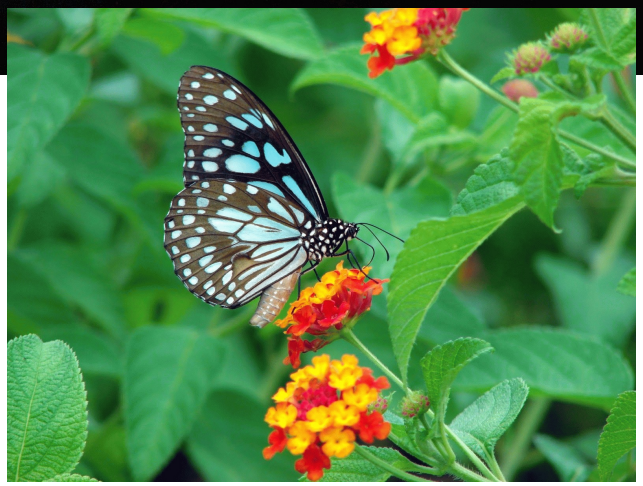

Big History, Deep Space, and Quakers' Experience of the Sacred

By Daniel A. Seeger
Offered for the Pennswood Village Quakerism Committee
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On February 11, 2016, The New York Times reported that scientists, for the first time, had detected gravity waves. The gravity waves they detected were created by the collision of two black holes a billion light years away. The detection of these gravity waves is considered a final confirmation of Einstein's general theory of relativity and of his vision of a universe in which space and time are interwoven, and are able to stretch, shrink, and bend.

The story reminds us of how far we have come since Galileo first pointed a primitive telescope at the heavens and determined that the earth revolved around the sun. This contradicted the Biblical understanding of religious authorities that the earth was at the center of the Creation. Galileo was tried by the Inquisition in 1615, was put under house arrest for the remainder of his life, and was forced to recant. Thus there was inaugurated a long culture war between science and religion which persists to this day.

The accepted view of Galileo's day is depicted in various paintings of the time, such as Raphael's *Disputation of the Holy Sacrament,* painted in 1510 to decorate the private library of Pope Julius II. (Figure 1, page 2). We see a heavenly realm floating above the earth and in which reigns God the Father, Jesus Christ, and the Holy Spirit. Among the human figures in the earthly realm there is the Pope on the right in gold robes, and just behind him the presence of Dante Alighieri reminds us that there is another realm not depicted in the painting, but thought to be below – the inferno of hell.

In 1654, Bishop James Ussher, Primate of all of Ireland, published a study of the age of the earth using the Bible as a primary resource. His effort represented a considerable feat of scholarship for its day. It demanded a great depth of learning in ancient history, in the Bible, in biblical languages, in astronomy, and in ancient calendars. Ussher's dating of historical events outside of the Bible, such as the deaths of Julius Caesar and Alexander the Great, accord closely with modern understandings. Nevertheless, for deep history Ussher had to rely solely on the Bible. After careful consideration of its many details, he concluded that the earth was created at around 9:00 p.m. on October 23, 4004 B.C.E., which makes the earth just over 6,000 years old.

A contemporary of Bishop Ussher, Nicolas Steno (1638-1686) of Denmark, had a different idea. He studied the sedimentary rocks which can be seen in many parts of the world. (Figure 2, page 2). He surmised that these rock layers were laid down successively, that rocks at lower levels were chronologically more ancient than rocks at higher levels, and that although some layers are tilted (Figure 3, page 2), or even folded in some places (Figure 4, Page 3), all were originally horizontal, and the tilted and folded strata were displaced by geological forces within the earth. Although Steno

Figure 1: *The Disputation of the Holy Sacrament.* (1510)

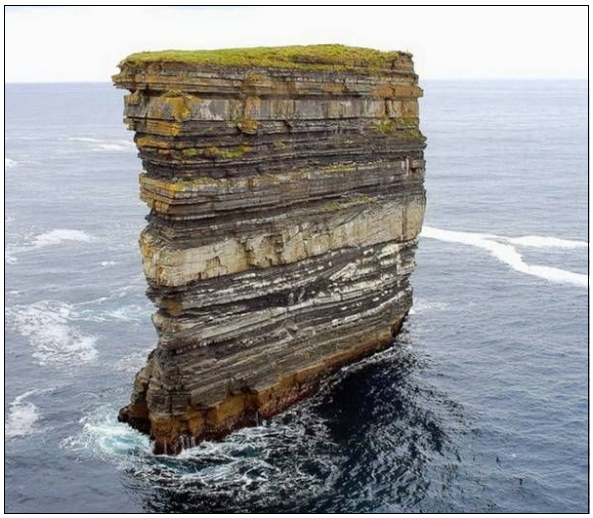


Figure 2: Dun Briste, Ireland

Figure 3: Chalus Road, Northern Iran

had no way of dating the age of the rocks except with respect to each other, he surmised that these deposits must have required much, much longer periods of time than Bishop Ussher's Biblically-based chronology allowed.

Figure 4: The "Crumple" near Lulworth Cove, Dorset, England.

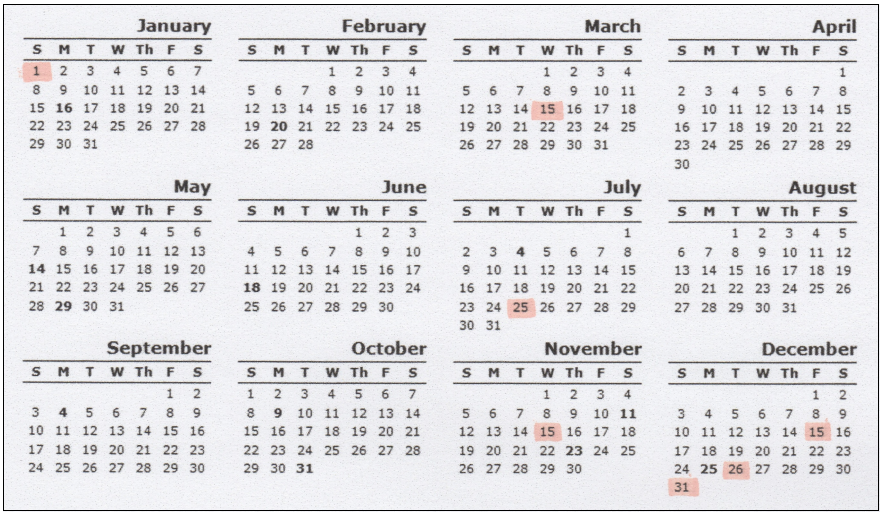
Modern scientists, using rates of radioactive decay, can now date rock layers quite precisely. In fact, scientists now believe the earth to be, not 6,000 years old, as Bishop Ussher claimed, but 4.54 billion years old.

Now, suppose we condense that 4.54 billion years into one calendar year, just to get some idea of how the history of the earth has progressed.

Imagine the earth to have been formed 4.54 billion years ago on day one of our hypothetically visualized calendar. The first life on earth appears remarkably soon. Scientists believe that colonies of bacteria first formed in the oceans at about March 15.

But it would not be until about July 25 that oxygen first appears in the atmosphere; on November 15 creatures with shells first appear. So, although life had appeared much earlier, it is not until November 15 that creatures get substantial and begin to have shells and skeletons.

By December 15 dinosaurs evolve, but they are gone by December 26.



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Homo Sapiens, that is, human beings anatomically similar to ourselves, first appear at around 11:30 p.m. on December 31.

The birth of Jesus Christ occurs on December 31 at 11:59:46 p.m. So most of recorded human history occurs only in the last few seconds of the

earth's geologic time scale, if the time scale is analogized to a year.

Until recently the academic study of "History" was limited to human experience for which their remain written records. But in the late 1970s historians began to realize that adequately to describe the human story it is necessary to enlarge the spatial and temporal context of their studies. They began to incorporate the fields of astrophysics, geology, biology and anthropology into the study of history. Big History, as this new discipline is called, places the human story within the context, not only of the evolution of planet Earth, but within the context of the history of the entire cosmos itself.

This is a bold and daunting undertaking. It involves teams of scholars from many disciplines. Their work, like all Creation stories, carries implications for the meaning of human life and for the place of the human estate within Reality itself.

The universe is now understood now to have begun with a "big bang," otherwise more properly known as a singularity, 13.8 billion years ago. This conclusion is reached by scientists as a result of their observation that all the known galaxies in the universe are at present moving away from each other. Extrapolating backwards brings everything to a point 13.8 billion years ago, when the universe would have been so hot and dense that there could have been no atoms or elements. Einstein's general theory of relativity provides a framework for this assumption. The theory explains several observable phenomena, such as the abundance of light elements, a background of cosmic microwaves, and the observed motion of galaxies. The popular term "big bang" can be misleading, as it implies an explosion in space, while the theory posits that it is space itself which is expanding. Scientists do not claim to know what preceded the big bang, or what caused it to happen.

At any rate, at the beginning of the universe the heat was so great that only sub-atomic particles were able to form. But with more cooling the first stars were created out of hydrogen and helium atoms. As stars have burned, they fuse the hydrogen and helium into larger and heavier atoms, and there came into being the menu of elements we humans classify in a periodic table according to their atomic structure. What it is important to realize is that it is collapsing stars which dispersed into the universe these elements which gravity eventually caused to come together in configurations of stars and planets like our solar system.

And it is particularly important to realize that among the lightest of these elements which these collapsing stars disperse into the universe are carbon, hydrogen, nitrogen, oxygen, phosphorus and sulfur – the elements necessary to make life possible. As Carl Sagan and others have pointed out: we are ourselves made from stars. We are composed mostly of billion-year-old carbon particles. The atoms of which our own bodies are composed were forged in the interior of ancient stars – stars that ended their lives in spectacular supernova explosions that dispersed those atoms into space, where

they coalesced into new solar systems with planets, life, and sentient beings capable of sublime knowledge and, hopefully, moral wisdom.

When attending a funeral in southern New Jersey I encountered a tombstone which caught my interest. The grave was fresh, and the name of the deceased was not indicated. Inscribed in a plain piece of local sedimentary rock laying horizontally on the ground was this sentiment: "Amazed and grateful for the borrowed atoms once assembled into an unlikely thing called me – blessed with wondrous experience and awareness – now passing on to enable other wonders."

Figure 4: Gravestone.

I spoke earlier of a culture war between science and religion. Actually, the relationship between science and religion varies quite widely from culture to culture, from denomination to denomination, and from century to century. Here in the west, many of the earliest scientists were Christian clergyman pursuing what was then called "natural philosophy." Islam encouraged the sciences, which flourished in the great ages of Muslim civilization. Modern Buddhists and Hindus see nothing in either traditional or modern scientific theories which contradict their religious belief systems. Jews, who represent 0.2% of the world's population, have won approximately 25% of the Noble Prizes awarded to scientists.

So what I have called a culture war between religion and science might better be called a culture war between science and some very significant groups of Christians. This culture war is framed at the beginning of the modern age by the Galileo controversy, and in more recent times by the Scopes Trial and the on-going battle over evolution.

To this day publishers in the United States remain under intense pressure to omit any mention of evolution from science textbooks. There has grown up a world-wide movement of "creation science ministries" which seek to promote theories of the earth's history which borrow scientific imagery but incorporate it into narratives consistent with a literal interpretation of the Bible. Among these educational efforts are several Creation Science Museums where one can see fossils and dinosaur images, but where the narrative will have dinosaurs coexisting with Adam and Eve. (Figures 5, 6, and 7, page 6). The extinction of dinosaur's is portrayed as having been caused by the flood we read about in the story of Noah.

Most Christians have adopted a posture of peaceful coexistence between their own awe of science and of the accomplishments of science, on the one hand, and their traditional

Figure 5.

Figure 6.

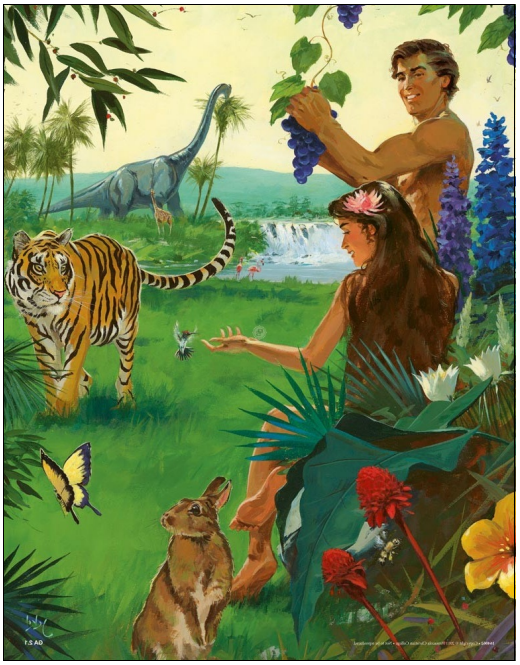
Figure 7.

religious faith, on the other. But this involves a sort of schizophrenia – putting on one hat when dealing with certain aspects of life, and donning another when dealing with others. The overall effect of this seems to be a gradual erosion in the credibility of the religious side of the equation. Europe is for all practical purposes now a post-Christian civilization. Here in the United States mainstream religious denominations, where a liberal attitude towards the acceptance of scientific truths prevails, seem constantly to be losing ground, suffering diminished numbers and shrinking financial resources. More and more people become unchurched and decline to identify with any religion, while often nevertheless claiming to be "spiritual." The number of people who self-identify as atheists is growing constantly.

Entranced by everything from their smart phones to Hubble telescope images, ordinary people become increasingly drawn into the scientific view of the world. It is a view preoccupied with materiality, and with evolutionary chains of causes and effects and random chance happenings. It is a view in which there is less and less room for interiority and spirituality, where stories of Adam and Eve and apples become less and less plausible, and where there is less and less room and role for a Creator God. It becomes easy to assume that the human estate is an accidental by-product perched in a tiny, tiny corner of incomprehensible stretches of space and time operating according to immutable physical laws.

But it is useful to reflect upon some of the limitations of the scientific approach. Scientific laws and theories involve varying degrees of certainty, rather than a kind of absolute and irrefutable knowledge. Admittedly, some scientific knowledge is very certain. By the time we have traveled to the moon and photographed the earth from space, we are certainly very sure that the earth is round and not flat. We know for sure that water is composed of hydrogen and oxygen. But many scientific principles that people take for granted are what might be called "plausible inferences," rather than proven and observable facts. No one has ever seen one animal species turn into another, for example. Newton's Laws of motion were considered iron-clad until some facts were discovered which did not fit the laws, and so Newton's Laws have been replaced by Einstein's Theory of Relativity.

There are admittedly some things science cannot yet explain. There is really no explanation for how life emerged from inanimate matter. Starting with experiments by Stanley Miller and Harold Urey at the University of Chicago in 1952, many scientists have tried to generate life from inanimate matter by creating in their laboratories the conditions which prevailed on earth when life is thought first to have appeared. They have managed to produce the amino acids necessary for life, but no life itself.

As mentioned, no one knows why or how the so-called Big Bang came about or what preceded it. Huge advances in studying the functioning of the human brain have been

made in very recent years, yet the exact nature of human consciousness and its relationship to the brain's physiological processes remains something of a mystery.

Finally, it should be observed that many scientific theories as they have developed defy our ordinary powers of comprehension. We are to believe that space is curved and time is elastic, and that we change something merely by observing it. Most of the matter in the universe is deemed invisible matter, or dark matter, because if invisible matter was not there exerting a gravitational force, the universe would not behave as we observe it to do. Space itself is expanding even though there is nothing for it to expand into. String theory now proposes that there are many parallel universes. Thus, scientific hypotheses, rather than settling issues, often tend to raise as many questions as they solve.

Nevertheless, materialists assume that the relentless march of science will continue, and that all gaps in our knowledge will eventually be solved by scientific and materialist explanations.

Considering matter and spirit, it has been common in western thought, from ancient times up until the present, to view reality as divided between an ideal but immaterial world of spirituality and perfectedness, and a counterpart world of material and practical reality which is fallen and corrupted. This concept began with Plato and was given a theological overlay by Christianity. It invites the idea that truth and beauty are attractive but insubstantial, and are impossible of realization. The demands of practical reality inevitably require various violent and ugly compromises, and radical departures from ideal concepts of purity and goodness. This spiritual perspective, known technically as substance dualism, is shared by both the Catholic and Protestant branches of the Christian Church.

In contrast, Friends, from the beginning of their movement in the 1660s, have affirmed the unity of spirit and matter, and have rejected the traditional dualism. Friends saw the world itself as a divine milieu, with all its grandeur, power and beauty. They refused to regard some days as more sacred than others, and so avoided the celebration of Christmas and Easter.

Figure 8. Farmington-Bethpage (Long Island) Friends Meetinghouse.

Rather than building churches they built meeting houses which were deliberately not separate places set apart and distinguished by special architecture, for Friends saw that all the world is sacred.

Friends communed with God through the world, living in the world and making them-

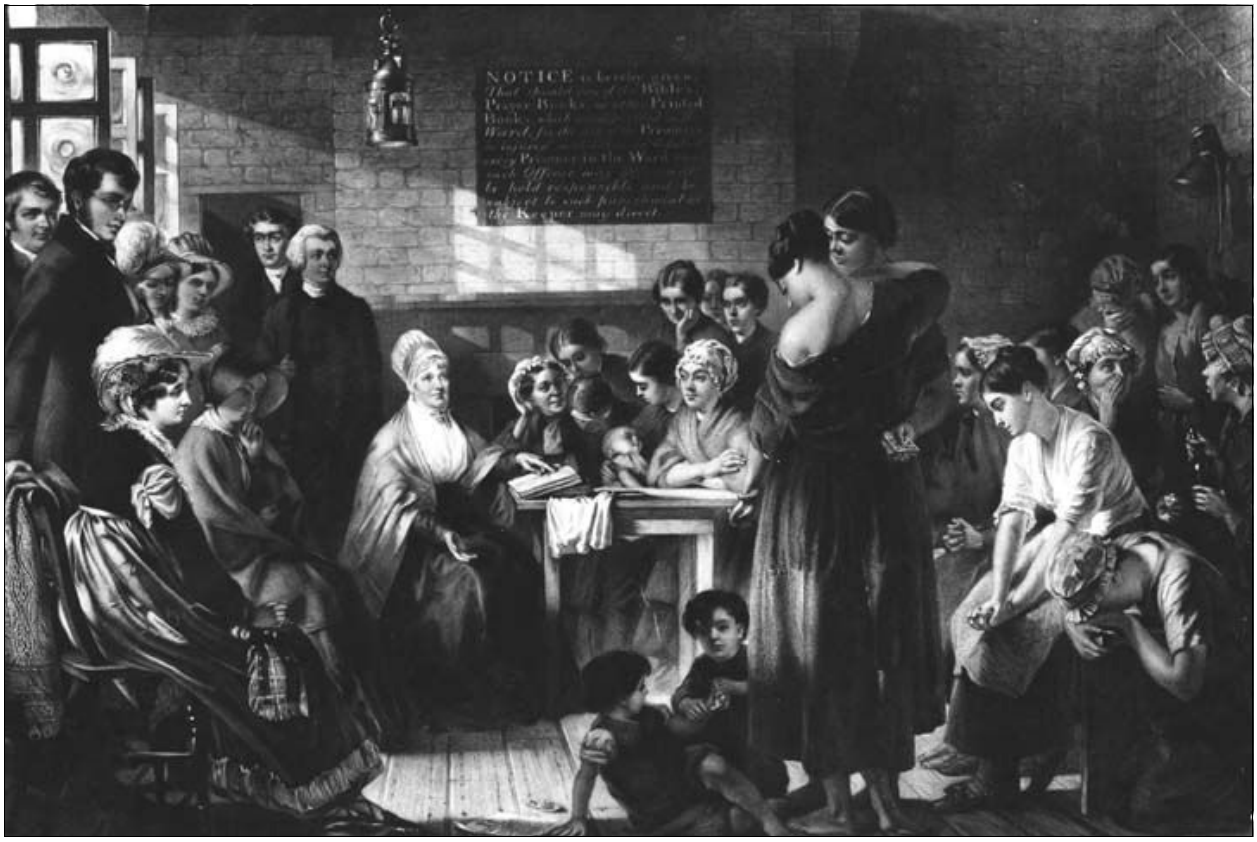

Figure 9: Elizabeth Fry (1780 - 1845) reading to inmates of Newgate Prison.

selves available to address the world's needs. Most importantly, they saw human beings not as separate and apart from each other, but as members one of another.

John Woolman, a Friend from Mount Holly Meeting in southern New Jersey, made a difficult and dangerous trip to Native American encampments to absorb the wisdom of their nature-based spirituality. Friends were radical egalitarians, refusing to doff their hats to the king, denying that ordained clergy were any more qualified to apprehend God's will than ordinary people, recognizing women's gifts for leadership, and struggling to abolish slavery. They saw that the creative principle of the universe was alive in each and every human being, giving every person's life an incomprehensible gravity and importance.

Figure 10: A peace witness, 1962

Attentiveness to the unity of the spiritual

and the material allows Friends to understand that a propensity for war-making, in addition to its unjustifiable cruelties, distracts us from the true causes of our problems, and, in fact, compounds these very problems.

Although Friends have historically used the phrase "that of God in everyone," it would be more accurate, perhaps, given the totality of Friends religious views, to speak of "that of God in everyone and everything." This understanding of the unity of the sacred and the secular, and this moving beyond the traditional matter/spirit dualism of traditional religious perspectives, underlies all that is distinctive about the Friends approach, and provides an insight much needed in today's world of Big History and Deep Space.

Understanding that matter and spirit are not two separate realities, but are aspects of one and the same reality, that matter itself blazes with the fire of spirit, lays the foundation for correcting the missteps humankind has taken in recent centuries.

Since we began to live in settled villages, practicing agriculture and the domestication of animals, (Figure 11, page 11) human activities have placed increasing burdens upon the biosystems of the planet. These burdens, until recently, have been absorbed because of the limited number of humans and the fecundity of Mother Earth. But with a huge growth in human population and the advent of industrialism, our activities have de-stabilized the planet's systems. In destroying the earth's many species and their habitats we certainly will end up destroying the human estate itself. (Figures 12, 13 and 14, page 11).

We should see matter as holy, and our planet as an inter-related system in which each element has an important part to play. Realizing this draws us into a new unity with rocks, plants, and animals, and encourages us to live in graceful harmony with all. Service to the Earth itself, to the people of the earth, and to the plants and animals, is divine service. We have to find new ways to spell this out in our lives. Our task is to move modern industrial civilization beyond its current devastating impact upon the Earth.

The human estate must become a more benign presence on the planet. The future of humanity will be governed, not by the survival of the fittest, but by the capacity of human beings to unite in making the right decision to build a planetary community of greater justice and peace and unity.

The universe is manifesting an irreversible sequence of transformations, moving from a lesser to a greater order of complexity and from lesser to greater consciousness, as its various components enter into collaborative association fueled by that great power of the cosmos we call love. Every part of the universe is related to every other part through its vast extension in space and time. We can see everything as having at once anthropomorphic features, divine features, and material features.

Figure 11.

Figure 12.

Figure 13.

Figure 14.

Human beings are not an accident or an intrusion, but are quintessentially integral with the universe, an expression of its inherent intellectual, emotional and imaginative capacities.

Some religious people disparage what they call nature mysticism as a counterfeit spirituality. In truth, it is not a counterfeit spirituality, but it is the foundation, the essence and the core of the religious sensibility.

Both science and religion rest ultimately on our contemplation of the natural world. Jesus often began his teaching conversations by drawing attention to natural things – a fig tree, the germination of seeds, the birds of the air, and the lilies of the fields. Mohammed, too, made frequent references to the natural order, and observed, when challenged to perform miracles, that the stars in the heavens, the ships at sea, and the oases of the desert were miracles enough.

To survey any beautiful scene without distraction is to become aware of an incredible creative process which has raised all things up from the formless dust, which infuses everything with vitality and energy, which maintains balance and lawfulness, and which illuminates each order of living things with a degree of wisdom suitable to its estate. We become aware that human existence is an integral part of this great web of reality, we are humbled, and we ask what response is called for from us in order that we might play our role properly in this great, unfolding drama.

So we do know that we are the stuff of stars, that this universe through some mysterious Creative Process generated us, and that we have a kinship with all that exists. Francis of Assisi, as legend has it, recognized this when he sang of Brother Sun and Sister Moon. Jesus recognized this when, in his final sermon in the Gospel of John, said he came "so that all may be One."

People are gradually giving expression to this spirituality of living in gracious harmony with the plants and animals of a normally balanced ecosystem. We see it in the new interest in gardening with native plant species rather than with gaudy but invasive ornamentals. We see it when people work to restore butterfly and wolf populations. Of special significance is our capacity for celebration. We see neighbors and friends celebrating the equinoxes and the solstices with rituals that coordinate human affairs with the great liturgy of the universe. We see it when people demonstrate against mountaintop removal, fracking, and the Keystone tar sands pipeline.

Several years ago I had the privilege of descending into the Grand Canyon on the back of a mule. The Canyon is over a mile deep. It was a journey through the silence of vast spaces. As one descends, one passes layer after layer of rock of increasing age. Some of this rock has imbedded in it the fossilized remains of water creatures, left from a remote time when this now arid region was once the bed of a sea.

Ultimately, at the very bottom of the Canyon, one comes to rock which is a solidified form of the earth's central plasma – rocks thought to be fully half as old as our planet itself.

And as one gazes upward from the bottom of the Canyon, past all the strata of rock of different ages and eons, up to the very distant rim, one realizes that the time that human beings have walked upon this earth is represented by only the top few millimeters of all these layers, and one is awestruck at the great and long creative process which has raised us up to where we are.

A true simplicity of heart will know in any given moment if we are acting so as to be at one with this great creative principle, or if we are not.

"Who shall stay the human heart," asks Augustine of Hippo, "that it may stand in stillness and see how eternity, ever motionless, neither of the past nor of the future, nevertheless utters time past and time to come?"

We know we live in a time of profound transition – a time when the world's habitual way of doing things has outlived its usefulness, has exhausted itself, and is foundering on its own internal contradictions. The job that is given to us – we did not choose it – is to lay the foundations for a new civilization. This is a task not to be undertaken with sadness, resignation, anxiety or desperation, for that would taint the result, but should be addressed with joy, confidence and hope. Truth is never without its witnesses; there are always people who are discriminating and independent, yet communicative and responsive, and willing to join with others in the decent management of our common human affairs. We must persevere in our work, planting seeds whose fruits we will not live to see. The arc of history is unmistakable – whatever good things folly threatens to dissolve will, over the very long run, be restored through the practices of reconciliation and love.

To conclude, I would like to explore a metaphor. Let us consider a goldfish bowl in the living room. Suppose the goldfish seek to apply, from within their bowl, some scientific method rooted in their own condition in an attempt to figure out the source of the family income. The facts of the comings and goings in the living room itself reach them only in the most blurry and distorted fashion, and their capacity for gathering data about, no less comprehending, the vast and complex world of economic activity which takes place beyond the household is clearly such as to consign them to perpetual bewilderment.

Continuing this train of thought, we might observe that the goldfish bowl in the living room contains inhabitants of different nations. There may be guppies, angel fish, and neons, as well as goldfish. They might eat each other up, as sometimes happens, turning their goldfish bowl into a nightmare of violence and death. On the other hand, it might be quite possible for them, without explicitly knowing the source of the family

income, to make of their goldfish bowl a place of peace and harmony. But it is interesting to realize that if they succeed in doing this they will have done so because they have made manifest in their own sphere and on their own level principles which are beautiful and true and which hold not only within the goldfish bowl, but which are the law for the great world outside of the house and even beyond the nation, in spheres of which the goldfish cannot even have a glimmering.

The wisest of our goldfish will know this truth with an unshakable certainty which will bring them a joy, a consciousness and a bliss which will enable them to be a healing influence in the affairs of their small aquarium. And while their knowledge of a truth which holds for every universe empowers them to work for harmony within the goldfish bowl, they also know that it is wrong to take their aquarium too seriously. They will know that the goldfish bowl is not everything; that whether it is harsh with envy, greed, and assault, or whether it blooms with friendship, courage and truth, it is at best an inn on a thoroughfare.

And so we, in our own goldfish bowl, build castles of sand. It is right for us to do so because we need them; and it is right for us to value them, not for themselves, but because they reflect in their fragile moats and turrets the patterns of another place. For though we may be surrounded by hunger, tyranny, and terrorism, we are more properly the citizens of a different place, a realm whose poise, balance and peace is the natural destiny of the Creation, a community whose ordinarily dim outlines become clear to those who are awakened to its possibilities, and who in their right toiling are faithful to its laws. And in our practical activism for peace and justice, there is neither anger nor affliction, but only love and joy – the same love which has summoned all things up from the formless dust, the same love which sustains them; the joy which comes from the simple tasting and feeling of all goodness, from the simple knowing of all Truth. For those to whom it is given to find natural delight in such being and such doing, the Creation is, indeed, a smiling place.

Daniel A. Seeger
Pennswood Village
Newtown, Pennsylvania

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