

## PHILOSOPHY OF NATIVE SCIENCE

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In the conceptual framework of philosophy, Native American science may be said to be based upon perceptual phenomenology, the philosophical study of phenomena. The central premise of phenomenology roots the entire tree of knowledge in the soil of direct physical and perceptual experience of the earth. From a phenomenological viewpoint, all sciences are earth-based. In Abram's words: "Every theoretical and scientific practice grows out of and remains supported by the forgotten ground of our directly felt and lived experience, and has value and meaning only in reference to this primordial and open realm" (Abram 1996: 43).

Edmund Husserl, the original promulgator of phenomenology, believed that lived experience, or the "lifeworld," was the ultimate source of human knowledge and meaning. The lifeworld evolves through our experience from birth to death and forms the basis for our explanation of reality before we rationalize it into categories of facts and apply scientific principles. In other words, it is *subjective* experience that forms the basis for the *objective* explanation of the world.

The lifeworld, a vast ocean of direct human experience that lies below all cultural mediation, forms a foundation of Native science. Husserl described it as culturally relative, diverse and different for each culture and each person because it is based on the experienced world of distinct peoples who evolve in distinct places and describe themselves and their surroundings in distinct languages. Yet, there is a unity in such diversity derived from the fact that humans share a species-specific experience and knowledge of nature. Humans also share an experience of nature with all other living things, although our perceptions are different from those of other species because of our unique physical biology. Metaphoric for a wide range of tribal processes of perceiving,

thinking, acting and "coming to know" that have evolved through human experience with the natural world, Native science is born of a lived and storied participation with natural landscape and reality. Current cultural concepts of time, space, relationships, and linguistic forms are rooted in this precultural biological awareness.

Native American philosophy of science has always been a broad-based ecological philosophy, based not on rational thought alone, but also incorporating to the highest degree all aspects of interactions of "man in and of nature," i.e. the knowledge and truth gained from interaction of body, mind, soul, and spirit with all aspects of Nature. As all knowledge originates in a people's culture, its roots lie in cosmology, that contextual foundation for philosophy, a grand guiding story, by nature speculative, in that it tries to explain the universe, its origin, characteristics, and essential nature. Any attempt to explain the story of the cosmos is also metaphysical as the method of research always stems from a cultural orientation, a paradigm of thinking that has a history in some particular tradition. Therefore, there can be no such thing as a fully objective story of the universe.

Their cosmology, a people's deep-rooted, symbolically expressed understanding of "humanness," predates all other human-structured expressions, including religion and social and political orders. The first cosmologies were built with the perception that the spirit of the universe resided in the earth and things of the earth, including human beings. A people's understanding of the cycles of nature, behavior of animals, growth of plants, and interdependence of all things in nature determined their culture, that is, ethics, morals, religious expression, politics, and economics. The people came to know and to express a "natural democracy," in which humans are related and interdependent with plants, animals, stones, water, clouds, and everything else.

According to Husserl, there is a kind of "associative empathy" between humans and other living things which is grounded in the physical nature of bodies. The creative body and all that comprises it – mind, body, and spirit – is the creative, moving center of Native science. Although this may seem common sense, modern thinking abstracts the mind from the human body and the body of the world. This modern orientation frequently disconnects Western science from the lived and experienced world of nature. The disassociation becomes most pronounced at the level of perception, because our perceptions orient us in the most elemental way to our surroundings. Receptivity to our surroundings combined with creativity characterizes our perception.

Indigenous people are people of place, and the nature of place is embedded in their language. The physical, cognitive, and emotional orientation of a people is a kind of "map" they carry in their heads and transfer from generation to generation. This map is multidimensional and reflects the spiritual as well as the mythic geography of a people.

Knowing the origins of their people, their place, and the all-important things the place contains is considered essential orientation for a tribal person. A people's origin story maps and integrates the key relationships with all aspects of the landscape.

The metaphor of the body is often used by tribes to describe themselves: not just the physical body, but the mind-body that experiences and participates in the world, as well as their communities, social organization, and important relationships in the world. Indeed, humans and the natural world interpenetrate one another at many levels,

including in the air we breathe, the carbon dioxide we contribute to the food we transform, and the chemical energy we transmute at every moment of our lives from birth to death. "Ultimately, to acknowledge the life of the body, and affirm our solidarity with this physical form, is to acknowledge our existence as one of earth's animals, and so to remember and rejuvenate the organic basis of our thoughts and our intelligence" (Abram 1996: 47).

Native science is a broad term that can include metaphysics and philosophy, art and architecture, practical technologies, and agriculture, as well as ritual and ceremony practiced by Indigenous peoples past and present. More specifically, Native science encompasses such areas as astronomy, farming, plant domestication, plant medicine, animal husbandry, hunting, fishing, metallurgy, geology – studies related to plants, animals, and natural phenomena, yet may extend to include spirituality, community, creativity, and technologies which sustain environments and support essential aspects of human life. It may even include exploration of such questions as the nature of language, thought, and perception, the movement of time and space, the nature of human knowing and feeling, the nature of the human relationship to the cosmos – questions related to natural reality. The collective heritage of human experience with the natural world, Native science is a map of natural reality drawn from the experience of thousands of human generations. It has given rise to the diversity of human technologies, even to the advent of modern mechanistic science.

Phenomenology parallels the approach of Native science in that it provides a viewpoint based on our innate human experience within nature. Native science strives to understand and apply the knowledge gained from participation in the here and now, and emphasizes our role as one of nature's members rather than as striving to be in control of it.

Our universe is still unfolding and human beings are active and creative participants. Creativity is both the universe's ordering principle and its process, part of the greater flow of creativity in nature. It flows from the "implicate order" or inherent potential of the universe, and whatever it produces becomes a part of the "explicate order" of material or energetic expressions. These expressions range from entire galaxies to the quarks and leptons of the subatomic world. Human creativity is located in this immense continuum. We are, after all, a microcosm of the macrocosm. We are an expression of the nature within us, a part of a greater generative order of life that is ever-evolving. It is from this creative, generative center of human life that central principles of Native science emanate (Briggs and Peat 1999: 28–30).

An understanding of the nature of creativity is important for gaining insight. Native science embraces the inherent creativity of nature as the foundation for both knowledge and action. Human life at all levels is wholly a creative activity and may be said to be an expression of the nature within us with regard to "seeking life," the most basic of human motivations since it is connected to our natural instinct for survival and self-preservation.

The concepts of creativity: *chaos, participation, and metaphoric thinking*, lend themselves specifically to the way in which Native peoples envision the *process* of science. They also form a conceptual bridge between Native and Western science, although Native

science refers to them differently through particular cultural representations in story, art, and ways of community. These theories and their connections to quantum physics have brought Western science closer to understanding nature as Native peoples have always understood it – that is, not simply as a collection of objects, but rather as a dynamic, ever-flowing river of creation inseparable from our own perceptions, the creative center from which we and everything else have come and to which we always return.

*Chaos* is both movement and evolution, the process through which everything in the universe becomes manifest and then returns. The flux, or ebb and flow, of chaos appears in everything and envelops us at all times and in all places. From the evolving universe to the mountain to the human brain, chaos is the field from which all things come into being. It plays a central role in the creation of the universe, the earth, and humankind in the mythology of all ancient cultures. Chaos and its offspring, creativity, are the generative forces of the universe.

*Chaos theory* describes the way nature makes new forms and structures out of the potential of the great void. It also represents the unpredictability and relative randomness of the creative process, appearing in mythology throughout the world in stories of the trickster – the sacred fool whose antics remind us of the essential role of disorder in the creation of order.

There is an ordering or self-organizing process that results from chaos, called “order for free.” A simple example may be found in the boiling of water. As water is heated, the water at the bottom of a saucepan starts to rise to the top while cooler water at the top moves to the bottom. This causes a turbulence which takes the form of boiling water or, as a chaos theorist might describe it, the water in the pan exercises its “maximum degree of freedom.” In other words, the water in the closed system of the saucepan is exercising the maximum range of behavior available to it. However, if the water is brought slowly to the point just before boiling, something interesting and characteristic of chaotic systems occurs. The water self-organizes into a pattern of vortices. This is called the “bifurcation point,” the point just before the system transforms itself, in this case, to boiling water. The bifurcation point is the direct result of the interaction of “positive feedback,” which amplifies the transformation to boil, and “negative feedback,” which dampens the transformation. These tendencies interact to create a stable pattern of vortices.

This moment, the bifurcation point, when a truth comes to be intuitively known is like the still point in the eye of a hurricane; it is that point when a connection is made to a natural principle manifesting itself in the unfolding of a natural process. Like the birth of a child or a bolt of lightning connecting sky and earth for a moment in time, these are the infinite moments of both chaos and order. This is a precept of Native science, for truth is not a fixed point, but rather an ever-evolving point of balance, perpetually created and perpetually new.

In nature, all systems of energy transformation exhibit a similar kind of behavior. The survival of any self-organizing system depends upon its ability to keep itself open to the flow of energy and matter through it. This necessity may last a millionth of a second or billions of years, as is the case with the universe.