

## Searching for Truth in the Pandemic

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Good morning. I want to talk about truth and science and their importance in our world today. I'm also going to speak about doubt and uncertainty. During our modern plague, we hear conflicting views all claiming to be true, as well as widespread conspiracy theories. The fourth of our 7 Unitarian Universalist principles says that we are committed to a "free and responsible search for truth and meaning." I'm going to delve into the significance of this principle and its relevance to how we can better understand current claims of scientific truth.

In addition to our 7 principles, UUs affirm and promote 6 sources of wisdom and spirituality, and the 5<sup>th</sup> of these refers to "the guidance of reason and the results of science." We know that science matters, evidence matters, and bad things happen when we try to pretend that the science around things like climate change, vaccinations or pandemics can be ignored, distorted or denied.

We also know that there are laws of how the universe works that help us understand why things happen, and we've known this for a very long time. Elements of the scientific method were pioneered by Aristotle in ancient Greece. He was born in 428 BC, in the middle of a typhoid pandemic that ultimately wiped out 1/3 of the population of Athens. Unlike his teacher Plato, who valued thinking over observing, Aristotle called for careful observation and reasoning about the natural world.

Lesser known in the West is the brilliant Islamic physicist, mathematician and astronomer Ibn al-Haytham. He was born in Basra, which today is in Iraq, in the year 965, and spent his adult life in Cairo, where he died in the year 1040. Ibn al-Haytham lived during the golden age of Islamic science, and he was an early proponent of the scientific method. He said that "finding the truth is difficult, and the road to it is rough. For the truths are plunged in obscurity." He also described the duty of those studying scientific writings to be critical readers. Ibn al-Haytham said that if learning the truth is their goal, students of science must make themselves "enemies of all they read and attack it from all sides." Enemies of all they read -- today we call this critical appraisal, which means applying rules of evidence to analyzing scientific studies.

So how do we go about searching for truth, and how do we know when we have found it?

That brings us back to the 4<sup>th</sup> principle – the free and responsible search for truth and meaning. This principle is often explained in theological terms, related to the freedom and diversity of religious inquiry, and this is a fundamental aspect of Unitarian Universalism. But today I'm going to relate this principle to science, as I start by defining the terms Free, Responsible, Truth and Meaning, and view these as building blocks in constructing houses of understanding.

A free search, or freedom of scientific investigation, means that we are encouraged to formulate our own questions and answers about the riddles and mysteries of the universe, without the constraints of any particular beliefs. We are free to inquire about any matters of importance to us and society. An example of a violation of such freedom occurred when the US Congress passed The Dickey Amendment in 1996, which stated that "none of the funds made available for injury prevention and control at the Centers for Disease Control and Prevention may be used to advocate or promote gun control." This law, successfully lobbied for by the National Rifle Association, was in place until late last year. For 23 years, public health researchers were prohibited from investigating one of the biggest causes of death in the US -- gun violence.

Another violation of free scientific inquiry occurred in August 2010, when climate scientist Michael Mann, a professor at Penn State University, was opening mail when white powder fell out. It was cornstarch, not anthrax, but this was only one in a long series of threats Mann has received since the late 1990s in response to his research demonstrating how global warming produces rising temperatures. The sender of one email said that Mann and his collaborators "ought to be shot, quartered, and fed to the pigs along with [their] whole damn families." And we are well aware of frequent attacks on scientific integrity by the current US administration.

The next building block is "responsible," and responsibility is critical in scientific inquiry, for freedom without responsibility can lead to dangerous results. I spoke here last year about the extremes of irresponsibility in Nazi medicine. Under the Third Reich in Germany, which before Hitler had been the world leader in medical teaching and research, doctors orchestrated a killing machine that selected victims for sterilization, euthanasia and genocide and performed gruesome torture under the guise of experimentation.

So, what comprises responsible science?

First, we need responsible methodology. That's where the scientific method is important. This method applies logic and objectivity to the understanding of phenomena. As I learned in my biostatistics and epidemiology courses, we start with a hypothesis, then we plan an experiment to test the hypothesis. Next, we observe and collect data. Finally, we analyze and interpret the data.

The scientific method uses a well-tested combination of direct experience and reason to sort out fact from fiction, truths from untruths, and what is likely from what is unlikely. An example of bad methodology with dangerous consequences was the article by Andrew Wakefield published in the journal *Lancet* in 1998 claiming a relationship between the measles-mumps-rubella vaccine and autism. It was retracted by *Lancet* 12 years later, after it was shown to be based on flawed and falsified data, and its author was barred from practicing medicine. But even today, that study and its author continue to fuel the anti-vaccine movement that is responsible for the deaths of many children.

A more recent article with faulty methodology, published earlier this year, proposed that the drugs chloroquine and hydroxychloroquine are effective treatments for Covid-19. That study had no control group, and several controlled studies since then have demonstrated that these drugs are not only ineffective, but they often cause harm. Nonetheless, those at the highest levels of power still advocate these medications, unfortunately even in Mexico. As Ibn al-Haytham cautioned us a thousand years ago, we must look at studies critically and be enemies of all we read.

But responsible science is about more than methodology. There are ethical rules that emerged from the ashes of World War 2 and the Nuremberg doctor trials of a handful of the thousands of misguided Nazi physicians. These rules say that human research should be voluntary with informed consent, should not be harmful, should promote the well-being of patients and society, and should do so in an equitable manner.

That last point, equity, is particularly important today in planning the implementation of new treatments and hopefully vaccines for coronavirus as they become available. Vulnerable populations, including people of color, migrants and those living in poverty, should be a central priority for protection, but will they be the last to receive it? This begs the following questions: who owns science, and in the context of this pandemic, what, if any, should be the role of profit and private ownership of science and technology? The answers to those questions deserve a separate talk, so I'll just leave them for you to ponder for now.

We've talked about freedom and responsibility, but what about truth, our third building block? Defining truth is challenging in this era of "alternative facts."

Now, I've been accused of being a Marxist, and I admit that I'm a fan of the Marx brothers. Their 1933 film *Duck Soup* includes the following dialogue that gives an interesting spin on defining truth and alternative facts:

Mrs. Gloria Teasdale (played by Margaret Dumont) says: "Your Excellency, I thought you left."

Chicolini (played by Chico Marx) says: "Oh no. I no leave."

Mrs. Teasdale: "But I saw you with my own eyes."

Chicolini: "Well, who ya gonna believe, me or your own eyes?"

The term *alternative facts* is also reminiscent of the term "*Newspeak*" in George Orwell's 1949 novel *1984*. Orwell says that "*Newspeak*" is "designed and controlled by the state in order to suppress free thought, individualism, and happiness." This language in both that novel and today's reality aims to shape peoples' minds to what the State wants them to think, feel and even see.

Truth is defined as a fact or belief that is accepted as true. But who accepts it as true? Is truth absolute, or does it vary by observer or when it is observed. A frequent metaphor used by UUs describes our theological view of truth as the sun, and we're all in a cathedral trying to

understand and describe it. We're all standing at different stained glass windows within the cathedral, so we each perceive the sun differently. But we're all looking at the same sun.

Another metaphor that many of us know derives from ancient India – the 3 blind men and the elephant. Each one feels a different part, but only one part, such as the side, the trunk or the tusk. They then compare notes and learn that they are in complete disagreement, though they are describing the same animal.

So, truth is often elusive, but may be approached when we put our observations together. But observations only get us so far. Albert Einstein said: "It would be possible to describe everything scientifically, but it would make no sense; it would be without meaning, as if you described a Beethoven symphony as a variation of wave pressure."

That leads us to meaning, the final building block from our 4<sup>th</sup> principle. In science, meaning is what is intended to be conveyed or interpreted by a concept or observation, what the scientist wants us to understand. Using the scientific method, we can interpret the data we collect and sometimes make conclusions about or interpret the truth we observe, and thus give it meaning.

But interpretation of data can also get us into trouble. An important concept in research methodology is bias, which is something that causes a systematic deviation from the truth. A current example of one type, detection bias, is responsible for much of the wide variation in reported mortality rates from coronavirus infections, caused both by differences in rates of disease testing and inaccurate attribution of deaths to Covid-19. Both of these will yield biased mortality rates.

Einstein also said: "Two things are infinite: the universe and human stupidity; and I'm not sure about the universe."

Now, a sensible 7 year old could tell you that it's not a good idea to drink bleach and other cleaning products. Yet, so-called bleach cures did not start in the Oval Office, and may be driven by profit as well as stupidity. Mark Grenon, the self-appointed archbishop of Genesis II, a Florida-based so-called "Church of Health and Healing," is the largest producer and distributor of bleach as a miracle healing agent. On his website, he calls it "master mineral solution," and claims it can help the body heal 99% of all illnesses, including cancer, malaria, HIV/AIDS and autism. Grenon is known to have influenced current presidential advice on ingesting household cleansers.

In a recent op-ed in the New York Times, 4 mothers of autistic children who are working to prevent medical misinformation discuss some of the dangers of the current pseudoscience movement. They explain how the pandemic has exposed the ways this movement is using social media and fear to peddle their products, and call for more responsible content management by large social media companies. These mothers argue that people are drawn to pseudoscientific ideas by a "siege mentality, rooted in the ideology of the anti-vaccine

movement, based on anecdotes, conspiracy theories and a fear-mongering distrust of so-called Big Government,” often linked to the disproven autism-vaccine myth.

As a pediatrician, the use of vaccines to keep kids healthy is close to my heart. As young child in the 1950s, I have vague memories of devastating polio epidemics, and as a pediatric resident in Pittsburgh from 1979-82, I cared for many children who died or were permanently disabled by conditions we rarely see today due to vaccines. I know that vaccines save lives. Yet when I was in practice, I worked with a number of parents who were skeptical or hesitant about vaccines, and a few who refused them entirely, and I’m familiar with some of their concerns.

Behind the anti-vaccine movement is big money from right-wing foundations, as well as several prominent celebrities, TV doctors and other self-interested individuals. Their funds are used to pay for large-scale online campaigns and public events. Organized anti-vaxxers have recently been seen demonstrating side-by-side with armed right-wing militia at state capitals to end sensible stay-at-home orders and other social distancing mandates.

Many well intended new parents have never seen the devastation caused by vaccine preventable diseases that have now become rare, and parents are understandably concerned about vaccine safety, so they may be ripe for recruitment by anti-vaxxers. My friend Dr. Paul Offit, in his book *Deadly Choices*, speaks of the critical importance of mistrust in explaining the views of vaccine hesitant parents. He says: “A choice not to vaccinate is a choice not to trust those who research, manufacture, license, recommend, promote, and administer vaccines – specifically, the government, pharmaceutical companies, and doctors.”

To repair this mistrust won’t be easy. In fact, there may be good reasons not to trust the government or drug industry – I often don’t -- and many of us have known doctors who are not trustworthy. In talking with parents who were skeptical about vaccines, I would always share the facts about their effectiveness and safety as well as possible side effects, but I believe the most helpful way some of them were convinced to accept vaccines came from developing a trusting relationship over time.

It’s important to appreciate that science is a process, not a conclusion. Everything we know through science is the best understanding that we have at the time, not necessarily the final answer. The picture can and often does change as we get more information, and scientists must be comfortable with uncertainty and doubt. The biologist Carl Bergstrom has recently called upon the media to “recognize that scientific studies ... are provisional ... Anything can be corrected. There’s no absolute truth there ... each finding is just adding to a weight of evidence in one direction or another.”

So what do we know, and how do we know it? If we accept truth as a process rather than an absolute, we should also understand that we are on a continuous search for truth and meaning. Learning and growing are ongoing parts of what we do as seeking human beings. Just as we UU’s abhor fundamental truths in religion, we should also be skeptical about dogmas that claim to be scientific truths.

I talked before about critical appraisal of what we read, and I understand that very few of you have the training in medicine, epidemiology and biostatistics to analyze medical research articles. So I recommend that you choose a few go-to sources that are trustworthy with factual information. For the coronavirus pandemic, the site I recommend is CDC.GOV, and for local information, the Covid19 SMA Facebook page or website.

So, to conclude: through science, through relationships, through stories, through experiences that we can't yet explain, we gather up building blocks and create structures of understanding. These structures may expand or shift or change over time. Sometimes we may even need to tear down a wall or two, or we may need to put in a new window or door.

Our responsive reading said: "Those that would silence doubt are filled with fear; their houses are built on shifting sands. But those who fear not doubt, and know its use, are founded on rock." Throughout the span of our lives as Unitarian Universalists and rational human beings let us commit to building ever sturdier and more beautiful houses of understanding to live in and explore from, with foundations of rock. Together, we can make it so.