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## KEYNOTE ADDRESS

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### Connecting with Creation: The Convergence of Nature, Religion, Science and Culture

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### Abstract

This paper argues for the existence of a universal and genetically-encoded human yearning to connect and unite with nature or, writ large, creation. In human society, this yearning is often revealed through the vehicles of science and religion. This is a weak genetic tendency, however, that through the human genius of culture and free will produces widely different versions of science and religion. Nevertheless, this yearning being an expression of biology and the product of human evolution is ultimately bound by its functional and adaptive expression. This perspective implies that not all individual and cultural constructions of science and religion are equally legitimate, some proving dysfunctional and destructive over time. This perspective also advances an ethic for the care and conservation of nature based on a broad understanding of human self-interest.

This paper proceeds in four stages. The first part asserts a basic, universal, and genetically-encoded yearning of humanity through the vehicles of science and religion to connect and unite with nature or, writ large, creation. The second part addresses the reality of varying individual and cultural constructions of this yearning, the genius of humanity being our ability to exercise free will in response to weak genetic tendencies that permit the construction of widely different versions of science and religion. Still, I will argue this yearning is a universal expression of our biology, the product of human evolution and, thus, this variability is ultimately bound by its functional expression. By implication, this

perspective advances the sometimes contentious claim that not all individual and cultural constructions of science and religion are legitimate, some over time proving both dysfunctional and destructive. The third part of the presentation discusses the implications of this perspective of science, religion, culture, and nature for advancing an ethic for the care and conservation of creation. Finally, because I will have burdened the reader with so much theory and abstraction, the fourth and final part of this presentation concludes with a narrative from a recently published book of mine that, through story, will hopefully render more vivid some of the issues raised.

### *A Universal Yearning for Connecting with Creation*

All humans possess some degree of yearning to connect and unite with nature (Kellert 2005, Kellert and Wilson 1993, Wilson 1984). This yearning is revealed in at least two basic ways—first, through discerning commonalities that emerge through empirical and systematic observation; second, through a more intuitive, a priori, and subjective judgment of the unity of creation. In society, these expressions of empirical and spiritual relation to nature are expressed through the cultural institutions of science and religion.

The claim of a universal yearning for connecting with creation suggests it is essentially a biologically-encoded tendency that emerged because over time it proved functional in the human evolutionary struggle to achieve fitness and survive (Kellert 2002). Identifying with nature engendered, in other words, the desire to understand our world with the confidence to challenge the mysterious unknown that both advanced us materially and mentally in the pursuit of security and even possibly fulfillment. The struggle of empiricism or its modern variant, science, and religion offered the promise of transcending the daunting and sometimes despairing limits of a single person or culture separated and suspended apart and alone in space and time. The salvation of uniting with creation carried the potential for conquering both geography and history.

As suggested, a universal spiritual tendency and its institutional expression in religion gave form to an inherent human inclination to connect with creation. In the face of remarkable and sometimes overwhelming evidence of extraordinary diversity on Earth and beyond, the spiritual insight allowed humanity to believe in an equally astonishing commonality that subsumed it all. Despite encountering breathtaking variability, where even probing the secrets of a single species revealed a virtual bottomless well of detail and diversity, there also emerged an equally astonishing and reassuring web of relation that united a microbe

in the soil, a particle of sand on the seashore, a molecule of water vapor in the air, a fish in the sea, a snake on the ground, a bird on high, even a contemporary person in the modern megalopolis. This apparent unity and connection suggested an underlying order, a pattern in nature that gave shape and meaning to our lives despite our remaining but a speck of dust in the great vastness of space and time. Moreover, when shared with others, such religious conviction reinforced mutuality, cohesion, and shared commitment, even the conception of a fundamental logic, even goodness in the world. In this fashion, we achieve faith and conviction that whatever adversity, separateness, and aloneness inevitably confront us, there persists an underlying meaning and the possibility of salvation.

In different but analogous fashion, careful, systematic, and empirical inquiry—the essence of modern science, but an ancient tendency as well—also inspired us to seek fundamental and universal understandings and presumed truths. Embedded in our genes is the basic need to know and understand our world in detail and with confidence and authority. Through study and exploration of the natural world, we nurture and hone our capacities for critical thinking, problem solving, intellectual analysis and competence. In the process, we discover the remarkable ingenuity of life, and the possibility of its purposeful engagement, a kind of teleology that suggests the capacity of individual forms to pursue an ideal while making their way through the world. Holmes Rolston has, thus, observed an ‘exquisite complexity and intelligence of evolution—the agility, versatility, and spectacular micro-engineering of a dragonfly’s flight [or] the growing inclination of geneticists to acknowledge the innovative and creative capacities of the genome’ (2005: 137). Similarly, John Steinbeck has observed that many of the world’s great scientists have concluded:

All life is related...one group merging into another, groups melting into ecological groups until the time when what we know as life meets and enters what we know of as non-life; barnacle and rock and earth, earth and tree, rain and air; the units nestling into the whole and inseparable from it...—a plankton, a shimmering phosphorescence on the sea and the spinning planets and an expanding universe, all bound together by the elastic string of time (1941: 93).

Both empiricism and spirituality and, by extension, science and religion, thus, reflect a universal human tendency to seek meaningful connection with creation. As universal expressions, they suggest a genetic affinity for nature, what Wilson (1984), I (1997), and others (Kellert and Wilson 1993) have called ‘biophilia’ or the inherent inclination to affiliate with life and life-like process that encompasses both the quest for empirical

understanding and the pursuit of spiritual meaning, each and more instrumental in our evolutionary struggle for physical and moral security and even fulfillment. Science and religion are rooted in these hereditary needs of our species and, as such, underscore the self-interest that connects empirical observation and spirituality with physical and material well being; these and other basic values of nature are indicative of our inevitable dependence on the health and integrity of the natural world. From this vantage point, people can never achieve an enriching and fulfilling humanity, a state of physical security and grace, absent both secular and spiritual bonds with creation.

Yet, biophilia, like so much of what makes our species unique, is a weak genetic tendency heavily reliant on stimulation, learning, and social support to become functionally manifest. We may be born with inclinations for empirical and spiritual connection with creation, but these tendencies remain nascent and atrophied lacking experience and robust expression. One must be introduced and nurtured into the methodologies and occasional mysteries of empirical observation and spirituality often through the guiding hands of science and religion. The genius of our humanity is the extraordinary capacity for creativity, individuality, and learning; our ability, in effect, to often deny or affirm our biology. This freedom from the dictates of genetics constitutes the basis for our ingenuity, free will, and ability to progress. But, it is a two-edged sword carrying with it the potential for intolerable excess and violent destructiveness.

### *Cultural Constructions of Religion, Science and Nature*

The capacity to deny or encourage all but our most hard-wired instincts, and the related ability to construct particular religious and scientific expressions of our yearning to connect with creation, is at the heart of our capacity for culture. This creative genius constitutes the strength and weakness of our species, defining in so many ways what it means to be human. It is the wellspring of our individuality, creativity, and distinctive identities. This volitional ability to respond to weak genetic tendencies, such as biophilia, produces extraordinary variability that defines our humanity, including how we choose to express our empirical and spiritual relations to nature. The result is aesthetic richness and unique creative expressions of religion and science. This variability also encourages experimentation, innovation and change, serving as a lubricant for social and biological evolution unknown in any other creature. Most important, because humans are essentially social creatures, these scientific and religious constructions revealed in an historical and geographical context give rise to and sustain culture.

Yet, these scientific and religious constructions are ultimately bound by universal needs forged on the crucible of biological evolution. Their adaptive potential remains bounded by the constraints of biology and the unyielding dictates of fitness and survival. Thus, not all cultural constructions of science and religion are equally adaptive. Some inevitably prove dysfunctional and life denying. Our celebration of diversity must acknowledge the equivalent need for unity or the commonality that binds us, like all creatures, to our genetic heritage. Diversity and unity rather than opposing forces are complementary reflections of the religious and scientific quest for meaningfully connecting with creation.

The blessing of human individuality, creativity, and free will is, thus, a two-edged sword whose other side is the potential for choosing poorly, yielding intolerable excess and dysfunction. Our species' capacity for enriching spiritual and scientific articulation is matched only by our equivalent and unexcelled capacity for self-destruction. Individual and cultural expressions of science and religion can become not just unpleasant but highly threatening and terrifying. Harmony and peace with nature is not an inevitable outcome of any scientific or religious expression, but rather something that must be achieved and legitimately earned.

### *Implications for an Ethic of Care and Responsibility for Creation*

This leads to the question of how this perspective can help generate a viable ethic for caring and conserving for nature. As may have been inferred by now, an anthropocentric ethic is advocated here residing at the intersection of an empirically based science and a deeply held faith in creation, each reflecting the human self-interest derived from affirming our dependence on the health and integrity of natural systems and processes. This perspective builds on the notion of biophilia, the inherent inclination to affiliate with nature, which conversely suggests that when our relational ties with the natural world become fundamentally diminished, not only is our material fitness at risk but so too is our aesthetic, emotional, intellectual, scientific, and spiritual capacity and well-being. Each of these genetically rooted tendencies to value the natural world are all ultimately related to human fitness and survival (Kellert 1997, 2002).

This ethical rationale for caring for creation stands in marked contrast to the shallowness of a narrow utilitarianism that advocates material security and economic efficiency, or the impractical idealism of an intrinsic rights ethic that extends moral standing to all of the natural world. This broad anthropocentric environmental ethic is reflected in Edward O. Wilson's defense of biological diversity when he suggests:

What humanity is now doing will impoverish our descendants for all time to come. Yet critics often respond 'so what?' The most frequent argument is one of material wealth at risk. This argument is demonstrably true but contains a dangerous flaw—if judged by potential value, species can be priced, traded off against other sources of wealth, and when the price is right, discarded... The species-rights argument..., like the materialist argument alone, is a dangerous play of cards... The independent rights argument, for all its directness and power, remains intuitive, aprioristic, and lacking in objective evidence... A simplistic argument for the right of species to live can be answered by a simplistic call for the right of people to live... In the end, decisions concerning preservation and use of biodiversity will turn on our values and ways of moral reasoning. A sound ethic... will obviously take into account the immediate practical uses of species, but it must reach further and incorporate the very meaning of human existence... A robust, richly textured, anthropocentric ethic can instead be made based on the hereditary needs of our species, for the diversity of life based on aesthetic, emotional, and spiritual grounds (1993: 37).

This ethical perspective suggests each species, as well as other aspects of nature, represent individual chords in a symphony of relationships binding the human experience to the tapestry of life joining non-life. Each species constitutes connections to a parallel world, whether rationalized scientifically or spiritually, that lifts and inspires us, reminding us how we are integral constituents in a great ecological enterprise, not exactly alive, but organized and giving rise to and sustaining life, including our own. This anthropocentric environmental ethic arises less from compassion for other life than from a profound realization of self-interest that acknowledges how nature inextricably shapes our body, mind, and spirit. Degrading nature causes not only physical and material harm, but engenders a profound loss of psychological bearings, alienating and debasing our intellect and morality.

This ethical perspective embraces all our inherent values of nature—material, spiritual, scientific, aesthetic, emotional, even ones of mastery and fear. All constitute vital threads in our fundamental dependence on natural systems and processes that when functionally revealed comprise a cloak of enduring strength that ties our destiny to the unity and diversity of life. A broad anthropocentric ethic of duty and responsibility for creation affirms these unyielding ties with nature, offering spiritual and scientific nourishment that celebrates our participation in the natural order. As René Dubos suggested:

Conservation of nature is based on human value systems that rather than being a luxury are a necessity for the preservation of mental health. Above and beyond the economic reasons for conservation there are aesthetic and moral ones which are even more compelling. We are shaped by the earth. The characteristics of our environment in which we develop condition our

biological and mental health and the quality of our life. Were it only for selfish reasons, we must maintain variety and harmony in nature (1980: 126).

This part of the paper closes by briefly addressing an issue that has become a special focus of mine in recent years because it represents in so many ways our greatest challenge to living in sustainable relation to the natural world. This is the challenge of the modern built especially urban environment where our contemporary onslaught upon and alienation from the natural world has become most acute (Kellert 2005). The prevailing paradigm of design and development of the modern built environment has resulted in grave symptoms of environmental degradation and growing separation of people from nature. The urban built environment consumes most of our resources, produces a large proportion of our pollutants and greenhouse gas emissions, generates much of our wastes, and increasingly alienates people, especially youth, from contact with nature vital to their health, productivity, and well-being.

Most attempts at remedying this design failure (optimistically assuming it is not an intrinsic flaw of modern life) have been laudable but narrow and inadequate. Efforts at so-called green or sustainable design have largely emphasized more efficient energy and resource use, minimizing toxic products and materials, and protecting human health. These low environmental impact strategies are necessary but insufficient, failing to heal the prevailing breach existing between people and nature in our cities where most of humanity increasingly resides. We have neglected to recognize that our most sustainable places are those we recycle generation after generation because they inspire and connect us to a reality larger than ourselves, conveying a sense of enduring order, harmony, and even inserting the divine into our lives.

Instead of a narrow notion of sustainable design, we need a broader and more ethically responsible restorative design that both avoids adverse effects on natural systems and fosters positive links between people and nature in places of ecological and cultural meaning. 'Restorative environmental design' is this complementary expression of both low environmental impact and positive environmental impact or, for reasons apparent by now, what I prefer to call biophilic design. Only by harmonizing the natural and human-built environments in an increasingly urban world can we arrest and reverse ominous trends of environmental destruction and alienation that are increasingly pervasive in our lives. Our challenge today is to restore in our constructed and artificial world all of our biophilic connections with creation. This ethic of sustainability affirms how even in our modern urban environment beneficial contact with nature remains an indispensable basis for what it means to be

physically and materially secure, emotionally and intellectually sound, as well as endowed with an abiding sense of moral purpose and reverence for creation.

### *Narrative Epilogue*

Because this has been a largely theoretical and somewhat complicated discussion, I will conclude with a story that hopefully offers a more whimsical and vivid illustration of many of the issues addressed in this paper. The story is from my recently published book *Building for Life: Designing and Understanding the Human-Nature Connection* (2005). This narrative is the fifth and final in an epilogue that follows a largely scientific and management-oriented discussion of the human-nature connection and how to enhance and restore this relationship through deliberate design of the built environment. The first four stories follow a hypothetical person through four phases of his life—middle childhood, late adolescence, early adulthood, and middle age, beginning in 1955 and ending in 2004. The fifth and final story—the one I will summarize—begins in 2030, involving one of the protagonist’s children. It ends in 2055, when this child has become an adult.

#### *Reminiscences of Childhood and the City*

It was highly unusual back in 2030, and still far from common today, to encounter a large ungulate—let alone a huge carnivore—in or near a city. Even now, the memory unsettles my soul. I was eight then, living with my parents and sister in Denver. Our home was an ‘urban village’, the unusual attempt in those days to re-create an old-fashioned neighborhood within the city’s core. The ‘village’ consisted of single-family homes, attached townhouses, and a few multistorey apartment buildings, all stitched together by footpaths, small parks, playgrounds, vegetable gardens, shopping center, high school and lower school. The large streets and parking areas were at the rear of the complex, meaning one navigated the main living and shopping areas mainly by electric cart, bike, or foot. You could see the Rocky Mountains from the complex, like some great wall looming in the distance, although my parents said in previous years the mountains routinely vanished into a curtain of polluted air.

One might think a city so populated would offer few places for children to play. But besides our backyards, the village also had small parks and, even more significantly, paths that led from the village to the city’s recently established greenway system. The greenways were trails linking various parts of the city to one another, to the suburbs, and, eventually,

to agricultural areas and even distant wilderness areas. People loved moving about the greenways by bike, foot, and sometimes horseback. One moment you would be close to home, another downtown, next a shopping center, and then, with persistence, a national forest. The greenways became so popular that newly constructed or renovated homes along its borders were the most expensive in the city. The village kids were not supposed to venture far into the greenways, and most of the time we were content to play in our backyards and nearby parks. But, occasionally, we snuck off to the greenways, often to one in particular where we constructed a hideout and tree house in a large cottonwood. We worked hard at making our fort more comfortable than our parents could ever imagine and it was where we planned great battles and trips to distant lands.

One of my great pleasures was meeting Dad once a week for lunch at his office, a fifteen-minute walk from home. I loved his building. Tall and narrow, it rose like a needle, tapering at the top; from a distance, it looked like a forest because of its pyramidal shape, triangular windows, and trees actually growing on the rooftop. The glass sides had tens of thousands of photocells, which—along with the building's fuel cells—generated most of its electricity. The rooftop included trees, gardens, and a pond, various sitting areas, meeting places, and two restaurants. The gardens and pond were also connected to the building's heating and cooling system, and the rainwater collected in the pond was used for flushing toilets and irrigating the six interior gardens.

Located every tenth floor, the three-story interior gardens contained plants, aviaries, and butterfly gardens, each representing a different Colorado habitat with information about those habitats. Also connected to the building's heating and cooling system, the gardens were places where you could have lunch or just sit. Some of the upper floors on each of the building's four sides also had ledges; here, great nests could be found where peregrine falcons raised their young and hunted pigeons. I could watch the birds all day, particularly when the nests were full or when the adults dive-bombed the pigeons at awesome speeds. The nests helped the once-endangered birds, who returned the favor by scaring away songbirds that otherwise would have crashed into the building's glass sides.

My best outdoor experiences of all occurred along the greenways, especially on those cold winter days when the elk came thundering down from the mountains like a living avalanche, bursting into and through the city on their way to the warmer prairies and wet meadows on the east side of town. Before the greenways, elk were unable to travel to their historic range because the city, cattle ranching and fencing blocked

their way. By the early twenty-first century, however, elk numbers had greatly increased in response to declining ranching, greater wildlife protection, and ecotourism. All this would not have brought elk back onto the city if not for the greenways, which provided migratory corridors necessary to connect the mountains to the plains. The greenways were like restoring some great connective tissue that re-stitched the high to the low elevation landscapes.

Following the greenways' completion, few elk at first used the corridors. But then, the elk population appeared to reach some critical threshold or perhaps a harsh enough winter occurred and the small numbers became a stream, as if some great spigot had been turned and out gushed tens of thousands of elk. The first days, you would see only a lone animal or a small group, but soon huge masses would appear, advancing almost as one across the city. When this occurred, thousands of people turned out to gape, some cheering despite police, fire, and wildlife officials trying to keep them quiet and at a distance. An elk or even a person might occasionally be hurt, but more often the animals passed without incident, parading before the kids glowing, the adults ogling, the television commentators commenting, the merchants hawking, the scientists studying. It became the stuff of legend and a cause for annual celebration as well as a great source of city pride.

But I will always remember one event above all others. One winter when the elk were due, Dad had managed to obtain a permit that allowed a small number of people to occupy viewing blinds in preserves at the city's edge within dark, concealing pines. For four consecutive days, we arrived early on bitterly cold mornings hoping to see elk, but nothing happened. Then, on the misty morning of the fifth day, we heard a snapping of twigs signifying the sound of heavy animals. Soon, out of the mist, barely discernible, ghost-like shapes appeared in the cold fog, their numbers swelling until the very ground shook. Tawny browns and grays, bare heads and flaring spikes, massive hulks and some massive antlers paraded past, leaving us in awe. They seemed like apparitions in the weak twilight, ancient visages comingling with the present, coalescing and dissipating as they passed through our human-dominated landscape.

Then something far more improbable occurred. We had been watching the elk for perhaps an hour; most of the mature males by then having past, the mothers and new calves now following. Suddenly, something bolted from the opposite pines that at first looked like a horse crossing a meadow at full gallop. The elk reacted as if a bomb had exploded in their midst, fleeing in every direction, one small yearling remaining on the ground. The incident had taken seconds but seemed to unfold as if in

slow motion. The creature that had streaked from the forest had been fast but hardly graceful and oddly lumbering, at first resembling a horse but lacking that animal's polish and grace. Besides, horses don't run down and pounce on elk. Even my unformed mind sensed I was in the presence of something fearsome and wonderful. It was the greatest of all land predators, an enormous carnivore of arching back and unyielding determination. It was the great mythical bruin!

'Oh, my god!' Dad cried out. 'A griz. But, it can't be!' As far as anybody knew, with the exception of a few hardly believed biologists, grizzly bears were not found anywhere near Denver, only a small population having been rediscovered and augmented in the San Juan Mountains in the southwestern corner of the state. Occasional grizzly sightings had been reported in Rocky Mountain National Park, not that far from Denver, but these were generally unconfirmed and dismissed. Yet this was no apparition. Perhaps it was a young bear, hungry, recently awakened from its deep winter sleep, who had wandered the cold mountains, caught the scent of elk, and followed the great herd—a bear just young and dumb enough not to avoid its ancient archenemy: humans. Maybe it also sensed the diminishing threat from a once-lethal species that of late had embraced a new covenant of reverence for the wild, especially for its legendary lord of the mountains.

The young bear stood on its hind feet at Dad's yell, glaring in our direction. It rose six feet tall, its round, almost human-like face staring menacingly at us, while we gazed back too frightened and awed to flee. An electric arc of conflicting emotions passed between the bear and ourselves like some great indigestible stew—fear, fascination, appreciation, just possibly mutual respect. We certainly meant the creature no harm, yet Dad assumed an aggressive posture yelling back at the bear, his first instinct to protect his young. The bear in turn snorted and growled, nose flaring, but soon he settled back on all fours and with great strength dragged his prey back into the forest, quickly disappearing. We felt as though we had just experienced a massive hallucination. We soon told our tale to officials, skeptical at first. Following careful investigation and additional sightings, however, they soon acknowledged that a small grizzly population had reestablished itself in and around Rocky Mountain National Park and adjacent wilderness areas.

My young boy's heart had been touched by something miraculous, something beyond amazing that would affect me for the rest of my life. If an eight-year-old can experience a transcendent moment this has been it—and I have carried it with me ever since. I found afterwards that I could reach back, especially during moments of crisis and uncertainty and gather strength from the memory of the bear. I would then pluck the

great bruin from the recesses of my mind like a constellation from the sky, retrieving some enduring meaning that always muted whatever stress and anxiety has befallen me.

Even now, a middle-aged man in 2055, a week hardly passes without my recalling that singular instance of sheer inspiration and joy. Just today, I awoke stressed by events at work and in the world. I read daily of wanton cruelties and needless destruction, circles of pain radiating from a world of indifference and greed. A pervasive loneliness and self-hatred sometimes seemed to have afflicted humanity like a virus that imperiled us all. At moments like this, I remember the great bear and gather my dogs for a walk up the mountain near where I live.

When I do this, the city is soon left behind as I follow a path lined with willows along a dry creek bed. Cries of cactus wrens and circling raptors are carried along by the wind. I move quickly, driven by my goal of reaching the summit until a mosaic of sensations slows me down. The dogs help, reveling in their curiosities, circling about, encased in a world of smell more than sight, drawn by a multiplicity of plants, rocks, and other signs of life. I begin to open myself to a world of endless detail and possibility. At first, I intellectualize, identifying various birds, flowers, and more. I count and classify, drawing pleasure from a growing familiarity and seeming control. But then I give way to an intense appreciation of wonder, beauty, and discovery. A monarch butterfly alights on a nearby rock, and I marvel at its orange and black patterns so in harmony that it defies the narrow interpretation of a mere evolutionary fitness. I am stunned by the miracle of a creature so flimsy it seems weightless but able to traverse enormous distances. I am awed by its seemingly inconsequential brain that guides it to distant lands despite weather and terrain.

I finally reach the summit, looking back at the city spread across the plain, admiring its immensity and creation. I look up at the clouds and imagine the shape of my childhood bear. I travel with him across the sky carried by winds that connect me to a world greater than myself. The great bruin never leaves me, has always been a part of my consciousness. We remain fellow travelers in the grandeur of our lives. Then, I am stripped of my self-absorption and self-pity, carried along by this miracle of creation.

I return to my home and office no smarter or skillful but renewed and revived. I have drawn sustenance from the bear and the butterfly, emboldened by their accomplishment. I have become the bear, rising on its hind legs, startled, apprehensive, yet inextricably tied to those humans who stare back with anxiety but also with reverence, faith, and devotion.

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