A Heavy, Heavy Blanket of Deep Time

At some point, I resolved that I needed to be a scientist to be a better environmentalist. To solve problems in nature, one must understand it, like a doctor understands a patient. Of course, chemistry, physics, biology, and geology have all been used for certain human benefits, with damage to nature and to humans resulting. Understandably, this turns some people away from science. Although many scientists believe that their methods are unbiased, there is always bias, and the science itself is just a tool to be used and supplemented in one way or the other. But, its use has become the only way to fix its damages to nature and human health, besides time and waiting.

In the geological sciences this dualism is very clear. A large number of geologists work in oil, natural gas, and mineral exploration. They are also involved in gold, copper, silver, coal, and diamond mining and work in stone quarrying. For all of us, life without these minerals and materials would be quite different. Other geologists work as hydrogeologists cleaning pollution out of groundwater aquifers. Geologists work on gathering paleoclimate data and study glaciers in the attempt to understand global climate change. Like most sciences, geological knowledge is used for positive, negative, and neutral goals, and the definitions of positive and negative have changed and continue to change through time.

I wanted to be better equipped to solve environmental problems through training in sciences. In some regards, I am. I know what to look for, what questions to ask, and I have a basic understanding of how the Earth's systems work. If there is a problem, I might at least understand what it actually is. But, I might not.

Even the most experienced scientists researching the Earth's biosphere and atmosphere only partly understand how everything works together. There are many variables that change things that no one has even considered yet. This lack of knowledge is no surprise to scientists who often find that asking questions leads to a set of all new questions. Realizing it leads to caution. Studying the sciences has led me to hesitate before I make up my mind. Of course, there is little point to science if it cannot be used to make decisions about society, but in some difficult issues, there is not enough of an understanding of things to be presumptuous.

Some environmental issues are easily explained, but others are very unclear. The problem of deteriorating, old underground storage tanks containing fuel leading to groundwater pollution is clear cause-and-effect. The cause, effect, and solutions of global climate change are confusing and unresolved, aside from the consensus that the global average mean temperature is increasing. In some cases the solutions are clear, but the cost of the solutions with the current technology and methods are expensive and time consuming, and a lot of people with something to lose don't want to deal with them. In other cases there may not even be a consensus on what the problem is.

The nature of the scientific method is conservative and negative. No theory can actually be proven, it can only stand, as yet, not-disproven. That isn't particularly reassuring. In this sense, science is a lot like religion, based on our faith in evidence that has, so far, not been proved wrong. But in science, we have standard methods of inquiry that often prove theories to be wrong or partly wrong, causing a shift in understanding. We know that our understanding of the world can and will change. There is no particular end to what could be known about something, scientifically. Nothing is allowed to be concluded, it is only that the money runs out, a particular goal is reached, or the researcher stops researching.

I think I was already a skeptical person, but science has made me more of a skeptic, untrusting without a good defense– "What is your bias? What are you trying to prove? Show me your evidence." I see an environmental issue presented to me as something that is wrong, with an alternative that is right, and I hesitate. I wonder if there are flaws in the "right" answer, whether there is legitimate dissenting opinion, whether there is another alternative "right" answer possible. This skepticism and doubting comes unconsciously, even when I want to feel

enthusiastic and passionate about the problem. It is crippling. It is good to analyze information, but this is frustrating. I don't get much done.

Geology has something to do with this. I am sure of it. Studying geology month after month from one year to the next, the idea of deep time settled over me like a heavy, heavy blanket. At first, it is one number to write down and memorize: 4.6 billion years – the estimated age of Earth. Then, there are more numbers. 590 million years before present: beginning of the Paleozoic Era, the Cambrian Period- appearance of vertebrates; 245 million years before present: beginning of Mesozoic Era; 66.4 million years before present: beginning of Cenozoic Era; 2 million years: beginning of Quaternary Period; 10,000 years before present: end of last ice age. I thought about the numbers long enough that they became real amounts of time. These numbers really mean million and billions of years– years like the ones you and I live one after the other that seem shorter as we get older but never feel infinitesimally small. For a human, a million and a billion are numbers that are out of our mental range. We deal with them by dividing them into smaller units of hundreds of thousands, but we cannot even count to a billion one number at a time in our own lifetimes. We know there are now 6 billion humans on the Earth, but we cannot dwell on it. It is absurd. No one could meet everyone on Earth. No one tries. There is mystery involved. There are areas with millions and billion of people with the same brains and same needs existing who will never have faces or names to us. There are too many. There are so many people that humans are beginning to seem like a plague for other species.

And yet, geologic time makes everything human seem quite trivial. Humans have only been around for 100,000 years or so as Homo sapiens sapiens. Anthropologists say hominids, our related ancestors and the branches unrelated to us, appeared maybe 5.5 million years ago. Neanderthals, another hominid different from humans, only disappeared 35,000 years ago. For humans, these are large amounts of time, too long to really imagine, and yet, the dinosaurs were around for possibly 150 million years, and they died out about 60 million years ago.

To think about geologic time is to think despite humans– to forget that I am human at all. Humans seem silly, nonessential, and inconsequential, in terms of millions of years. Even if we ruined the Earth's surface with a massive nuclear war there would be species that survived. The Earth would eventually recover. New animals would evolve and things would go on. The Earth has a few billion more years left before the Sun is supposed to burn out. Humans might even have a few million more years to exist, but they will last a shorter time than fruit flies or spiders. Complex mammals just don't last as long through changing conditions. An enormous volume of time stretches out behind us and in front, and things will go on happening whether or not humans are around to write them down.

Since it doesn't really matter what humans do in the long-long term of Earth, it seems trivial to worry about anything we do now. But then, I pinch myself and remember that I am human. I'm not some outsider looking in. For me, a year is a significant amount of time, and I only have at the most about 100 years to live. I have to think on a smaller scale. I have an interest in seeing things turn out pleasantly for humans, on Earth. I don't have five million years to recover and adapt to water and air pollution or decreasing biodiversity. Environment-centered thought looks to protect other species from harm caused by humans, to allow them to thrive or die out by nature's path, not the path altered by humans. Much of environmental thought revolves around stopping, slowing, reversing, or preventing changes in nature that occur because of human activities. But, often it isn't so much about other species as it is about humans ourselves. We want to let nature do what it will, as it would if we hadn't messed it up, because we have realized that the system is complex and it is what was needed for us to thrive in the first place. There isn't any other place to go, and even if we could survive on an altered Earth, it might be depressing and uncomfortable. If natural forces cause climate change and mass extinction, there is no one to blame, but if we cause such things we will have to shame ourselves for our gross failure.

What is going on in the combination of population growth and environmental alteration depresses me. It appears to be a big problem without a happy ending. The diversity of human interests and levels of awareness of the situation make it very complicated to solve problems. Some problems are fairly easy to confront, and I can handle them. But human economic and technological interests are strong and difficult to fight. The overarching environmental questions about population carrying capacity, climate change, and resource consumption are highly complicated and confusing even to the scientists who study them. These fundamental environmental questions make me want to curl up in bed and ignore everything, knowing that Earth will survive this even if humans don't. I turn to that idea when I feel overwhelmed by a sense of ecological doom. But the other part of me that lives and functions subjectively as a human, in human time, wants to know what the answers are. It's too late to be apathetic and indifferent because I have gone to the trouble to be trained to appreciate nature as it is, in its outward appearance and its underlying form. When I opened my mind to science I deepened my fascination with everything on Earth and my responsibility to protect it from the destructive nature of my own species.

June, 2000.

Appeared in *EcoZine vol.1*, no.1 published by Tree of Knowledge Press under the title "A Heavy, Heavy Blanket of Deep Time."