

Yellowstone

Earlier this year, I was reading Simon Winchester's *A Crack at the Edge of the World*, which is centered on the story of the San Francisco Earthquake of 1906. But if you have ever read Simon Winchester, you know that his stated topic is just an excuse to open up a window onto a new way to look at the world. His story of the history of earthquakes lays out some convincing and disturbing evidence of the way earthquakes affect one another – that they may not be isolated events. At the end of the book, his investigation takes him on a road trip in early 2006 to the Denali Fault in northern Alaska. On the last pages he writes:

“Now that I had seen the Denali Fault and the (Trans-Alaska) Pipeline there was however, one final thing to see – and that required my driving yet another 4000 miles back down south... to my goal by way of the imposing stone gateway into the first of America's great national parks, Yellowstone.”

As soon as I read this, I knew for some strange reason, that I had to go to Yellowstone. And so next week, my brother and I will go on another of our almost annual Brother Adventures to attend a week-long class at University of Montana to learn about Yellowstone. In preparation for this, I have been doing as much reading as I can about Yellowstone and thought that there would be a service in all that reading. The talk today is much different than I had expected it would be.

I want to begin with two personal stories about Yellowstone.

The first is about my own experience at Yellowstone in 1958 as a nine-year old. My family had gone out there that summer as part of a 5 week Western road trip. One morning we got going early to see the Old Faithful geyser. The plan was to go on a guided walk after breakfast to a spot that would give you a great vantage point. Apparently I became very cranky, which I can only assume was due to excessive teasing by my older brother, and for some reason my father had had it with me and told me to I did not have to go on the walk and I could stay at the geyser and fend for myself. So I was left on my own and soon found myself befriending a boy from California. I would never have done that if I was with my family. As we stood side by side, Old Faithful, on schedule, began to spew its how steam. When Old Faithful had finished spewing, the boy from Southern California turned to me and said very matter-of-factly: “It's not as good as Disney land.” Disney land had opened recently and it was every 9 year-old's dream to go to the Wonderful World of Disney; it sure was mine. Still I found his comparison strange.

And for many years, that story represented for me the hurdle faced by the environmental movement – given the choice between the natural phenomenon of Yellowstone and the fabricated world of Disney, most Americans will take Disney magic.

But as I began to read more about Yellowstone this summer, I thought about this story some more. And I realized that my California friend at Old Faithful might have had it right in that we were looking at Yellowstone as if it was just a source of entertainment and amusement. In 1958 we did not know much more so the comparison might have been fair. However, there is so much more to the Yellowstone story that we know about today, than just some physical phenomenon to stare out. Hopefully you will get a sense of that from my talk this morning.

My second story happened soon after Mt. St. Helens erupted in 1979. WE were living in the State of Washington at that time and came very close to having our home inundated from the ash fallout even though we were about 125 miles away. However, we were close enough to be awed by the power of a volcano. That morning, before the volcano blew, I was out in the yard roto tilling. It was hot and I was perspiring profusely and had my shirt off and my head down watching the tiller till. But then all of a sudden I felt chilled. While putting my shirt back on, I looked up and saw a large black cloud covering the whole sky moving from West to East. I am sure that if I had not been aware of the possibility of the volcano erupting, I would have been an easy convert to any religious leader who could help explain this phenomenon. Forester Church in his book “our Chosen Faith” says that it is human-kind's awareness of death that created the need for religion. I think experiencing a volcanic eruptions would be another reason for people to want religion.

A few weeks after the Mt Saint Helens eruption, a vulcanologist came to town to give a lecture. I thought vulcanologists only existed on Star Trek. Needless to say, he opened my eyes to a whole new discipline within geology that had been going through some impressive changes. He described the various types of volcanoes from the continuous lava flows from volcanoes in Hawaii to the classic mountain tops like Mt. St. Helens or Mt. Vesuvius that explode with vicious force. In the case of St. Helens, the volcano blow off 1 cubic mile of material that spread ash over several hundred miles. Thinking about a cubic mile of material is a bit mind boggling and makes human created chemical or nuclear explosions seem very hum-drum.

But then he talked about Super Volcanoes. A super volcano is capable of blowing off 240 cubic miles

and spread ash and other material over thousands of miles several feet thick. They can bury and wipe out whole species either by burying them, suffocating them with the ash in the air or starving them from the crops that are wiped out.

He then went on to say that Yellowstone was formed by supervolcanos.

Now when I was in Yellowstone in 1958, no one realized that Yellowstone was a supervolcano. This was not recognized until satellite photos in the 1960's and 1970's of the area revealed that the park is actually the formation that remained after several recent, in geologic time, eruptions. The large basins that remain after 100's of cubic miles of rock has been blown away are known as calderas. The Yellowstone we see today is comprised of several large calderas. This along with other evidence of the the thick remains of ash from this volcano being identified throughout the mid-west, lead to a whole new understanding of what made Yellowstone what it is today and it influence on life in North America and probably beyond.

And for today's talk, it led me to another level of my understanding of **spirituality**.

Didn't see that coming did you!

I used to view religion and science as a zero-sum game. I saw religion as having evolved to help humans understand the world around them. If I had no geologic background, how could I explain what I saw as I looked up from my roto-tiller in Kennewick Washington as the Mt. St. Helens curtain **of ash came** down on the sky above? For what ever reason, humans are driven to find explanations to the world around us. Some of us do this based on intuition, some by experience, some from others explanations, some of us do it by way of analogy, but we are all doing it and doing it all the time. It is what enables us to process information and make decisions, for better or for worse.

Initially the only tools we had were our senses and our wonderful, but evolving minds. With that we created explanations. Explanations for how humans began, how the world was formed, how the sun revolves around our planet or vice-versa. Religion was initially the embodiment of all those explanations. For example, although in general, today is much like yesterday, over time we see that there are patterns over the timeframe of a year. Thus we identified seasons; but we needed explanations of why there aer seasons. So we created religious traditions that helped to celebrate and show reverence for those responsible for the changing seasons. And religious leaders who often were

the same as the tribal or city-state leaders, were the stewards of those explanations.

But with science – stating hypotheses, establishing experiments to prove or disprove the hypothesis and then measuring the results of our experiments – and with improved instrumentation for measuring the experiments- we have made long strides in providing testable explanations for these mysteries. Often religious leaders fought those insights as they saw it as a direct threat to their turf.

My first UU minister was Brandy Lovely, a name that I would love to use if I ever write a novel. He would define God at each service as the mystery in our world that could not be explained. This is what I refer to as the “residual God”¹ – what's left over after science has explained as much as it can. As we learn more, the residual value would naturally become smaller. And probably more importantly the role of the religious leader in a community becomes smaller – they are not asked to be the resident expert on all things moral, physical, biological, ethical, social, historical, medical, psychological, etc.

The power of science over classical religion became very clear as I read about Yellowstone. It strikes me that the Abrahamic traditions that are at the root of Judaism, Christianity and Islam is limited in their perception of both time and space. As you read about the geology and biology of Yellowstone, you get a whole new insight into both time and space that go beyond the “wow” effect of spewing geysers and boiling hot springs.

When you think about it, it makes sense. The perspective of our western religious ancestors until quite recently was a time horizon of thousands of years, distances of about a 1000 miles that they had either traveled or had met people who had traveled and a very limited knowledge of what was below the crust of the earth – maybe 100 feet for a water well. Distances above the earth's crust was limited to the tallest building and your ability to jump.

But what do you see at Yellowstone given our current scientific knowledge:

First, it is a display of some 200 million years of geologic activity including volcanoes and massive shifts of the earth's crust and the significant impacts of water and wind erosion. At a centimeter of movement per year, you can really make some major moves over 200 million year. Yellowstone's

¹ Jerry Ross's response pointed out that as we learn more from science, the wonder of the world around us expands including the mystery. Thus “God”, the unexplained mystery, grows larger with each scientific breakthrough. My comment was oriented toward the traditional God of the Bible and Koran. Jerry's point, however, is very valid.

geology displays these movements at the surface for all to observe.

Second, we realize now that we are seeing on the surface of Yellowstone the results of significant sub-surface geologic activity. And with our measurements, we know that the activity is far from dormant but part of an ongoing process. Creation is not over, it is still happening. The Biblical Lord was not done after his day of rest. Apparently there was a second, third and many more weeks of creating.

Abrahamic religions' view of biology was based on what existed in a short span of a few thousand years in a relatively similar climatic zone as far as temperature and rainfall.

Yellowstone is a display of biology spanning hundreds of millions of years through its extensive fossil record embedded in the exposed rocks and the petrified forests created when volcanoes smothered the trees in a sea of hot ash and lava. The array of life forms that have been discovered in the superheated mineral pools in what we would call extreme conditions continues to challenge biologists perception of what is life.

Our Abrahamic religions are static – to some degree it is one of their stated strengths. They deal in truths that are time-memorial.

Yellowstone is all about geologic and biologic change – in the past and from everything we know, to be extended into the future. If you go on the web to learn about Yellowstone, you will probably come across one of the survival groups that are preparing for the drastic changes to come after Yellowstone's supervolcano erupts again. If you want to get really nervous, watch the BBC video Supervolcano which is a docu-drama showing what might happen if Yellowstone had another eruption.

I think that what we see in Yellowstone is what has undermined the classical concept of the Abrahamic religions as explanations of why things are the way they are. But at the same time, Yellowstone makes us so much more aware that we are part of something much bigger.

In my 30 plus years with UU's, I have been struggling with the term spirituality. When I first started to hear the term, I was turned-off – this is not why I came to UU services on Sunday, I would say. I can remember in Morristown, NJ that the spirituality service was treated as something separate from our regular service – it was too new age, trendy and different than the intellectual aspects that had drawn

many of us to UU. But slowly I began to see something here about the connectedness of our minds and bodies and our sense of connectedness to each other. I became more comfortable with the term. This is still the core of what brings us here each week – building of community or connections.

Later this term spirituality, seemed to me to expand to talk about our connectedness not just to other humans but to all of nature. There is something awe inspiring about that recognition of finding our place in nature. But when thinking about nature, I was thinking about other biological entities. If you will, I was stuck in the carbon cycle with a focus on the process of photosynthesis and the citric acid or Krebs cycle.

My reading on Yellowstone challenged me to think about the spirituality of the rock cycle. I was not aware of the rock cycle as a real term until a visit to the Museum of Natural History in 2008. My Abrahamic mind set still had me thinking of our earth's crust as fairly static with only the intermittent interruptions of an occasional volcano or earthquake. But the rock cycle is happening all around us and we have evolved and will evolve in response to that cycle.

Unlike the carbon cycle's which derives its energy from the Sun, it is believed that the rock cycle derives its energy from the highly radioactive material that is at the core of the earth. With radioactive decay, this material gives off tremendous amounts of energy that heats a massive layer of molten material that lies beneath the several miles of crust that we refer to as earth. But as we know, the crust is only like a thin outside peel of an orange as far as its relative thickness.

Now in the last 50 years, we have come to see that this crust is really made of massive plates of hardened rock that literally floats on top of this molten material. The continental plates where people live are heavier than the ocean plates and as a result there are many processes that happen when these plates move – sometimes butting up against each other and forming mountain ranges like the Himalayas and sometimes one moving below another creating fault lines and eventually earthquakes. From time to time, a weak spot is created in the crust that allows the pressure on the molten sea below to come to the surface – sometimes with a whimper as in Hawaii's slow lava flows and sometimes with a very large bang as in Krakatoa.

At the same time, wind and water are constantly wearing down the earth and taking large quantities of rock to the ocean where it finds its way back down to be melted by the molten material down below.

And the cycle begins again.

What makes Yellowstone unique, it is believed, is that there is a reservoir of this molten material or magma at a much higher level – closer to the earth's surface than normal. This is what is heating the hot springs and causing the geysers. The crust or plate have been moving over this abnormal hot spot, one of a handful identified so far around the world. As more material falls on top of this reservoir, the pressure builds until it creates the conditions for a huge explosion. In recent geologic history of Yellowstone, this has happened about 2 million years ago, 1.2 million years ago and 600 thousand years ago. Some say we are due! There are now special United States Geological Survey stations set up to measure the changes in the magma reservoir which apparently is far from static. Some say its actions are if it is breathing in and out, something that does not have a good explanation at this point. It is ever-changing as is all of the earth where we reside.

What I think we are seeing in Yellowstone is our connectedness to the whole earth. And if there is anything I was taught in my early religious training it is that the Abrahamic traditions were all about moving away from earth-centered religious traditions. Earth centered religion was considered primitive, backward.

But of course, we are part of the earth and we have evolved both genetically and culturally based on the earth. Maybe the metaphor in Genesis of the Lord forming man and woman from earth is apropos.

If there is a supervolcano eruption at Yellowstone, it will create a cascade of effects that will forever change the planet and all that live on it. We now know that this has happened many times before and it will happen many times in the future. And the world in which we live is a product of all that geological activity in that it sets the boundaries for our biology.

Thanks to my reading on Yellowstone, my sense of spirituality has grown to include the ever-changing rocks upon which I stand.