Waters of Creation

A sermon preached at Niles Discovery Church
A new church for a new day, in Fremont, California,
on Sunday, April 7, 2013, by the Rev. Jeffrey Spencer.
Scriptures: Genesis 1:1–2:3 and Luke 1:26-38

I wish I had taken a physics class in high school. I wish I had learned the bas of at least classical physics. I don't feel the need to master quantum field theory (I'm not even sure what those words mean). But it would be nice to have a formal way to organize what I do know about mechanics, acoustics, optics, thermodynamics, and electromagnetism. I mean, I have this bits and pieces of information floating around between my ears, and I think I understand them a little, but …

For instance, there are four laws of thermodynamics – the field of science that looks at the connections of heat, work, and energy – the zeroeth, first, second, and third. I love that numbering system. I wish I understood them better.

The scientists in the congregation can correct me if I'm wrong, but (as I understand it) the second law of thermodynamics, the law of entropy, says that the general tendency of the universe is to go from order and structure to lack of order and lack of structure. Yet look around us. Our species is staggeringly complex. And the ecosystems that we live in are staggeringly complex. And the diversity of species that exist on this planet is staggeringly complex. In a universe ruled by the second law of thermodynamics, how can we have this amazing complexity?

Evolution tells us that the first species of life on this planet were simple single-celled organisms and that over the eons, the species became more and more complex and more and more diverse. This seem directly contradictory to the second law of thermodynamics.

As I worked on this sermon series and decided that this first sermon would be based on the first creation story, told in Genesis 1 (and dribbling into the beginning of Genesis 2), I remembered a TED talk I heard months ago.[1] A professor named David Christian gave the talk titled, "The History of our World in 18 Minutes." He starts out with the very questions I just asked: In a universe ruled by the second law of thermodynamics, how can we have this amazing complexity? He goes on to explain that the universe can create great complexity, but that it's really, really hard.

The way the universe developed, there are pockets with "Goldilocks conditions" – you know, not too hard or too soft, but just right, or more importantly, not to cold or to hot, but just right for the creation of slightly more complex things. And when there are complex things, slightly more complex things can come into being. So complexity builds, stage by stage, and each stage is magical because it creates the impression of something utterly new appearing almost out of nowhere in the universe. Now, as things get more complex they become more fragile and

vulnerable, and the Goldilocks conditions become more stringent, and the creation of more complex things becomes even more difficult.

If you go back 13.7 billion years, to the beginning of time. There's nothing. There's not even vacuum. Not even time. Then suddenly – BAM – a universe appears. And scientist theorize that it is tiny, smaller than an atom, but it contains all the energy that's in the universe, so it's expanding really, really fast, and within a second the energy starts to congeal into matter – and about 380,000 years after the Big Bang (that's twice as long as humans have been on this planet), hydrogen and helium nuclei capture electrons and form stable atoms.

Now, thanks to telescopes, we can look back into time. Because light travels at the speed of light, the light from 13 billion light years away that we see now is actually a picture of what was going on 13 billion years ago. And scientists have looked back to this early time in the history of the universe, they've looked back into this simple, unstructured cosmic mush. And they've found that there are slight variations in this cosmic mush, just enough for the universe to move to the next level of complexity.

Gravity is more powerful where there's more stuff, so where you have slightly denser areas of hydrogen and helium, they start compacting. So the universe starts dividing up into clouds. And as the clouds get more dense, gravity increases, which makes the clouds get more dense, which caused gravity to increase, … The temperature rises in the center of each cloud, and when the temperature increases past the threshold of 10,000,000 degrees, protons start to fuse, there's a huge release of energy, and – bam – we have our first stars.

It's as if God said, "Let there be light."

David Christian goes on to explain who when stars die, they get so hot that more complex elements are created, leading to a chemically more complex universe. These chemicals swirl around young stars and start to coalesce into rocks and asteroids and planets and moons, and that's how our solar system was created some four and a half billion years ago. Rocky planets like the earth are far more complex than stars because they contain a much more diverse collection of materials. But with this more diverse collection of materials – and the right conditions – the next stage of things can happen.

Given the right amount of energy – not too much and not too little, given a great diversity of chemical elements, and given *liquids like water*, you can have living organisms. Why is water so important? In gasses, atoms move past each other so quickly than can't hitch up. In solids, atoms are stuck where they are and can't combine in new ways. In liquids, they can cruise and cuddle and link up to form molecules.

Where do you find these Goldilocks conditions? Planets are great and our early earth was just about as good as it gets. It was just the right distance from its sun to contain huge oceans of liquid water. And deep beneath those oceans were cracks in the earth's crust where you've got heat seeping up from inside the earth's crust and you've got a great diversity of elements. And so wonderful chemistry takes place and molecules get formed and eventually you get this wonderful molecule that can replicate itself called DNA.

And one of the beauties of DNA is its imperfection. Every now and again, one of the rungs on the DNA ladder copies itself incorrectly. And sometimes that mistake works and something new is created. So DNA itself starts introducing more diversity, more complexity. And eventually we get single celled organisms and then multi-celled organisms and then fungi and fish and plants and insects and amphibians and dinosaurs and mammals and human beings. All of this was possible because of the energy and chemistry and water that exist on this planet circling that star we call the sun.

As a Christian, I find this scientific explanation fascinating and deeply spiritual. Yes, I can turn to the creation stories in Genesis to reflect on creation. And, yes, one of the reasons for the original telling of those stories was probably to answer the question of how the universe came to be. But thanks to science, I have a much better answer to that "how" question. So I find the scientific explanation dancing with the biblical stories, especially the first one in Genesis.

And as I reflect on the biblical creation stories to wrestle with those deeper "why" questions and the relational questions – Why is there creation? Why was I created? Who am I in relationship to creation? Who am I in relationship to the creator?

I find the scientific story helping to fill me with awe. You see, when I contemplate both the biblical stories and the scientific story, I find myself returning to the understanding of God as the Creator. I believe that God is responsible for creating this wonderfully simple universe that allows for such complexity, that wants to move simultaneously toward entropy and diversity. I have no science to back that belief up and I don't think it should be taught in science classes, but I don't find it contradictory to the scientific story. I believe that God created and creates and is in and through this creation.

So I read that first creation story – the first verses of the creation story – and I am struck by its poetic description dances with the science. "In the beginning when God created the heavens and the earth, the earth was a formless void and darkness covered the face of the deep, while a wind from God swept over the face of the waters." I think about the chaos it describes – a formless void of darkness – out of which God creates. I hear echoes of the first half a billion years after the Big Bang. I think about the wind/spirit (the Hebrew word has that double meaning) from God sweeping over the water, and I think of the chemistry that was going on in the depths of earth's oceans.

Our scriptures tell us the God creates out of the waters. Science tells us that life on earth was created out of the waters. Our own experience of birth tells us that life is created out of the waters of the womb. Jesus himself walked among us thanks to the waters of Mary's womb.

Our scriptures also tell us that this creation is very good and that we have a responsibility to care for this creation. That word, "dominion," may not be the best contemporary American English word to use as a translation of the Hebrew. That word has too much of a connotation of ownership of and power over, and not enough of responsibility for. Perhaps "stewardship" is a better word. And, to be honest, we're not being good stewards of the oceans, our planet's waters of creation.

According to National Geographic,[2] for tens of millions of years, earth's oceans have maintained a relatively stable pH level – that's the measure of how acidic or basic they are. "It's within this steady environment that the rich and varied web of life in today's seas has arisen and flourished. But research shows that this ancient balance is being undone by a recent and rapid drop in surface pH that could," National Geographic says, "have devastating global consequences."

They trace the change to the beginning of the industrial revolution in the early 1800s. Now, I know that the industrial revolution did some amazing things. It is largely viewed as being a vital factor in the blossoming of middle class lifestyles in America. But it was powered by fossil fuels. The unfortunate consequence, however, has been the emission of billions of tons of carbon dioxide (CO_2) and other greenhouse gases that had been safely locked away underground in those fossil fuels into Earth's atmosphere.

Scientists now know that about half of the CO_2 coming from the burning of these fossil fuels has been absorbed over time by the oceans. This has benefited us by slowing the climate change these emissions would have caused if they had remained in the atmosphere, but the introduction of these massive amounts of CO_2 into the seas is altering water chemistry and affecting the life cycles of many marine organisms, particularly those at the lower end of the food chain.

When CO_2 dissolves in this ocean, carbonic acid is formed. "This leads to higher acidity, mainly near the surface, which has been proven to inhibit shell growth in marine animals and is suspected as a cause of reproductive disorders in some fish."

National Geographic explains what's going on. "On the pH scale, which runs from 0 to 14, solutions with low numbers are considered acidic and those with higher numbers are basic. Seven is neutral. Over the past 300 million years, ocean pH has been slightly basic, averaging about 8.2. Today, it is around 8.1, a drop of 0.1 pH units, representing a 25-percent increase in acidity over the past two centuries.

"The oceans currently absorb about a third of human-created CO2 emissions, roughly 22 million tons a day. Projections based on these numbers show that by the end of this century, continued emissions could reduce ocean pH by another 0.5 units. Shell-forming animals including corals, oysters, shrimp, lobster, many planktonic organisms, and even some fish species could be gravely affected."

In other words, we are burning fossil fuels at a rate that is undermining the Goldilocks conditions that enabled life to evolve over the eons and for human civilization to flourish for the last 10,000 years.

Our stewardship of the waters of creation remains on our shoulders. As we consider the moon and the stars, the sun and the oceans, and wonder at how among of all the trillions of stars and planets in the universe that God cares for us human beings, let us remember our responsibility as we give God thanks.

Amen.

ENDNOTES

[1] David Christian, “The History of our World in 18 Minutes,” *TEDTalks*, https://www.youtube.com/watch?v=yqc9zX04DXs, uploaded 11 April 2011 (6 April 2013).

[2] “The Ocean: Ocean Acidification,” *National Geographic*, http://ocean.nationalgeographic.com/ocean/critical-issues-ocean-acidification/ (6 April 2013).