The Scientific Method: Doubt Leading to Wonder
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Tri-County Unitarian Universalists
Summerfield, FL
Rev. Cynthia A. Snavely

My little introductory blurb for today's service was, "The physicist Albert Einstein said, 'Logic will get you from A to Z; imagination will get you everywhere.' What questions have we not yet thought to ask? What wonderful answers may we yet find?"

I don't remember my school science classes as being filled with wonder, but I love when I happen to be driving somewhere on a Friday afternoon and so get a chance to hear at least part of Science Friday with Ira Flatow. I am always fascinated. Some recent topics include on February 18 "New Device Helps People With Paralysis Walk Again Spinal cord injuries are notoriously difficult to treat, especially for those who have been paralyzed for several years. Now, researchers have developed a new implant that is able to reverse paralysis in patients with complete spinal cord injuries. The device uses specially designed electrodes, which bring the brain back into communication with the patient's lower body. The findings were recently published in the academic journal Nature Medicine. Ira talks with the study's co-authors, Jocelyne Bloch, a neurosurgeon at Lausanne University Hospital, and Grégoire Courtine, professor of neuroscience at the Swiss Federal Institute of Technology, based in Lausanne, Switzerland.." and "New Energy Record Set By Fusion Reactor The promise of a human-made, sustained, controlled nuclear fusion reaction has always seemed to be 'just a few decades away.' But now recent results from JET, the Joint European Torus experiment, have researchers hopeful that practical fusion may indeed be possible as soon as 2035. In the experiment, a high-temperature plasma made of equal parts deuterium and tritium was confined in a magnetic containment vessel known as a tokamak. The run produced 59 megajoules of energy over a fusion 'pulse' of five seconds, considerably longer than previous attempts. While the experiment did not produce more energy than it took to produce the extreme conditions needed to induce fusion, researchers took the run as a proof of concept that an upcoming reactor called ITER should be successful. Alain Bécoulet, head of the engineering domain for the ITER project and author of the upcoming book Star Power: ITER and the International Quest for Fusion Energy joins Ira to discuss the recent advance at JET and the prospects for producing a sustained, controlled nuclear fusion reaction—what Bécoulet calls mastering a small piece of the sun," ." Science Friday : NPR. As I said, "Fascinating

I was too old to watch "The Magic School Bus" when it first came out in the 1990s, but I enjoy seeing it in the presence of children now. For those of you who have never seen it an eccentric teacher Miss Frizzle takes her class for field trips on a magic school bus that can go underwater, fly in space, shrink and go through someone's body, etc. The Magic School Bus (TV Series 1994–1997) - IMDb

My school science classes were not so exciting. They seemed to consist of a lot of memorizations. Learn the names of all the bones of the body. Learn the names of the different stories of a rain forest. Learn the names of all the parts of an atom. Learn the periodic table. We didn't ask questions. We didn't explore. We simply learned by rote a science vocabulary. Not exciting. But science can be thrilling. What if instead of teaching me to learn that ROY G. BIV was the way to remember the colors of the rainbow and that stalagmites had to be mighty to grow up and stalactites had to hang on tight to grow down my teachers had installed in me an awe that rainbows, stalagmites and stalactites existed at all?

Back to Science Friday. On February 11 one of the segments was "Meet The Drag Artists Who Are Making Science More Accessible Each generation has had science communicators who brought a sometimes stuffy, siloed subject into homes, inspiring minds young and old. Scientists like Don Herbert, Carl Sagan, and Bill Nye are classic examples. But our modern age of social media has brought more diverse communicators into the forefront of science communication, including the wild, wonderful world of STEM drag stars. These are queer folk who mix the flashy fashions of the drag world with science education. Some, like Kyne, use TikTok as a medium to teach concepts like math. Others, like Pattie Gonia, use drag to attract more people to the great outdoors. The accessibility of the internet has made these personalities available to a wide audience. Kyne and Pattie Gonia join Ira to talk about the magic drag can bring to science education, and why they think the future of SciComm looks more diverse than the past." Science Friday : NPR

When we are really scientifically exploring nature, seeing new things or seeing old things in new ways instead of just cataloguing what we see, nature can change us. In an interview with Yale Climate Connections Pattie Gonia, who out of drag is Wyn Wiley, a professional photographer, said, "I really think that nature, if we're letting it do its thing, shows us that binaries don't exist. There is never just an either/or. And I think for a queer person to see that in nature – when I saw that in nature – my life changed," A conversation with environmentalist drag queen Pattie Gonia » Yale Climate Connections.

What if Wiley had never doubted that nature was binary? Without that doubt could he have seen what was there in front of him? Would his life have changed? Science has made some of its worst mistakes when people have refused to doubt. Horrific experiments have been done on African Americans and on animals because for more than a hundred years, white scientists believed that African Americans and animals did not feel pain in the same way as white people. That lack of doubt in what one was told continues. In fact, in 2016 it was reported that, "Numerous studies have shown that black patients are less likely than their white counterparts to receive pain medicine for the same injury. Now, new research from the University of Virginia suggests a reason why. It found that a substantial number of white medical students and residents believe black people are less sensitive to pain," UVA Study Links Disparities In Pain Management To Racial Bias : NPR.

In science it is necessary to doubt what one has been told. Is that really true? Is that really impossible? If no one had ever questioned, if no one had ever followed their doubt we might still believe the earth was the center of the universe. Surgeons still might not wash their hands between patients. You might not be able to throw your leftovers in the microwave and have a warm meal in under three minutes. You might not be walking around with your pacemaker and artificial knees.

Let me share with you this week again a favorite excerpt of mine from a literary work. This is from Eric Bentley's English translation of Bertold Brecht's play Galileo.

"Every day something is found. Even the centenarians have the young shout in their ears what new thing has been discovered. Much has been found already, but more can be found in the future. And so there is still much for new generations to do. The old teachings, believed for a thousand years, are on the point of collapsing. There is less wood in the beams of these structures than in the supports which are supposed to hold them up. But the new knowledge is a new building of which only the scaffolding is there. Even the teaching of the great Copernicus is not yet proved. But (humanity) will soon be properly informed as to its dwelling place, the heavenly body where it has its home. What is written in the old books does not satisfy (humanity) anymore.

“For where Belief has sat for a thousand years, there today sits Doubt. All the world says: yes, that is written in the books, but now let us see for ourselves.

“The most celebrated truths are tapped on the shoulder. What never was doubted is doubted now.

“And thereby a wind has arisen which blows up the gold-brocaded cloaks of princes and prelates, so that fat or skinny legs are seen beneath, legs like our legs.

“The skies, it has turned out, are empty. (The people) laugh merrily at that.

“But the water of the earth drives the new distaffs, and five hundred hands are busy in the rope and sail shops at the dockyard making a New Order.

“Even the sons of fishwives go to school. In the markets, the new stars are talked about.

“It was always said that the stars were fastened to the crystal vault so that they could not fall. Now we have taken heart and let them float in the air, without support, and they are embarked on a great voyage –like us, who are also without support and embarked on a great voyage.”

Einstein said, ‘Logic will get you from A to Z” (but I say, not if you start out on a falsehood you don’t question). Einstein finished the quote by saying “imagination will get you everywhere.” Knock out the supports. Doubt. Allow yourself to float. It will be a great voyage.