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The Anáhuac Knowledge System: a Dialogue Between Toltecs and Descartes

Rudolph C. Rÿser, PhD

(This essay was originally developed with the support of a Fulbright Research Scholar Grant and the Center for World Indigenous Studies in 2011 and delivered at the Universidad del Valle de Atemajac-Vallarta [UNIVA]. The manuscript has been since updated as a result of continuing research by the author.)

ABSTRACT:

Indigenous political leaders and indigenous peoples' diplomatic representatives urge states' government and international organization representatives to sit at the negotiating table to ensure that traditional knowledge becomes incorporated in local, regional, and international agreements aimed at mitigating and organizing adaption strategies to remedy the adverse effects of climate change. How can traditional knowledge be employed along with conventional sciences? When indigenous peoples' advocates call for scholars, representatives of states' governments, and international institutions to recognize and respect "traditional knowledge," what features of traditional knowledge should they recognize and respect? How will they know the difference between conventional knowledge and traditional knowledge—are there differences and what are they? Can traditional knowledge inform modern climate change food security adaptation strategies, and if so what form does the application of traditional knowledge take? In this essay I offer an answer to these questions by explaining a Fourth World scientific method for deciphering the knowledge system of proto-historic West Mexico (600 CE to 1540 CE) and blending that method with conventional scientific methods. I discuss a method of multi-variant domain retrodiction and the transposition of elements of the ancient Anáhuac scientific system into a contemporary structure blended with aspects of conventional scientific methods, thus providing details about the construction, internal coherence, and conceptual foundations of a knowledge system that extends throughout the western hemisphere. The conceptual framework presented can be incorporated into agreements between indigenous peoples' representatives and their counterparts in states' governments as they seek approaches to mutually understanding strategies for tackling vexing complex problems. Discussing a method for "blending" the Anáhuac knowledge system with the Cartesian knowledge system that arose in 17th century Europe may be possible if the two systems are used "in parallel" to facilitate collaboration between indigenous scientists and conventional scientists permitting them to formulate adaptation strategies that help all populations. The method of decipherment and transposition may have wider application when the need exists to blend ancient knowledge systems from various parts of the world with conventional knowledge systems used to address complex challenges in many parts of the world.

Keywords:

analogic reasoning, retrodiction, relational reasoning, knowledge systems

Conventional wisdom among many scholars and policy makers asserts that the utility of "Western knowledge" when applied to complex modern-day social, economic, political, and cultural problems may be enhanced if useful aspects of "traditional knowledge" can be identified and integrated. Indeed the International Council for Science[1] illustrated this consensus when its published report[2] from the World Conference on Science (Budapest, Hungary 1999) concluded that to use scientific knowledge responsibly for the benefit of human kind collaborations between "science and society" is needed. The ICSU Report (Fenstad, Hoyningen et al. 2002) called for a "proper interaction between science and local cultures" where traditional and local knowledge can make "a valuable contribution to science and technology."[3] Meanwhile, Fourth World scholars and policy advocates call upon academic institutions, governments, corporations, and multi-lateral organizations[4] to decolonize "indigenous research," and actively recognize and respect "traditional knowledge" in treaties, conventions, and domestic state legislation and institutional policies. As these assertions ring out in wider circles of policy debate, academic institutions[5] have begun to encourage research and policy analysis and states' governments have begun to consider recognizing and respecting traditional knowledge in multi-lateral agreements.[6] Yet, despite the vigorous advocacy of respect and recognition for "traditional knowledge" few if any of these advocates can answer the questions: What is the nature and content of the knowledge that must be the object of respect? How will academic institutions, governments, and all the rest recognize traditional knowledge? Is there one "traditional knowledge" or are there many—how are they the same or different? How are the various systems of knowledge constructed, communicated, and applied? In other words, those who call for recognition and respect must also define what will be recognized and respected. What are the possible concepts and terms of reference that may contribute to bridging the apparent gap between the Cartesian based knowledge system and the Anáhuac Knowledge System?

The present study recognizes this problem and attempts to answer the many questions about "traditional knowledge" by drawing on the results of a multi-year inquiry into the nature, content, structure, and concepts that define the Anáhuac Knowledge System, which has been the focus of the author's research for more than twenty years. This system of

1 The International Council of Science is an international organization comprised of 120 multi-disciplinary National Scientific Members, Associates and Observers representing 140 countries and 31 international, disciplinary Scientific Unions. ICSU also has 22 Scientific Associates. Its mission is to "strengthen international science" through International Research Collaboration, Science for Policy, and Universality of Science. The organization is based in Paris, France and in 2015 included a staff of 15 with Heidie Hackman serving as Executive Director. http://www.icsu.org/about-icsu/about-us/funding

2 Fenstad, J. E., Hoyningen-Huene, Hu, Q., Kokwaro, Q., Salick, J., Shrum, W., & Subbarayappa, B. (2002). *Report from the ICSU Study Group on Science and Traditional Knowledge. Knowledge Creation Diffusion Utilization.*

3 Ibid, 1.

4 E.g. United Nations, International Labor Organization, Organization of American States.

5 Notably, for example: University of South Africa (UNISA) Graduate School of Interdisciplinary Studies; University of Kwazulu-Natal, University of Illinois; University of Mainz, Center for Native and Comparative Indigenous Studies; University of Central Florida; Australian National University, National Center for Indigenous Studies

6 Negotiations leading to the Convention on Biodiversity contained language (paragraph 8j) recognizing traditional knowledge, negotiations of the UN treaty on Climate Change continues to involve discussions about the role of traditional knowledge, the UN Declaration on the Rights of Indigenous Peoples includes language calling for recognition and respect for indigenous knowledge, and the United Nations World Conference on Indigenous Peoples Outcome Document incorporated language calling for the recognition and respect of indigenous knowledge.

knowledge, I suggest, includes local, regional, and hemispheric-wide influences and applications long overlooked by scholars dedicated to seeing "traditional knowledge" as solely a local manifestation of human experiences. Indeed, as will be discussed in greater detail below, there is no doubt that the Anáhuac Knowledge System is present locally; but through cultural exchange and diffusion combined with rigorous intentional construction and definition the wider system of knowledge came to prevail throughout the hemisphere over the last three thousand years.

Indigenous knowledge systems and Fourth World Theory[7] at the root of research and analysis of topics of concern to Fourth World

7 The Basic Concepts of Fourth World Theory are rooted in on-the-ground-experiences, concepts and constructs articulated by theorists Rudolph C. Ryser, Bernard Q. Nietschmann, Richard Griggs, David Hyndman, John H. Bodley, Grand Chief George Manuel, Marc A. Sills, Ward Churchill, Dina Gilio-Whitaker, Heidi G. Bruce, William T. Hipwell, Kathy Seton, Victoria Tauli-Corpuz, Glenn T. Morris, and Danielle Elford:

1. There are different types of knowledge, and these types of knowledge function differently when "owned" by an individual, a family, or a community, or within a trans-community environment.

2. Fourth World Theory essentially states that the concepts of comparison, relational reasoning, balance between contending forces, and an equality of kind (that human beings are part of all living things and not the dominant living thing) will— when applied in life and thought— ensure comity between peoples, between peoples and living nature, and with the forces of the cosmos Ryser, R. (1998). Observations on 'Self' and 'Knowing'. Tribal Epistemologies. H. Wautischer. Ashgate, Aldershot: 17-29, Ives, C. A. (2011). The Effects of Segregated Development Ideologies on the Achievement of Sustainable Development. Masters of Arts Sustainable International Development, Master of Arts, Institute of the North.

3. Fourth World Theory also asserts that human cultures— as with the cultures of other animals, plants, rivers, mountains, and the lands—are defined by the evolving and dynamic relationship between people (animals, plants), the land, and the cosmos existing in the past, present and future simultaneously.

4. Another important concept of FWT therefore is that culture (that which defines human reality) is understood as the dynamic and evolving relationship between a people and their ancestral kin, the land, and the cosmos.

5. History, memory, and thought processes are understood in time as simultaneous and multi-dimensional— where instead of two-dimensional thought (linear past progressing to the future, fatalistic, cyclical, or providential) thought is in reality seven dimensional requiring the understanding of multi-level and multi-factorial aspects of a problem.

The seven dimensional method for evaluating material and immaterial relationships as a truth in time can be aided by the four directions metaphor. The four directions metaphor is symbolically rendered as horizontal and vertical lines intersecting at their midpoints demarcate space pointing to the planet's polar north and south, and the rising sun and, moon, and the "tree of life" (the stars making up the Milky Way Galaxy). The vertical, polar line is in dynamic motion moving slightly back and forth, mirroring the earth's wobbles in space. The horizontal line not only points to the east and west, but it too moves up and down on its axes reflecting the seasonal changes owing to the earth's changing angle relative to the Sun as it follows its orbit around the Sun.

Ancient cultures may symbolize the four directions for example as a medicine wheel, calendar, four distinct symbols, and prayer ceremonies in the four directions toward the rising sun, setting moon, and the polar north and the south.

6. Fourth World Theory views a people as self-defining. Nietschmann, B. Q. (1994). "The Fourth World: Nations Versus States. Reordering the World," ***Geopolitical Perspectives on the Twenty-first Century***. D. J. D. a. W. B. Wood. San Francisco, Oxford, Westview Press: 226 - 242.writes, "A people is distinguished by a common history, a common geographical location and homeland, cultural or linguistic links, religious or ideological links, racial or ethnic ties, a common economic base, and an adequate number of individuals asserting common identity."

7. Fourth World theory in the geopolitical context provides an alternative, comprehensive examination of the complexities of international and inter-state relations—and places great emphasis on the dynamic interplay between humans and place,Bruce, H. (2012). "Northern Lights: Fourth World Nations and the Geopolitical Dance in the Arctic." To adequately account for the realities of indigenous peoples—with deep historical ties to a particular place—one must make reference to Fourth World Theory, as it seeks to enact social change by addressing the fundamental imbalance of power that has been

peoples and to humanity generally must, according to Dr. Marc Sills, "undergo greater rigor recognizing the need for theory to be "presented with clear definitions of units of analysis (e.g. 'nations'), acknowledgement of assumptions, operationalized hypotheses, and an agenda for research that could (and must) be reasonably followed by other independent scholars who come from other particular identities (e.g. 'non-indigenous' as different cultural contexts around the world) and ideological points of departure. Furthermore, that theory should evolve from a clear line of foregoing thought and literature, and that it be anchored in preceding formulations of reality, and that it be constantly subjected to critical examination and competing ideas. We simply have failed to make any of this happen in fact. Mere assertion does not constitute theory, wishful thinking notwithstanding."[8]

Such thought leaders demand new ideas and methods to produce solutions to meet the challenges of increasingly complex environmental problems, debates about human-caused global climate change, challenging food security problems, the increasing breakdown of states unable to maintain universal legal regimes, and problems associated with global economic integration resulting in economic disparities between small numbers of wealthy and great numbers of impoverished people. It is apparent that despite the common goals that "Western knowledge" advocates and practitioners, and "traditional knowledge" advocates and practitioners discuss in cross talk neither truly engages the other. The "Western knowledge" holders imagine that Western science is the sole and unchallenged originator and innovator of knowledge that has "been of great benefit to humankind." Traditional knowledge holders imagine that their indigenous knowledge is under siege, but must be recognized, preserved, protected, and respected. While the ICSU Report (and many studies and reports since 2002) contemplates receiving contributions of knowledge from Fourth World knowledge sources to enhance "Western knowledge,"[9] it also calls for governments to support cooperation between traditional knowledge holders and scientists to "explore the relationships between different knowledge systems and to foster inter-linkages of mutual benefit." This last point offers the prospect of mutual and collaborative engagement that could bear new and fruitful knowledge for all of humankind.

There are a few important problems that plague both "Western knowledge" holders and "traditional knowledge" holders: 1) Developing a clear understanding of knowledge systems, while, 2) forming a common vocabulary that can support effective communications between scholars and policy makers; and 3) addressing the significant obstacle of practitioner bias and prejudices.

Despite these obstacles there are some conceivable steps that will improve the possibility and range of dialogue between the systems of knowledge. Perhaps the first step is to recognize the extent to which "Cartesian science" has, as it has evolved, been informed

created as a result of the international state system and hyper-capitalism (Hipwell, W. T. (2009). "An asset-based approach to indigenous development in Taiwan." Asia Pacific Viewpoint 50(3): 289-306. By examining the distinction between nations and states, Fourth World Theory provides a geopolitical perspective from which one can paint a ground-up portrait of the centrality of people and their bio-cultural realities (Elford, D. 2002). "Conservation by Self-Determination in Central America." Fourth World Journal 5(1): 98 - 149 in addressing the world's challenges and solutions.

8 Private communication from Dr. Marc Sills during an online international discussion of Fourth World Theory and International Relations Theory involving 28 scholars from around the globe in June, July 2015.

9 UNESCO and the Nairobi Work Program as just two examples have established digital databases to collect such knowledge.

by Fourth World sciences in such areas as, "taxonomy, medicine, agriculture, natural resource management, and conservation" (ICSU 2002). While these areas are typically cited we cannot fail to further note the many knowledge systems that have contributed to architecture, hydrology, weapons technology, boats and ship construction, navigation, artificial intelligence, astronomy, mathematics, geometry, and food production.

Fourth World knowledge holders and Western knowledge holders must become actively engaged in sustaining traditional knowledge systems by supporting societies that construct, develop, disseminate, and apply knowledge by:

- Institutionally and within communities promoting learning to equip young scholars to carry out research on culture-specific knowledge systems,
- Organizing financial and institutional support for research to understand and document various Fourth World knowledge systems, and
- Organizing sub-regional, regional, and international symposia on Cartesian knowledge systems and specific Fourth World knowledge systems in parallel or in collaboration.

The settled reality is that Cartesian knowledge systems and Fourth World knowledge systems are different in kind, but still they are products of dynamic and evolving human relationships between peoples, the lands, and the cosmos. That fact offers scholars and policy advocates the opportunity for a dialogue between practitioners of knowledge systems for the benefit of all human societies.

I chose to work in western Mexico's indigenous cultural contexts since limited research has been conducted on the social, cultural, and economic conditions and the intellectual and political life of the region is not well understood. That is not to say there aren't remarkable researchers who have conducted important research in western Mexico, but the work has centered on archaeological and ethnographic studies conducted by late 19th century and 20th century scholars such as Carl Lumholtz, Adela Breton, and 20th – 21st century scholars such as Joseph Mountjoy, Phillip Weigand, Robert Zingg, Helen Perstein-Pollard, and Dorothy Hosler. Much of the work of these scholars contributes to this study in fundamental ways—as the substrate on which I build a narrative describing life and knowledge during the 1,250-year period that is the basis for this study. What has been missing from much of the work so far conducted in western Mexico is a multi-dimensional understanding of the civilizational knowledge system and its influence on local knowledge as well as epistemological characteristics similar to other knowledge systems.

The many microclimates, rather distinct populations, and rich natural food traditions in western Mexico suggested the possibility of developing a method for deciphering and transposing a knowledge system and perhaps local knowledge variants that demonstrate successful application of food certainty[10] adaptation strategies to adverse climatic changes that may have modern applications in the same geographic area.

This essay presents what can only be considered an experimental consideration of Fourth World knowledge decipherment and transposition that may be useful forming collaborations with other knowledge systems.

10 I choose to use the expression "food certainty" instead of "food security" since the latter expression basically refers to access to commercial foods. "Food certainty" more closely describes the goal of ordinary people either able to produce their own food or produce food for communities.

Since Fourth World peoples have developed many different knowledge systems and even more examples of local knowledge rooted in a knowledge system, the present essay can only suggest the possibility that the method employed in this study will benefit peoples elsewhere.

Anáhuac Cem Foundations

The Anáhuac Cem civilization emerged about 4,000 years before the present in what is now called México and it survives to this day in the indigenous peoples throughout the country and neighboring countries (Batalla 1996). Rivaling the emergence of the Chin (Chinese) civilization beginning in 5,300 BP, the Tat-Seti (Nubia) civilization that emerged about 6,800 BP, and the Ghana civilization that arose 2,200 BP, the Anáhuac Cem civilization evolved a complex knowledge system that has influenced the thinking of peoples throughout the western hemisphere and in the last five hundred years. Central influences to the larger civilization are the Purépeche, Maya, Zapotec, México, Mixé, Wixárika, Otomis, and Huastec cultures located mainly in the central and southern country of Mexico (Pollard 1987, Malmström 1995, Stone 2004). I choose to use Anahuac Cem as the designation for the civilization made up of these and many other cultures to reclaim the perspective of the original peoples of the subcontinent and to emphasize the importance of that perspective as I attempt to decipher this ancient system of knowledge for contemporary application.

Using "Anáhuac" as a descriptor of this western hemispheric civilization is controversial among anthropologists, archaeologists, and other social scientists. They commonly make the general decision to ignore the pre-Hispanic Nahuatl word usage for "the land" or "land surrounded by water"—the earth. I join a small group of researchers who agree it is

Figure 1. Anåhuac Cem

appropriate in scholarship to use the historical name "Anáhuac Cem" in part to reclaim the conscious relationship between the people and the land on which the people live.[11]

Like others of the world's great civilizations the Anáhuac Cem knowledge system has long provided systematic, empirically based descriptions and explanations shaping the material and immaterial realities. Anáhuac knowledge has contributed to other knowledge systems, systematically expanded on knowledge, and evolved innovations to construct new knowledge. These attributes qualify the concepts, principles, and structures of Anáhuac thought as a hemispheric and perhaps a global body of knowledge. This is a mature system of knowledge that has facilitated adaptation strategies to changing climatic, environmen-

11 Several researchers have chosen to incorporate the usage of the original Nahuatl name "Anahuac" for the land invaded by Cortez. Thomas Ward [Ward, T. (2001). "Expanding Ethnicity in Sixteenth-Century Anahuac : Ideologies of Ethnicity and Gender in the Nation-Building Process." *MLN, 116.*] uses the expression to refer to the "Aztecs" as a people, while Judith Lynne Hanna [Hanna, J. L. (1975) "Dances of Anáhuac-- for God or Man? An Alternative Way of Thinking about Prehistory." *Dance Research Journal, 7,* 13-27] writes that "Anahuac" is "the Nahuatl name for what is now the Basin of Mexico." Anáhuac Cem is the proper Nahuatl term for the "whole."

tal, social, political, economic, and cultural conditions permitting cultures to succeed and flourish.

"Toltec" is the word used in Nahuatl to refer to people of wisdom. Though many social researchers have been mystified at the disappearance of the Toltecs as a people (Whorf 1929) the reality is that individuals who practice *toltecayotl* (tōltēcayōtl)—the construction, study, understanding, and dissemination of empirical and intuitive knowledge—are the learned people who held and hold now the position of scholar and sources of wisdom. They were before and are now individual scholars, not a nation of people. They dispersed throughout México teaching and are today located throughout the hemisphere. The Anáhuac Cem system of knowledge remains extant in Anáhuac practiced by modern day Toltecs who as individuals may come from different cultures. As scholars practicing toltecayotl [12] they continue to inform learned and popular explanations and understanding of natural phenomena and the human condition, as well as the practical utilitarian human needs for food production, social organization, the making of tools, and construction of public spaces and structures (Marin 2000, Stone 2004). The Purépeche, who are mainly located in the modern day Mexican states of Michoacán and Jalisco (though a large number migrated to the United States state of California), refer to their holders of knowledge as petámuti ("one who pronounces")(Stone 2004). The Waxiriki refer to some of their knowledge holders as Kawitéro (wise elder) and Maxa Kwaxí (Deer Tail, shaman chief and ancestor deity) (Schaefer and Furst 1996). Though given different names according to the local language, their function remains the same as the Toltecs.

Anáhuac's long-term social and cultural investment in toltecayotl has a special significance in the 21st century since peoples, their countries, and international organizations seek to answer quandaries such as how to devise effective adaptation strategies to meet the many challenges caused by the looming adverse effects of climate change. The problems associated with climate changes throughout the world are so complex that researchers, academic institutions, governments, and multi-lateral intergovernmental organizations search for new sources of knowledge to blend with conventional scientific knowledge—hoping to form effective problem-solving strategies. Indigenous knowledge systems such as the Anáhuac Cem system of knowledge seem logical sources for this "blended" knowledge—knowledge systems that incorporate rational and intuitive concepts and methods. I chose to undertake a study of the Anáhuac knowledge system with a focus in the Central-West region (including the modern states of Jalisco, Nayarit, Colima, and Michoacán) at the height of its development, emphasizing the time during 600 CE to 1540 CE in an effort to decipher the structure of this system and transpose some of its main features that are complimentary to the conventional system of scientific knowledge. Accomplishing this goal may permit us to understand how the Anáhuac system of knowledge can be directly applied as a more appropriate system to meet the complex challenges of climate change, food security, and stabilizing environmental conditions to support life. It may be that the conventional system of knowledge can more directly compliment the Anáhuac Knowledge System as well. By transposing this system I expect to demonstrate the application of this knowledge to the development of present day food security adaptation strategies that effectively respond to the adverse effects of climate change—in particular drought and floods.

12 *Toltecayotl* is a Nahuatl term to describe one who studies and transmits culture, an artisan.

Knowledge Systems

Most governmental, academic, business, and even religious institutions world-wide subscribe to a system of knowledge in the 21st century that began to take form in mid-17th century Europe, introduced by René Descartes (1596 – 1650).[13] The principle of reason skeptically applied to empirical evidence so widely acclaimed is rooted in Descartes' formulation: "I think, therefore I am." Descartes found in this approach that God is the decisive guarantor of the truth of reason. So deeply embedded in social, economic, political, and cultural institutions is this system of knowledge that all other systems of knowledge are considered "mystical," associated with "cosmology," considered an extension of religion, or simply fairy-tales without practical use. Descartes' method is described as "science" based in logic and reasoning while virtually all other systems of knowledge are set in opposition as systems of "non-science."

- Descartes' formulation rejects substantial forms and their associated final causes in physics.
- Cartesian science denies the thesis that all knowledge must come from sensation, since as Descartes argues the senses sometimes deceive, and thus they cannot be a reliable source for knowledge.
- Descartes' analysis replaces what he considers the uncertain premises derived from sensation with the absolute certainty of the clear and distinct ideas perceived by the mind alone.
- Descartes concludes that all beliefs based on sensation will have been called into doubt, since it might all be a dream.

These basic concepts undergird "positivist science" and present a strong argument for narrowing knowledge to specified objects of inquiry employing empirical methods concentrating on causes and effects. The approach to knowledge construction, study, understanding, and dissemination became formalized in the 19th century and 20th century. The assertion of this system of science is that one must prefer "logos"[14] or logic over "mythos"[15] (though both forms of reasoning can provide truth).

Toltecayotl is the knowledge heritage of Anáhuac Cem that employs forms of both logos and mythos (rationalism and intuition) (Ramírez 2012) from which Tlatolmatinime is the emergence of knowledge from the Toltecayotl—poets, sages, and speakers.[16]

13 A French philosopher, Descartes is credited for popularizing a philosophical breakaway from Roman Catholic liturgy rooted in Aristotelian philosophical ideas that dominated western European thinking. He went on to advocate mechanistic approaches to the sciences. His argument that "skepticism" is fundamental to rejecting propositions if those propositions are based on sensation such as impression, intuition or feelings. While matters such as "faith" remained a powerful influence on his thought, he was among those who began to raise questions about the validity of asserting a fact on the basis of a "feeling." For Descartes the proposition "I exist" is uncontestable since God does not lie. "I exist" is proof of a truth.

14 Originally meaning in the Greek, "an opinion," speech, and later as "reasoned discourse." It has come to mean ordering of knowledge.

15 Originally rooted in middle French and Greek meaning, convey belonging, shared and religious experience, behavioral models, and moral and practical lessons.

16 The Toltecayotl is balance between the material and the immaterial or the intuitive and the rational. It is the term used to identify what is in modern times in the English the "four directions" as reported by Mixteca scholar Tizaá Lino Rene Ramírez. Tizaá provides further details as follows:

- The first section, from the waist to the head, symbolizes heaven. This part, in turn, is represented by the *Quetzal*, the bird with the most beautiful plumage. These symbols are associated with the Spirit.
- The second section, from the waist to the feet, symbolizes the Earth. This part, in turn, is represented by the serpent that slithers over Mother Earth, which is referred to as *Cóatl* in the Nahuatl tongue.

Figure 2. Toltecayotl

Numbers, shapes, colors, movement, relationships, sounds, and ceremony all play important roles in knowledge construction, study, development, understanding, and dissemination. An important metaphoric instrument for applying Tlatolmatinime is the "Four Directions" symbol.

Four Directions

The four directions symbolically rendered as horizontal and vertical lines intersecting at their midpoints demarcate space pointing to the planets' polar north and south, the rising sun and moon, and the "tree of life" (the stars making up the Milky Way Galaxy). The vertical, polar line is in dynamic motion moving slightly back and forth, mirroring the earth's wobbles in space. The horizontal line not only points to the east and west, but it too moves up and down on its axes reflecting the seasonal changes owing to the earth's changing angle relative to the Sun as it follows its orbit around the Sun.

Figure 3. Four Directions petroglyph from Timberline lodge

Ancient cultures symbolize the four directions, for example, as a medicine wheel, calendar, four distinct symbols, and prayer ceremonies in the four directions toward the rising sun, setting moon, and the polar north and the south.

This petroglyph etched on a stone centuries ago (now used to make a wall) illustrates a dynamic movement that is also incorporated into the Aztec (Mexíca) calendar that originated with the Toltecs.

The Calendar is actually three different "wheels" moving to mark the days, months, and years.

As a whole, both symbols are associated with matter. From them the philosophical principle of the *Quetzal-cóatl* emerges, which represents the idea of balance between the spiritual and material aspects of the world and life. This equilibrium manifests as clear understanding, which is embodied through the "Battle of Flowers." It is the internal struggle of the Warrior to find balance and harmony in life.

At the same time, the human body is divided into two vertical halves:

- The third section, the right half, which is called *Tonal*, is associated with the solar, masculine, active, dry, visible part, and above all with the use of *reason* to perceive the world.
- The fourth, the left half, which is called *Nahual*, is associated with the lunar, passive, humid, invisible part, and above all with the use of *intuition*.

- See more at: http://www.mastay.info/en/2012/09/toltecayotl/#sthash.zbGOzwDD.dpuf

Local interpretations of the Four Directions vary due to local cultural and environmental circumstances, but tend to follow the same general ideas.

Figure 4. Aztec calendar

Figure 5. Four Directions fire ceremony 07-12-2015

The four directions dynamic symbol not only operates on a single two dimensional plain, but it is further amplified by three additional directions demonstrated by passing a line through the middle axis of both lines extending toward the center of the Earth, the middle of the intersecting lines, and outward toward the center of the galaxy. This remarkable metaphor in its simplest form reflects the relationships between fixed physical points in space on the surface of the planet as well as with the galactic points that are in motion inside and outside the planet. In the Mayan nations' view Four Elements, Four Colors of Corn, and Four Races of Humans on the Earth are attributes of the Four Directions. The Maya believe that human beings came from the stars and that humans are made of corn. Daykeepers (the Toltecs of Maya) prophesized that when the four colors of the human race, just like the four colors of corn: red, yellow, black, and white, blend together like Indian corn on one cob, humanity will have reached the desired state of one consciousness.

A Mayan Daykeeper (modern day Toltec) marks the fire pit with the four directions symbol and then places coals around the symbol that will be lit for the fire ceremony.

Just as the Toltecs assigned Four Texcatlipocas (principles) to the four directions, they then assigned every aspect of life to all of the four directions where human beings live—the surface of the planet and in relation to the cosmos. Toltecs assigned metaphysical attributes of life to the direction below (the underworld or center of the Earth), to the center axis around which all things exist, and the direction above where all things originate. While all seven directions essentially define and position the human experience, and indeed the experience of all living reality, the four directions provide the most tangible guidance for human beings standing on the ground. Each of the four directions have a color, a sound, a plant, an animal, a dance, medicine, a shape, a climate, environment, a soil, water, and a name suited to each direction.

Fourth World Theory is rooted in the knowledge systems of indigenous peoples around the world who share this "four directions" metaphor. Rendered in its totality one must come to grips with the actual use of knowledge to understand the knowledge systems in terms of use, accumulation, and

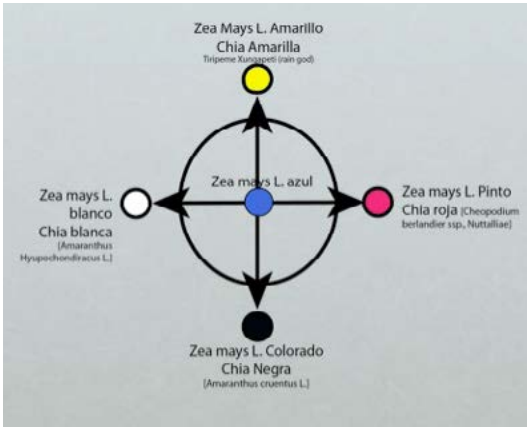

Figure 6. Anáhuac Cem Epistemology Four Directions

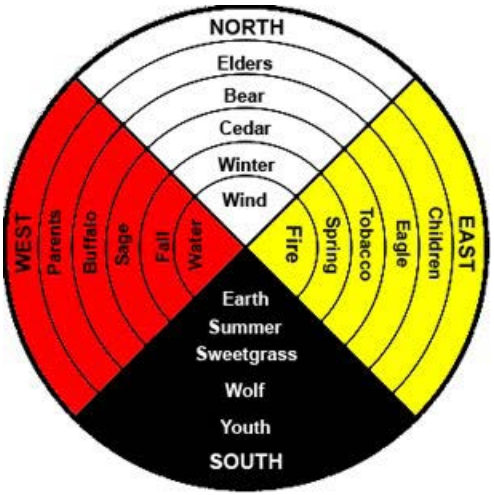

Figure 7. Anishinabe medicine wheel

Figure 8. Mayan calendar

Figure 9. Medicine Wheel Lakota

construction (Yeo, Zaman et al. 2013). Below are four examples of four directions-based knowledge systems: Anáhuac, Anishinabe, Mayan, and Lakota. These examples from the Americas—despite their varied origins—reflect similar global themes and structures as well as differentiated micro-systems reflecting the adapted, "on-the-ground" realities of the different peoples. Each system directly informs Fourth World Theory and thus links the theory to methods for inquiry and application.

Two instruments, the Four Directions and the Calendar, are essential tools for determining the application of knowledge on the physical plane by connecting to the cosmos. Both instruments reach to a period more than 2,500 years ago when the great circle symbol in the Mayan calendar and the two intersecting bars forming a "tee" served as metaphors for time and space in dynamic motion. That

all "four directions" local systems are rooted in the broader Anáhuac knowledge system (the Anáhuac system having its own "local" characteristics) there can be no doubt. There is growing evidence that trade from the Yucatan through the Mississippi River system was the pathway for diffusion of Anáhuac knowledge. This influence is evident from the structure of the Four Directions metaphor and the presence of corn, beans, squash, huauzontle[17] and the hairless dog **Xoloitzcuintle** (*zoh-loh-eets-**kweent**-lee*) in the great lakes region by 900 AD. A similar pattern of influence extended into the Andes region influencing the cultural development of the Quechua and neighboring peoples extending as far back as 3,000 years BP. It is highly prob-able given these influences resulting from trade and food distribution that Anáhuac Knowl-edge System is the mother knowledge system influencing many other developing systems throughout the western hemisphere.

Anáhuac Knowledge System—Toltec

Anáhuac in the México language describes "the place surrounded by water," used here to designate the knowledge system in Fourth World America upon which all other western hemispheric systems of knowledge appear to be based. It is apparent that numerous Fourth World knowledge systems around the globe are in many ways constructed similarly, suggesting extensive cross cultural sharing and influence both within and between hemispheres. It is evident that the Anáhuac Knowledge System that originated in the Toltec of Tollan, the cradle-culture of scholars and seers in México reaching back more than 1,800 years, influenced the Anishinabe, Quéchua, Mapuché, Dené, and many other nations across the western hemisphere. Central to this knowledge system is the concept of La Ech. It is the principle of love and respect for fellow human beings. It humanizes humankind by eliminating the ego. It unites as opposed to disuniting; it humanizes as opposed to dehumanization and fragmentation. It is the ultimate principle of spiritual love" (Ryser 1998). A second concept is Panche Be or "to seek the root of the truth and justice." The third concept is Hunab Ku, one supreme maker of all things, or the "dynamic energy of the cosmos and the unity and totality" (Rodriguez 2010). Within the broader system are the Four Texcatlipocas that provide the structural framework symbolized by the four directions:

- *Texcatlipoca:* the smoking mirror—a concept meaning memory as well as self-reflection.
- *Quezalcoatl:* the serpent symbolic of knowledge—precious and beautiful knowledge.
- *Huizilopochtli:* hummingbird to the left—will to act; ability to maintain balance and stability; it sits to the left referring to the location of the human heart and the sun rise in the wintertime—people-positive, progressive, and creative.
- *Xipetotec:* shedding the skin and achieving transformation; leaving behind that which hinders us; accepting the new, embracing.

Methodology for the Present Study

Though one cannot know precisely what manner of life people actually lived 1,400 years

17 Huausontle (pronounced WA-zont-lay) is a green vegetable (Chenopodium nuttalliae) originating in Mexico similar to broccoli in flavor. Before maize was a major food source in Mexico, huauzontle was a prime source of nutrition both in the green vegetable form and in the ground mature seed form. Huauzontle was found in Virginia USA carbon dated to 5000 years before the present.

Figure 10. Retrodictation method

Figure 11. Research Epoch

before the present it may be possible to reconstruct the knowledge system by examining the social, economic, political, and environmental conditions by retrodicting research domains that relate to a topic as the following illustration indicates.

Employing relational reasoning and analogic reasoning[18] the researcher establishes relations between domains moving back in time to the expected period in history. The sources of memory may fall into virtually any domain. Associating pictograms (in this case from the 16th century restoration of books by Mexica, Purépeche, and Wirraitari (pronounced "Weer-i-teery") peoples. Identifying and exploring patterns of relationship supplemented by domain source information where analogic reasoning is then employed gives the researcher a great deal of research space to understand how these relationships came into being over long periods of time—in the case of this inquiry, the period illustrated in the diagram below. When patterns emerge the researcher notes what domains are related and explores the possibility that other domains may also relate. Where a pattern fails to emerge or simply stops demonstrating further relationships as one moves back in time, the train of pattern is set aside with the possibility that the researcher can return given the possibility of a new pattern. If there is no relationship, the researcher abandons the domain or shifts it to another set of relationships.

The period of this study worked back in time to about 600 AD, the time of the Teuchitlan beginning era in Jalisco and the Jarácuaro period in Michocán (See figure 11) with the emergence of the Huacasacha from the Balsa River region on the coast.

I conducted retrodictions [19] on metallurgi-

18 Analogical reasoning is a complex process involving retrieval of structured knowledge from long-term memory, representing and manipulating role-filler bindings in working memory, identifying elements that play corresponding roles, generating new inferences, and learning abstract schemas. For empirical analogies, analogical inference is guided by causal knowledge about how the source analog operates. Simpler types of relation-based transfer can be produced by relational priming. *The Oxford Handbook of Thinking and Reasoning,* Edited by Keith J. Holyoak and Robert G. Morrison, 2012. ISBN 9780199734689.

19 An explanation or interpretation of past actions or events inferred from the laws that are assumed to have governed them....as in an

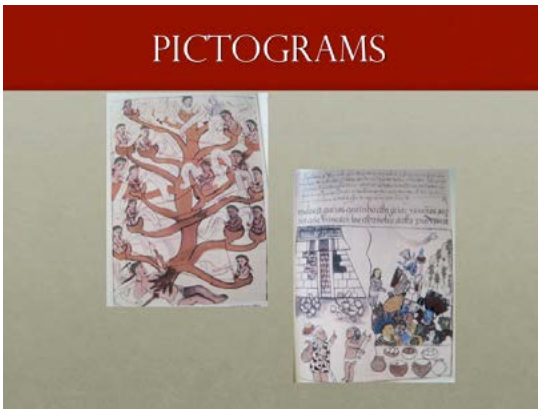

Figure 12. Purépecha Pictograms relationship

cal, agro-cosmological, indigenous political science, historical, language, toponyms, archaeological assessments, and initial pictogram evaluations focusing on relationships between such domains as social conditions, language, origin stories, ritual feasting, sub-regional trade, and food choices. These all pointed to a common region-wide scientific framework, the common features of which are the practices of dreaming, remembering, story metaphors, pictorial representations combined with oral expression, simultaneity, seven dimensional thinking (four-directions horizontally plus vertical elevation, descending, and time) and noticing relationships between multiple material and immaterial elements.

The pictograms above depict relationships between generations of influential spokespersons among the Purépecha. These are not familial relations, but rather power and influence relations.

These are structural elements of the four-direction epistemology that involved a simple process of localized notation amplified by cosmologic and temporal influences. It appears that the pre-Hispanic intellectual classes were able to conceive of very complex, multi-layered problems such as responding to changing climatic conditions in the immediate context (changes that are quite miniscule when considered in the short-term) and thus their thinking contributed to whole societies adjusting to a changing environment over an extended period of time. Adjusting to abrupt environmental changes (volcanoes, earthquakes, floods, etc.) proved to be much more difficult, though when such events did occur the transmission of historical knowledge would be so exact that it would be possible for later generations to make adjustments or accommodations at the slightest hint of a cataclysmic event. Noticing changes in animal behaviors and plant behaviors also served as early warning mechanisms for those skilled at noticing relationships. The more complex the communities (populations rising above 5,000) in various localities proved an important obstacle to adaptation since hierarchical systems of decision-making with horizontal power structures would combine to reduce adaptive flexibility. In other words, small groups—peopled by families—were in a much more efficacious position to change with the environment, whereas large and complex societies proved to be much too unwieldy owing to the complex array of competing interests that required sophisticated mediation or in some instances violent conflict.

Collaboration

Fourth World Theory incorporating Anáhuac concepts and principles served as the foundation of a Collaborative Partners Formative Evaluation study that was conducted over a year's time in 2012-2013 by the Center for World Indigenous Studies for the Oregon Museum of Science and Industry. The study focused on measuring the reciprocal collaboration success or failure by seven organizational

argument based on *retrodiction* (using current information or ideas to infer or explain a past event or state of affairs).

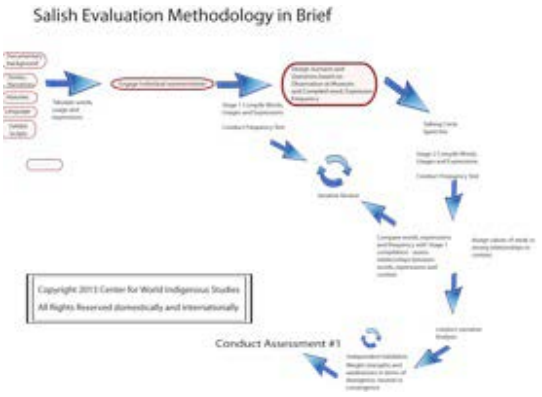

Figure 13. Salish Evaluation Method

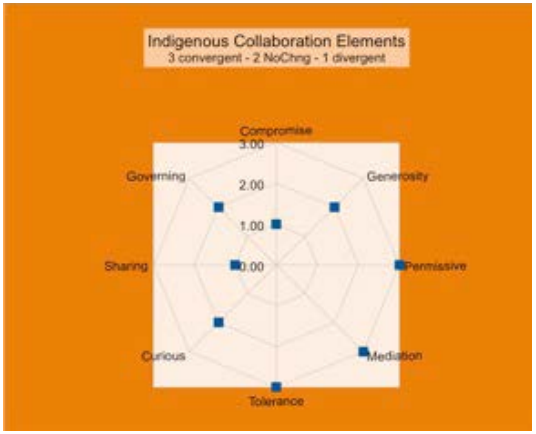

Figure 14. Indigenous Collaboration Relationships in Evaluation

partners engaged in an effort to design museum displays that reflected the theme "Generations of Knowledge." The degree of success or failure was important since three of the seven organizations relied wholly on the Cartesian knowledge framework and four indigenous organizational partners relied on various forms of traditional knowledge as a basis for their participation. The evaluation modalities were reliant on the Coastal Salish Knowledge System supplemented by conventional qualitative action research and narrative analysis techniques. This approach followed closely the conceptual and methodological approach of Toltecayotl.

The researchers adapted the relational reasoning, pattern finding, and analogical reasoning approach to test the method in a contemporary evaluation of relationships between organizations working toward a common goal. The process conducted over a year involving seven organizations and a single project followed this approach as illustrated in Figure 13 "Salish Evaluation Methodology[20] in brief.

The results of this approach illustrated a pattern showing the relationship between different collaboration attributes depicted in the following diagram. In the diagram it is easy to see where there is a convergence between the organizations (outer web line shows greatest convergence) whereas the points inside the web demonstrate reduced levels of collaboration or complete divergence between the organizations. This result was possible by systematically understanding the internal relationships of each organization from the organic instruments, histories, people, organizational experience and mission, and the frequency of commitment to the collective project.

The research techniques were inspired by Toltecayotl and were conducted in the fields of climate change, organizational collaboration, education, economics, and social and political change. The methods of retrodiction, relational reasoning, and analogical reasoning fit well with Toltecayotl of the Anáhuac Knowledge System and the Cartesian Knowledge System to expand understanding and provide insights

20 This is the name given to the evaluation method used in the Generations of Knowledge evaluation study conducted on behalf of the Oregon Museum of Science and Industry in 2013. The method rested on Fourth World Theory and the theoretical framework produced by Richard (Umeek) Atleo in his book Tsawalk that emphasized blending rationalist and intuitive methods.

into complex social, economic, political, cultural and strategic problems.

CONCLUSION

In the past, I have looked to Fourth World Theory to investigate the boundaries and constructs of Fourth World research, including specific health arenas such as the benefits of essential fatty acid sources to various native populations and the role of touch therapy in the treatment of dementia patient caregivers; the design of a tribal communications approach to organizing support for nuclear waste disposal; designing a tribally sourced education program for high school aged students; design of an environmental impact study; and design of a multi-variate tribal economic design.

The Anáhuac Knowledge System with its Toltecayotl emphasis on rationality and intuition proves the benefit of Fourth World Theory as a theoretical foundation demonstrating how the apparent gap between Cartesian knowledge and a Fourth World knowledge system can be closed by practicing a blending of knowledge. The systems are not contradictory, but different owing to cultural origins. In reality they share similar conceptual structures that allow researchers to obtain significant insights and understandings of complex problems in a complementary way.

From the Fourth World Geopolitical perspective we at the Center for World Indigenous Studies designed and implemented a three stage strategy based in Fourth World Theory for triangulating indigenous governmental, state governmental, and multi-lateral state organization to formulate a mutually acceptable policy for key language in the World Conference on Indigenous Peoples Outcome Statement. Similarly Fourth World geopolitical analysis was used by CWIS to develop initial agreement between the Russian Federation, Germany, Japan and the United States with ten indigenous governments to develop a Congress of Nations and States (1992). Admittedly the Congress of Nations and States was ultimately quashed by the George H.W. Bush government at the last moment during negotiations at the Russian Embassy in Washington D.C. This strategy employed Toltecayotl from the Anáhuac Knowledge System as well as the basic principles of Cartesian science to structure complex relations between political entities that conceived of themselves as quite different from each other. Evidence has been obtained in these research experiences to demonstrate that whether one begins approaching a problem employing the Anáhuac Knowledge System, a Coastal Salish Knowledge System, or Kwazulu Knowledge system (the dominant system in south western Africa), complex social, economic, political, cultural and strategic research strategies can be developed drawing on Cartesian sciences as well as Fourth World sciences. They can be closed instead of widened by continuing claims of separation. Human sciences do have different cultural roots, but they draw on similar human experiences and needs.

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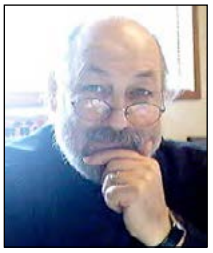
About the author



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