

The Earth as Primary Architect

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As architects, we have come to recognize that we are facing an ecological crisis of alarming magnitude. Much worthwhile work is underway regarding how we can address the problems, which this understanding brings into consciousness. However, the context in which these solutions are sought, remains for the most part based upon a worldview driven by global economics and mechanistic technologies.

This paper offers a critical analysis of this position, seeking first to demonstrate how we as architects have allowed our creative processes to fall out of alignment with the creative processes of the planet, followed by the exploration of a functional cosmology which is rooted in an understanding of the earth as primary and the needs of the human as derivative. Finally, it examines ways in which architectural technologies can begin to function in an integral relationship with earth technologies within a bioregional context.

Many of the insights, which I share throughout this paper, have been deeply informed and influenced by the work of mathematical cosmologist Brian Swimme, and cultural historian Thomas Berry, both of whom are grounded in contemporary scientific understanding and inspired by the world's great wisdom traditions.

THE BIG PICTURE: HOW DID WE GET HERE AND WHERE ARE WE GOING?

The Cenozoic age in the geological history of the earth's planetary evolution is described by Thomas Berry as the lyric episode of the earth's story. It is the time after the extinction of the dinosaurs when the great diversity of plant and animal life that we know today came to flourish. Sixty-five million years of creativity and fecundity brought the flowers and birds into being together with their myriad colours, fragrances and songs. During this period, the human too came into being as a distinct species. With time, language and culture emerged along with rituals that celebrated the surrounding beauty and diversity and which recognized the human's interconnectedness with and dependence upon the natural rhythms of the cosmological order. In a sense, through human consciousness, the universe could now

reflect upon itself... could marvel at its wonders and mysteries. The earth was perceived to be imbued with life, to be a beneficent, nurturing mother. The father sun and sky were likewise seen to be beneficent and life giving. The primal architecture of the time reflected this harmonious relationship.

With the transition from hunting and gathering of food to the cultivation of crops and the domestication of animals, the relationship of humankind to the natural world changed. A more active intrusion into the functioning of the earth's life forces began during this time as humans developed irrigation techniques, selected certain plant species and began cultivating the soil with tools. The great classical civilizations of history emerged in those fertile regions of the planet that were most consistent and dependable to supply their needs. The domestic, civic and religious architecture of these civilizations remained informed by the particular nature of the local bioregion and by a collective understanding of the relationship between humankind and the universe's eternal order. It was during this period of the classical civilizations that a sense of the pathos of the human condition emerged. While the phenomenal world was full of entrancing sights and sounds and fragrance and feelings, it also constituted a threatening reality to human life.

With the onslaught of the "Black Death" during the Medieval era, western consciousness further lost its sense of harmony with nature and came to live in fear of it. Traditional wisdom rooted in a deep understanding of mythic harmonies in the natural world eventually gave way to the search for empirical knowledge in an attempt to exploit and manipulate nature for the protection and benefit of humankind. The ability to transcend the human condition became of paramount concern to the scientific community. The universe was no longer perceived to be alive but was now understood in mathematical and mechanistic terms. Traditional cosmology became "mathematical cosmology". The disciplines of philosophy and theology were left to deal with the traditional questions concerning the role and meaning of humans.

With the coming of the Industrial Revolution and the widespread acceptance of Darwin's Theory of Evolution that placed the Human as the crowning glory of the evolutionary process, the Modern Era emerged. The understanding of natural selection based upon a cooperative relationship between a particular species and its environment became distorted. "The survival of the fittest" soon became the justification for an insatiable quest for economic wealth and power under both capitalism and socialism. The earth was seen solely as a resource to be exploited for its raw materials to fuel the engines of the economic enterprise. It also became the dumping ground for the waste products of these same industrial processes. The earth's ability to provide and absorb was assumed to be limitless.

Our current architecture reflects the deep cultural pathology of our times. The modern human adventure, particularly here in the western world, remains articulated and driven by a powerful myth deeply rooted in our collective consciousness. Thomas Berry and Brian Swimme have identified this as "...the myth of Wonderland, the Wonderland that is coming into existence by some inevitability if only we

continue on the path of Progress, meaning by Progress the ever- increasing exploitation of the Earth through our amazing technologies." As architects, we are inextricably part of this human process, which is quickly bringing to an end the Cenozoic Age of geological history. The complexity and diversity which has evolved over the past sixty-five million years of planetary creativity is being undermined at an unprecedented rate through human intervention. In our race to control and exploit the earth's natural resources for the benefit of humankind, we have been blind to the fact that we are shutting down the very life supporting systems of the planet that we depend upon for our survival. Like similar addictive behaviors, our thirst for unmitigated production and consumption is accelerating the demise of the Cenozoic. We continue to believe in and trust that technology will find solutions to our problems. This is the denial of our addiction.

Certainly technological advances have made significant contributions to the human adventure. If it were not for the Space programme, astronauts would not have been able to see this blue-green planet in all its beauty and fragility and to recognize the earth as home. Perhaps we would not have recognized the ecological crisis and as a profession would not have a Committee on the Environment or be hosting an Envirofest. At the same time however, I fear that the increasing trend towards dependence on computer technologies in architectural practices today, while serving to expedite much of the design/production process, also serves to mediate us from our creativity in a very fundamental way. We have yet to recognize that our creative processes have fallen out of alignment with the creative processes of the universe and that we are in fact working against them and subsequently against ourselves. However, there is still time to change course if we are willing to respond to the many signals, which are clearly indicating our contribution to the degradation of the environment. Our responsibility as architects is to actively seek out an alternative to the emerging Technological Age.

TOWARDS THE ECOLOGICAL AGE; THE EARTH AS PRIMARY ARCHITECT

The Ecological Age as defined by Thomas Berry into which we must presently move is "an opposed, though complementary age that succeeds the Technological age." Our scientific endeavors have brought us to understand the governing principles, which have directed the evolutionary process of the universe from the beginning of its explosive origin over fourteen billion years ago to the emergence of life and human consciousness here on the planet earth. Known as intuitive processes in the cosmologies of previous human eras, these creative principles are now understood through scientific reasoning made available by quantum physics. That there is a story of the universe in its historical sequence of irreversible transformations in measurable time was never realized before this century. However, according to Berry, in order for the human venture to ensure its success, we must come to understand this story of the universe not just as a secular story, but as our "sacred" story.

We have come from an age where it is evident that a cosmological vision has been eclipsed in favour of a more mechanistic and reductionist perspective. And it is clear that this approach is pathological in the magnitude of its destructive methodologies and processes. But how do we extricate ourselves from the terminal Cenozoic era and emerging Technological age? How do we begin the journey towards the alternative Ecological age? How do we weave ourselves back into the web of life? What we need to do as architects, we must first do as humans. The real hope lies in our ability to re-establish an integrated sense of the whole, to redefine a cosmology based not upon an anthropocentric view of the human as primary but based instead upon a biocentric understanding of the earth as primary and the needs of the human as derivative. In order to do this we need first to examine the inner intentionality of the universe as manifested by its three creative principles: differentiation, subjectivity, and communion.

According to Thomas Berry, "differentiation" is the primordial expression of the universe. Out of the fiery violence of the "Big Bang" came radiation and differentiated particles that through a certain sequence of events, found expression in an overwhelming variety of manifestations. The universe is coded for an ever increasing, non-repeatable, biodiversity as exemplified by the incredible variety of life that has evolved on the earth. From its rich and abundant tropical rainforests to the stark beauty of its polar regions, the evidence of this tendency towards biodiversity is obvious. Humankind would not have appeared as a species if somehow the process towards increasing biodiversity had been allowed to shut down. As architects we cannot help but be creative because the universe is creative. Our role as humans and as architects must now be to reverse the imposition of our monocultural principles upon the world and to restore the earth's ability to continue its growth towards complexity and differentiation.

The second primary creative principle of the universe as identified by Thomas Berry is that of increased "subjectivity". Together, every reality that makes up a part of the universe is not just a collection of objects but is a community of subjects. As subjects, we all have an inner dimension, an interiority or inner reality which not only reflects the diversity that surrounds us but reflects the original bursting forth of energy at the beginning of time. Our creativity as humans and ultimately as architects is informed by the diversity of subjectivity that is allowed to declare itself around us. Any human activity which contributes to the impoverishment of the natural world will then inevitably contribute to the impoverishment of our sense of wonderment. With every species that becomes extinct, every mountain that becomes scarred by deforestation, every river that becomes polluted with our industrial wastes, the presence of the divine that inspires our creativity as architects is diminished. Our own ability to survive as a species will depend to a great extent on the ability of all natural entities on the planet both living and non-living to develop their full potential apart from human influence as much as possible.

Thomas Berry's third creative principle of the universe "is the communion of each reality of the universe with every other reality in the universe." As mentioned before, we are an inextricably related

community of subjects. This genetic interrelatedness of everything in the universe to everything else means that the universe is in dialogue with itself as a community. "Everything is intimately present to everything else." The original bursting forth of energy at the beginning of time contained all the elements necessary for the evolution of the universe up to and including human culture. The potential for music, poetry, dance, art and architecture existed as part of that original expression. This is why we are connected to the stars in the night sky and to all living and non-living realities on the planet, why they are deserving of our awe and reverence, and why we must celebrate them in our creative arts.

When our actions cause a living species to become extinct, or when our work is responsible for the destruction of a natural habitat, we are in fact destroying a part of ourselves. The universe in all its wondrous modes of expression is a celebration of the intricate dance of creation. As humans, and architects, the time has come for us to forfeit our role as exploitive dominators and to assume the more responsible role of participatory co-creators by re-aligning our sense of creativity with the creative principles of the universe and the planet.

We will be planning on a planetary scale and we must have a functional cosmology as our context for developing the necessary programme to achieve our goals. To assist us as architects, I will adapt as the basis of our programme some basic principles that Thomas Berry identifies as part of an agenda to achieving a mutually enhancing, human-earth relationship.

TOWARDS A FUNCTIONAL COSMOLOGY

Before we can identify a new functional cosmology, we must first de-glamourize our current myth of Progress and replace its entrancement with the entrancement of the possibilities inherent within the Ecological alternative based on the universe story. This will be the only way to achieve and sustain the psychic energy necessary to proceed through the inevitable conflict resulting from the disintegration of the current unsustainable industrial infrastructures and emerge into the Ecological age.

It will be the task of all education including architectural education to play a leading role in achieving this goal. Through a critical analysis of the processes that fuel the myth of progress, students will come to understand the true costs of our privileged western lifestyles. As they come to fully comprehend the flagrant loss of habitat and species perpetrated by humans in the name of growth, they will experience a deep sense of loss. They will become sensitized to the fact that nature has its own unique, intrinsic and equally important values apart from those imposed by the human community. Ultimately loss is revelatory. Hopefully, our sense of reverence will return out of this place of deep feeling and we will be able to, once and for all, let go of our anthropocentric ethic of dominance. Hopefully, what will come is a renewed advocacy for the voices of the earth community that for too long now have remained unheard only because as humans we have chosen not to listen.

Ours is a terminal culture. There will be much grieving, too, over the loss of "Wonderworld" and our addictions to over consumption, which because of depleting resources can no longer be fed. Although the grieving process is an important component of our journey towards the Ecological age, it is not the whole story. Out of a renewed reverence for the earth and all members of its living and non-living community will come the desire for great celebration. The primary role of the human now will be to learn how to celebrate. All other members of the earth community are willing mentors. We need only stop long enough to pay attention to the everyday celebratory voices of the birds, the mountain streams, the wind in the trees.

As architects, it may be constructive for us to re-examine the architecture of primal peoples and that of the great classical civilizations as tangible expressions of their understanding of the universe and their role as humans. However, just as there is a need to replace our present dysfunctional myths, our intention is not to adopt the cosmologies of these previous civilizations. "The universe story is a one-time, multi-faceted, celebratory event" says Berry. We cannot go back, but must create our own cosmology to serve us for the venture that lies ahead. This new cosmology must put aside our tendency to place the human at the centre of the universe. Instead, it must adopt a bio-centric foundation, which recognizes a new reverence for the other members of the earth community as integral to our lives as humans.

We cannot afford to be mistaken. Minor changes to our habits of consumption through recycling and conservation efforts will only marginally slow down the inevitable demise of our modern western industrial society. For architects, it will never again be "business as usual". In June of 1993, at the World Congress of Architects held in Chicago, members of both the International Union of Architects and the American Institute of Architects developed and signed an agreement known as the "Declaration of Interdependence for a Sustainable Future". Although this document still demonstrates a preferential bias towards the human, it marks a bold and significant departure for architectural enquiry and dialogue. As architects, it is not enough to articulate on paper what we profess. We must be willing to embody wholeheartedly in our actions as professionals and as members of the broader earth community what we teach and what we believe.

TOWARDS HUMAN TECHNOLOGIES THAT FUNCTION IN AN INTEGRAL RELATIONSHIP WITH EARTH TECHNOLOGIES WITHIN A BIOREGIONAL CONTEXT.

Thomas Berry notes, "The spontaneities of nature need to be fostered, not extinguished. Nature has, during some hundreds of millions of years through numberless billions of experiments, worked out the ecosystems that were flourishing so abundantly when humans and human civilizations emerged into being." It is only through sheer species arrogance that we submit the earth's ecosystems to our own technologies developed independently from and in direct opposition to the technologies of the earth for

the sole benefit of humankind. It would be much more productive to invest our time in observing how the natural ecosystems of the earth function so that we can learn how best to exist in harmony with them. We have already said that the earth must be regarded as the primary educator, as the primary architect. Our building technologies must now be judged on how well they reflect the Universe's, and subsequently the earth's, guiding principles of differentiation, subjectivity, and communion.

The good news is that initiatives are being made by many concerned members of the profession. For example, the American Institute of Architects has compiled an Environmental Resource Guide. Similar comparative studies on building materials and real life cycle costing is being done here in Canada at the University of British Columbia. The OM hosts the annual Envirofest and demonstrates its support for initiatives within the membership by sponsoring the sharing of ideas and information. In the meantime, others are asserting pressure on the manufacturing industry to come up with more ecologically benign materials, technologies and assemblies than those currently available. Others are attempting to improve energy efficiency standards in new and renovated buildings. The idea of "resource conservation" is finally becoming legislated. Whereas all of these approaches represent necessary first steps, they are somewhat analogous to the "Blue Box Programme" and are, in themselves, insufficient to redirect our present path towards ecological disaster.

Part of our responsibility as architects is to advocate for change in all areas within our sphere of influence. The decisions we make about the building materials we specify have far reaching implications, not only for our own bio-community, but for the bio-communities all over the world, which supply, process, or manufacture them. With knowledge comes responsibility and accountability. There is no turning back. It is time to stop contributing to the degradation of the planetary bio-systems and start designing to improve the health and well being of all members of the earth community. It is time to restore bio-diversity...to re-connect humankind to the natural world...to restore balance.

To do so, we must also come to understand the meaning of "sacred place". I would like to suggest that every place is a "sacred place" by virtue of its existence in the universe. It is sacred by virtue of the fact that it will speak to us (subjectivity) in its own unique way (differentiation) of the numerous mysteries of the universe (communion), and because it participates in the celebratory, creative dance of the universe.

It is time for us to reconsider at a very fundamental level what it means to practice architecture in a place like the Greater Toronto Area, on the north shore of Lake Ontario, in the bioregion of the Great Lakes. Next time we are asked to design a building within our bioregion, before we bring preconceived ideas and biases to the design process, what if we were to first engage in a "vision quest"? What if we were to camp out on the site for an extended period of time so that we can trace the effects of light and shadow as the sun traverses overhead, or witness the dynamics of the wind and rain as they interact with the site's natural features? What if we were to get intimate with the site...to feel the

undulations and textures of the land contours beneath our feet...to get in touch with the natural vegetation, with the composition of the soil, with the voices of the living and non-living members of the property and the surrounding bio-regional community that depend upon the site either for their survival or for their declaration of presence? The immediacy of such an experience would undoubtedly sensitize us as architects to the many ways in which the natural world speaks to our desire to find solutions to the human built environment, which are truly in harmony with the natural environment.

The understanding achieved by this first hand knowledge could then be supplemented and greatly enhanced by research into the geography, natural history, geology, and biology of the surrounding area. In the context of the universe story, these subjects could put us in touch with the development of a site's unique characteristics over the millions of years of its existence. Furthermore, we would gain essential insight into the very materials that we as architects manipulate, form and mould into our creative design solutions. This is because the universe story includes the story of copper and iron, of limestone and trees, of sand and water and the story of how each came into being in the evolutionary process of the planet. Out of their stories might come a renewed respect for their intrinsic value, that is, an understanding of their sacred dimension and the recognition of their contribution to the development of our own species and to the ongoing role they play in sustaining life on the planet.

Instead of focusing on computer technologies that ultimately serve to mediate our experience of the design process rather than to bring us more in touch with its intuitive aspects, why not focus on the development of "low-tech" solutions which take their cue from the natural life supporting systems of the planet and which respond directly to the natural rhythms and particularities of a site and its surrounding bioregion.

Perhaps we should consider a building as though it had to function as its own self-sustaining eco-system. What are the real needs that must be accommodated by this building? Can we do without air-conditioning equipment that requires extensive use of fossil fuels and which depends upon ozone-depleting chemicals to operate? What then? Can we orient the building to capture the summer breezes? Can we design "wind scoops" that direct and enhance the flow of those breezes through the building or that naturally exhaust the excess heat within? Can we plant trees that will create shade and reduce heat gain? And so on... This level of enquiry, together with developing ways to receive and interpret the clues offered by the natural world around us are where we need to devote our learning skills.

Hopefully, a renewed intimacy and sense of interrelatedness to nature will go a long way towards recovering the poetic and cosmological dimensions in architecture which we so willingly forfeited at the dawn of the Age of Reason. By adopting the values of differentiation, subjectivity, and communion, we may come to fully realize our personal abilities and the unique contribution that each one of us can make as architects to an understanding of creativity beyond our wildest expectations... a creativity that has already been initiated by the universe in its original bursting forth of primal energy,

and which continues to be demonstrated through its self-emergent processes in the natural world around us.

As architects, we have traditionally devoted our creative energies towards giving concrete expression to humankind's collective hopes, desires, and aspirations. As such, we have the potential to nurture and give expression to the dream of an emerging new Ecological age, based no longer upon an exploitive anthropocentrism, but instead upon a participatory bio-centrism in which the human species co-habitates with the entire earth community in harmony and balance. It is time to re-enter the creative dance of the universe.

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