tilden’s Interpretive Principles in the real, everyday world in which young people live today. Compared to the years when I was a kid, my observations suggest that it is much more difficult for young people in the United States to get interested in, or turned on by, science. There are few events in the news that I would classify as scientifically inspirational. With the retirement of the space shuttle, NASA lost its ability to send humans into space. Since then, we’ve been relying on the Russians to ferry our astronauts to a space station in which crews carry out mundane chores in low Earth orbit. Although we see pictures of rocks taken by robotic rovers crawling across the Martian surface, I submit that those crisp, colorful images—interesting as they are—do not provoke the level of excitement generated by the blurry, black-and-white images of Armstrong and Aldrin on the moon. News reports from the research world of genetics and biotechnology are occasionally exciting—raising fascinating possibilities regarding cloning, stem cells, or gene therapy. But concrete, tangible results that people can relate to are difficult to detect in these areas. Computer technology and other advanced electronic gadgetry get most of the “wow!” media hype these days. However, is a new and faster iPad really as profoundly revelatory as reaching new and exotic worlds?

In many school texts that I’ve worked on as an editor (as well as in some interpretive exhibits), I’ve observed a message that seems to be much closer to a future of doom and gloom than one of hope and encouragement. Concerns about global warming catastrophes, mass animal extinctions, and even life-destroying meteorite impacts may have various degrees of scientific validity. However, I suspect that an educational emphasis on such pessimistic possibilities, while perhaps leading some kids to become political activists, does little for genuine scientific understanding—or mental health. Do we really want our kids to feel so anxious over global warming, animal extinctions, and Earth’s future that they fear for their own chances of surviving to adulthood?¹ An increasing number of young people may self-identify as “environmentalists,” but several measures, including the Program for International Student Assessment, reveal that science proficiency scores among American students continue to plummet.²

A growing lack of interest in science among Americans has been evident for many years. According to a 2010 study by researchers at Vanderbilt University, the ratio of foreign-born to U.S.-born scientists and engineers in the United States doubled from 1994 to 2006.³ Besides making up an increasingly greater share of the U.S. scientific community, foreign-born residents are apparently also starting more and more high-technology businesses in the United States compared to the native-born population.³ Why are people from other countries apparently more scientifically literate and ambitious than people from the United States?

The turn of a phrase

I hope the above words don't come off as a stereotypical rant from an older guy who thinks "things were better in my day." But I would think that it's hard for anyone to argue against evidence suggesting that we have a problem concerning the condition of scientific interest and scientific literacy among Americans today—particularly American youth. And this outcome occurs despite decades of efforts to improve scientific education and interpretation in this country. Maybe we're doing something wrong.

I wish we, as a society, could reclaim a little more optimism about science and technology—and our future. I know that will be hard to do after so many NASA failures, pollution problems, habitat destructions, WMD scares, Internet identity thefts, gene therapy setbacks, budget deficits, and other bleak realities of the modern world. But sometimes all it may take to promote a shift in attitude is the turn of a phrase. For example, instead of saying, "Scientists believe that human activities may cause thousands of animal species to become extinct within the next 50 years," why not say, "Scientists believe that more research and conservation actions could help thousands of animal species survive long into the future." If you were a kid in sixth grade, which version would you find more likely to make you want to become a scientist?

Ideally, we as a nation should have a great scientific goal again—a goal with a **unifying message** that **provokes** attention and curiosity, that people can **relate** to, that **reveals** a "wow!" response, and that **addresses the holistic theme** of "we can do it, and I want to be a part of it!" I would like to see Tilden's Interpretive Principles operating in the real, everyday lives of American youth again. My preferred great goal would be colonization of the moon or a human voyage to Mars. I have hopes that the planned Orion project of NASA and the European Space Agency will be a step in that direction. To share costs, an ambitious moon or Mars mission should be an international goal, involving governments and private corporations around the world. I'm convinced that such a goal—if firmly committed to, instead of being yanked back and forth by a forever-fickle Congress—would do more for scientific enthusiasm and understanding among young people than all the interpretive exhibits and school textbooks in the world.

Before we get to that desired point as a society, we as interpretive and education professionals must continue to do our best to work the concepts behind Tilden's Principles into our exhibits and writings. However, I urge everyone to keep in mind that an optimistic, positive presentation can do much more to inspire youthful hope and accomplishment than a negative presentation focused on scary warnings. I wish all kids today could know the unique mix of excitement, wonder, hope, awe, and joy that I felt on that night of July 20, 1969, as I watched Neil Armstrong step onto the moon and say, "That's one small step for a man, one giant leap for mankind."