

Entropy

Sermon at IHC, May 20th

In the beginning, when God began to create heaven and earth--the earth being Tohu va Vohu, unformed and void, with a darkness over the surface of the deep and a wind from God sweeping over the water--God said, "Let there be light" God saw that the light was good and God separated the light from the darkness. God called the light Day, and the darkness God called Night and there was morning, a first day."

There is a science experiment where you put a drop of ink into a glass of water. The ink molecules will initially start in a fairly ordered state-- in which all of the molecules are clustered close together in a drop--over time though, this ink disperses until you can hardly see the form of the drop, since the ink has become intermixed with the water. Becoming a fuzzy gray liquid.

This experiment is an example of the **second law of thermodynamics**, which says that every energy transfer or transformation makes the universe more disordered. There is a quantitative measure of disorder in a system, we call *entropy*, whose value increases as disorder increases. *Every energy transfer or transformation increases entropy in the universe.* In the universe we are moving towards an unstoppable trend toward randomization--just like the ink dispersing in the water.

This law of physics doesn't stop us from using energy to order our lives. We use energy in the form of the plants and animals we eat, the energy we harness from the sun and wind, and the combustion of fossil fuels to do work. Whether that work is rising ourselves up in the morning, driving to school, turning on our computers, mowing the lawn, or even reading a good book. Without using energy to do work, our houses would deteriorate around us, our bodies would collapse, and our societal systems wouldn't exist. We HAVE to use energy.

But using energy isn't free and there is a limited amount in the system. We can think of energy as money. There are many forms of money: cash, stock, bank accounts. Each can be transformed into any of the various forms. Still, there is a limited amount of money in our economy. Energy also can be in many forms: thermal, electrical, chemical. Entropy is like an exchange fee you

have to pay to the system to use energy, in any of its forms. When the system gets more ordered in one part--constructing a building or lifting weights, it increases the disorder somewhere else, **releasing heat as a waste product**. Some heat released is ok, **too** much heat and our natural systems go ary.

So if the universe is constantly moving to a state of disorder what was God thinking in the Torah when God formed Day and Night, Earth and Sea, Vegetation, Sun, Stars, Moon, Living Creatures on Sea and on Land, and us Humans?

If everything before creation was *tohu v' vohu*, then isn't disorder a state of total godliness?

God is our first model of a creative force, an artist, a potter who formed people from the void. Through an ordering and a naming, valuing and meaning arose within this godliness by creating ordered systems of names, places, ideas, languages, prayer..."and God saw all God had made, and found it to be very good." Order and disorder complement each other. In nature, there is both ordering and disordering. For example, evolution is the ordering of simple ancestors into more complex organisms. And disorder happens all around us, ice melts in a warm room, wood decomposes, the sun warms the earth, the earth uses this energy, and releases heat into the universe.

In the same way, humans can create order or disorder. Through our ordering though, we are often focused on creating patterns we are comfortable or familiar with. Humans assign great value to something if it has a specific order--clothes look neat, the bed is made, a forest exists in a specific place, where as we try to assign negative value to disordered states. True randomness or disorder, however, is not the absence of patterns (when you randomly roll a die you think no patterns will emerge but they do) . Rather, you could say, it's the absence of being able to control ahead of time (to predefine) what types of patterns are "allowed" to emerge.

Letting go of the patterns of control is an exercise in acceptance of the patterns of disorder.

Disorder, is about letting go of control, and order, is about defining how we can partner with God in a creative vision.

And after God saw that everything was good, God bestowed a creative responsibility upon us--to name each creature. So how can we be creative partners with God in an order that utilizes just enough energy?

One, we can bring awareness to the beauty around us. Today, I heard a black capped chickadee sing its song, while the squirrel scampered by searching for nuts long buried over winter, and the drops of rain glistened on the verdant leaves in the patch under my window as I smelled the honey suckles blooming. This is something we can learn from our Amish community here in Indiana. Indiana has the third largest population of Old Order Amish in the nation, with 19 settlements in the state, representing a population of more than 35,000 people. The Amish practice sustainable agriculture and have a culture that sanctifies the values of ecology, moderation, simplicity of life, and neighborliness. While the Amish way of life may not be replicable for modern sensibilities and general society, their almost scientific awareness of natural systems--paying attention to when the hummingbirds return in the spring and when the blight affects their trees, farming the soil without any chemical additives or pesticides, their use of less carbon heavy sources of energy, can be an inspiration to us to pay attention to the systems of nature all around us.

The second way to change our energy models are to uncover our closed loop thinking systems and challenge those systems. In 2009, Tim Dechristopher took a step in what author Terry Tempest Williams calls "moral imagination" by bidding on the sale of 150,000 acres of public lands in Utah that were being auctioned off at the price of \$1.50 an acre for oil and gas extraction. He has no plans to pay for these bids, but wanted to raise the price of our public lands to their true value.

Tempest Williams followed suit this past February by purchasing energy rights to her own piece of Utah's wilderness near Arches National Monument. When approached by Federal Agents about her development of the BLM land for energy she replied: "you cannot define our definition of energy, the energy development we are interested in is fueling the movement of 'Keep It in the Ground,' a growing movement pressuring the BLM and other federal agencies to

cease allowing the extraction of oil, gas and coal on millions of acres of public land in Utah and other Western states.”

We can also reimage our world at home! Are our lawns only for mowing? What would it look like to participate in a “Grow Don’t Mow or “Grow Food not Lawns” action. What would it look like to recycle? compost food waste at home? Install a solar panel on our roof? Ride our bike to work?

Lastly, rethinking our energy use means creating conscious communities. Globally, April was the seventh consecutive month of the warmest recorded temperatures in history. Climate Change is real and it is happening, 97% of scientist agree that this is caused by humans. There is a lot we can do. Join local and national organizations working to address climate change such as Citizens’ Climate Lobby which advocates for a Federal Carbon Fee and Dividend or Hoosier Interfaith Power and Light which brings Indiana faith communities together to promote renewable energy and efficiency. You will hear from Greg Silver in a moment about several ways he has been involved. In addition, I hope you will join us in putting our creative energy to work here at IHC. All are welcome to join us on June 16th, when IHC will have our first Green Team meeting to decide steps we can take as a community to increase our awareness and move our community to action. If you would like to get involved please talk to Rabbi Brett, Rabbi Scott, Greg Silver or I!

In Isaac Bashevis Singer’s nobel prize acceptance lecture in 1978 he said “As the son of a people who received the worst blows that human madness can inflict, I must brood about the forthcoming dangers. I have many times resigned myself to never finding a true way out. But a new hope always emerges telling me that it is not yet too late for all of us to take stock and make a decision.....although I came to doubt all revelation, I can never accept the idea that the Universe is a physical or chemical accident, a result of blind evolution. Even though I learned to recognize the lies, the cliches and the idolatries of the human mind, I still cling to some truths which I think all of us might accept some day. There *must* be a way for man to attain all possible pleasures, all the powers and knowledge that nature can grant him, and *still* serve God

- a God who speaks in deeds, not in words, and whose vocabulary is the Cosmos." --- Shabbat
Shalom!