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There is No Alternative to Tribalism

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Abstract: *Tribal traditions and the western scientific tradition are not investigated for congruency or correspondences. The tribal order of the universe concerns itself with wholeness while the western order, in comparison, is fragmented. The tribal order is introduced first through correspondences alluding to physics. The feature that both the tribal order and the western order, through modern physics, will speak to is reductionistic-externalistic* mechanism. *The relativity and quantum theories illustrate inadequacy with mechanism; a feature central to the tribal Lakota order, wakan, is used to bring both theories together through its internal, qualitative nature. The tribal order clearly has no issues in dealing with problems baffling to the western order.*

Introduction

Tribal traditions are a complete alternative to the western scientific tradition. Counter-intuitively, both traditions are derived from experience (Malinowski 1954: 4). The conceptual difference is that the whole of experience concerns the tribal order, while the western order reduces experience to a set of basic elements resulting in fragmentation (Barrerio & Johnson 2005: 160). The approaches differ in that the tribal order perceives a universe of relationships between relatives, in place of a western universe that exists for curious experimentation at the behest of creation's crowning jewel – the rational man. A particular field of western inquiry is required for complete illustration of western achievement in comparison to a tribal principle, both speaking to mechanism. In this respect, modern physics is without peer, and increasingly at ease with the tribal order of the universe.

Fragmentation

Fragmentation dominates the perception of the western order, in comparison the whole that a tribal order gives weight to. This is not philosophical drivel, however; the western scientific tradition fails to appreciate Indian traditions or any tribal order (Battiste & Henderson

2000; Feyerabend 1975: 88). Fragmentation must be illustrated. Think of an eyeglass – and then think of a hammer smashing the eyeglass. The glass breaks up into fragments that can no longer appreciate the whole.

Physics, biology, philosophy, art, music; these are fragments of *the whole of experience* as perceived in the tribal order. It must be remembered that the world does not *exist* as physics (biology, philosophy, art, music, etc.), this is how the western order tautologically *perceives* the world. And unless one possesses an ability in non-scientific endeavors that is short of *genius*, the work is written off without further investigation. This characterizes the dismissal of Indian and tribal thought with the condescending labels of *religious* and *artistic* (Neihardt 1972; Whitehead 1933: 48-49).

Scientists, and I apply the word as broadly as possible, are committed to the belief that tribal peoples and their knowledge represent a lower form of life and intellect. If there is any question of this, then investigate the plethora of tribal ideas explicitly driving current university research. Western science dismiss Indian traditions as mere superstition; Indians pull knowledge from tribal stories, ceremonies and other *traditions* scientists are prevented from approaching because of fragmentation (Malinowski 1954: 4). Prematurely, scientists are trained to erroneously believe tribal knowledge arises out of thin air because of the philosophical foundations that physical science is built upon (Whitehead 1933: 224).

Sadly, scientists *need* the "primitive." Scientists require tribal people for distinguishing their civilization because tribal people provide a concrete example of a hypothetically earlier stage of cultural evolution (Bohm 1979: 2-5). At both extremes of the scientific stereotype describing tribal peoples, fantasy reigns supreme.

At worst, the *primitive* in science has historically been portrayed as mystified or mortified of natural phenomena (e.g. fire, lightening) and left the caves only for food and water. Although some can recognize this for the stereotype it is, scientific discussions can still characterize ancient humans and modern tribal peoples without difference, both scurrying in fear of lightening. At best, the primitive is conceived as having a prescientific perspective; that is to say, tribal peoples yearned to use current scientific methods in explaining their world but were *unable* to form the abstract concepts that, when universally applied, allowed western scientists to make their insights. The reality is somehow more unfortunate than either ends of the spectrum.

Western scientists, solely because of political pressure exerted by ethnic groups, were forced accord Indian knowledge with a "quasi-

scientific" label (Erickson & Murphy 2003: 116). New academic fields were created by assigning established fields the prefix *ethno*, and scientists left minorities to argue over *supplementary* data. Western scientists gave minorities their own disciplines within the hallowed halls of universities; inherent in the action is the belief that western science is the yardstick against which other forms of inquiry must be validated by (117). That the new disciplines were not the result of appropriate analysis of tribal concern for the whole may be indicative of complacency, a view derivable from how long American education has borne its current imprint.

The fragmented view with which scientific inquiry perceives the world has its roots firmly established in the thoughts of Aristotle and the Mediterranean. The manner in which American schools divide and teach subjects reflect this fragmented influence. There once existed the seven liberal arts: grammar, logic, rhetoric, geometry, astronomy, arithmetic, and music...which conform to Aristotle's philosophic division of subjects (Deloria, Jr. & Wildcat 2001; Irwin 1990; O'Meara 1991; Plato et al. 1982).

Aspects of experience are isolated into what are now known as the scientific disciplines. In physical science, the universe is believed to be understood in terms of mechanism. The reductionist approach is then anointed as the means by which data is handled, whereby indivisible units of matter (called *quanta* – proton, electron, quarks, etc., but also electromagnetic and gravitational fields) are studied externally. In theory, the unspoken assumption is that by engaging in these pursuits of fragmented knowledge, human beings can come to understand the world they live in. Nothing could be further from the truth. In application, physicists divide and sub-divide ad nausea, blind in their belief that indivisible units of matter hold the secrets of the universe. The position is then taken that their approach to understanding the universe is not an article of faith, but a matter of time (Barbour 1999: 13-14). Rubbish.

Introducing the Tribal Order

It is perhaps a tough pill to swallow that the tribal order is at least equal to the western order. Indeed, it is difficult to precisely flesh out the differences in how tribal orders perceive experience to be studied, but language can offer insight. In North American Indian languages, there are no words for "art," "philosophy," nor a word for "religion." Some anthropology has toyed with non-Western categories and classifications of experience (Walker 1991: 111-113). Indians

engage in practices curious non-Indian academics have concluded as *religion* (Walker 1991). This was not always the case.

Historically, Indians were a godless people whose idle paws handled the devil's work because they did not possess Christianity. Naturally, American federal "Civilization Regulations" and Canadian federal legislation outlawed Indian religious practices (Pettipas 1994). For political reasons, Indians wanted non-Indians to have a rudimentary understanding of tribal practices; the aspect of experience non-Indians isolated with the label religion was selected to meaningfully clarify the difference between Indians and non-Indians. This idea caught on with non-Indian academics, still in an anthropologic frenzy of activity of the matter (Macgregor 1946). For Indian tribes then, whose approaches do not assume reducing or dividing experience will unlock the secrets of life, it is intelligent to prefer the term "life way" or "way of life" instead of religion's label (DeMallie & Parks 1981: 211-216). Indeed, for scientists, the "Indian" view is *only* a religious view, as if by placing Indian knowledge into a category it had thereby been understood.

I once took a course on vertebrate zoology, to flesh out critiques of evolution that open ground for Indian traditions. Anyone who has actually read the minutes of scientific congresses over heated arguments will agree with my opinion that science majors be required to take a law course on *Evidence*. The course instructor answered to paleontologists on her Ph.D. committee, who rely on morphology derived from bones of long-deceased life. I fancied this the perfect opportunity to begin analyzing the biological system of classification, historically categorization on the basis of physical similarity, in comparison to tribal systems of classification, usually the spirit and psychology of the being, "on the basis of shared, qualitative power" (Brown 1992).

After class I enthusiastically spoke with the teacher, relating it was the focus of future research. The teacher excitedly inquired about the research, yet when I spoke of critiquing evolution from a tribal position, a dark look washed over her face, her brow furrowed and she said, "I don't think I can help you." I did not know what to make of her comment, since all data required to start was contained in the textbook. Asking the teacher to elaborate, she stated, "I don't know anything about religion." I tried to explain how the tribal viewpoint need not be a religious one, but she began to look confused and asked me if I was talking about "creationism." I allowed myself a small chuckle, said, "No..." and she asked if I was referring to "intelligent design." I saw that the conversation was not going anywhere as the professor was only

trying to assign what I was relating to an isolated aspect of experience academics studied.

Just as there exist no words in North American Indian languages for art, philosophy, and religion, there is no word for *science*. These are discernible aspects of every experience, and Indian perceptions of the universe, linguistically-derived, do not reflect the same fragmentation the non-tribal languages and its speakers are handicapped by. Indian knowledge comes from experience, not out of thin air as anthropology has erroneously characterized (Malinowski 1954: 4). Indian knowledge is put into stories passed on primarily during the winter by story-tellers (Dooling 1984: *v-iix*). Additional community people also hold knowledge related to various stories. One must remember that these story-tellers who hold onto this community knowledge hold some of the tribe's collective experience within these stories with additional knowledge held by individuals. This alludes to mechanism as it is understood in modern physics; in the tribal order it is not *people* nor *things*, but internal relationships that create sub-wholes (and the whole) of the universe, communities.

The current *Indian problem* is that the sole data scientists perceive within Indian traditions is ecological, commonly referred to as traditional ecological knowledge (Pierotti & Wildcat 1999). That western scientists can only discern ecological data from Indian knowledge is failure. Indians cannot discuss their knowledge because western scientists take externalistic-reductionistic-mechanism to be the final word on the universe. Before approaching discussion, scientists require the entire discussion put into whatever technical jargon characterizes the academic field approaching new data, in addition to having the subject matter put into a format tailor-made for their field. A review of how physics understands its own changes is warranted.

Physics

And in the beginning...there existed in the ancient Greek understanding of the Earth giving the universe a center, surrounded by seven concentric spheres in an order of increasing perfection into the Heavens. All spheres, including the Earth, comprised a total considered to be an integral organism, taken to be meaningful. Elaborating, Aristotle said each part had its proper place in the organism, that its activity was seen as an effort to move toward its proper place as well as carrying out its appropriate function. Of central importance in the whole system was man and the implication that his proper behavior was necessary for overall harmony of the universe (McKeon 2001).

In *On the Revolutions of the Celestial Spheres* (1543), Nicolaus Copernicus brought the idea forward that the sun is the center of the universe – interestingly, the sun played little part in the articulation of his idea and he simply happened to place it there. The modern scientific meaning of revolution derives from the title and the book established the form of the solar system for western people (Copernicus & Wallis 1939). Around sixty years later Johannes Kepler showed the sun to be the center of the solar system, and with Galileo Galilee cleared a path for Newton, somehow more known for the physical work he produced that were corollaries of his much larger mystical works.

Isaac Newton penned his three famous laws on motion and the theory of universal gravitation in *The Mathematical Principles of Natural Philosophy.* His idea was that all bodies, Earthly *and* Heavenly, obey the same laws – what is important is this scheme is easily capable of describing the entire universe as a unified whole. The science Newton produced is mechanics, often now-called dynamics, which swept in the modern scientific age. Newtonian mechanics are often labeled as a worldview in which space and time are absolute; Newton claimed all motions take place in an infinite, immovable, absolute space and that time too is absolute and "flows uniformly without relation to anything external" (Newton 1999). And then there is the most erroneously interpreted, and simultaneously most known, paper in physical science.

If they had a nickel for each time a university classroom discussion ended with, "...everything is relative..." (as if the phrase somehow allowed validation to seep into an otherwise unintelligent discussion), Indians would be able to buy back all their stolen land. Illustrating *The Special Theory of Relativity* (1905) with electromagnetism, Einstein showed that simultaneity cannot be defined absolutely at spatially separated points, that time and space are inextricably linked together. Densely put, what appears as space and what appears as time depend on the motion of the observer. Physicists were giddy over his predictions about the behavior of measuring rods and blocks, and everyone else simply memorized special relativity's famous equation, $E = mc^2$, to recite later in testimony to their intelligence (Bohm 1979; Einstein 1961). Three years later, Hermann Minkowski formalized space-time as a rigid, four-dimensional arena of world events (Gwinn 1992).

While Einstein's special theory of relativity described a world without gravitation, his *General Theory of Relativity* (1915) came eight years later in which the arena of Minkowski's space-time is made flexible, responding to the presence of matter in it. Gravity is given a

creative interpretation as an effect of the curving of space-time. The theory has been taken to show that time can have a beginning (the Big Bang), and that the universe can expand or contract. Although nearly a creation of pure thought, many predictions of Einstein's theory have now been well confirmed. It describes large-scale properties of matter and *the universe as a whole* (Einstein 1961).

Quantum Theory (1925/1926) gets its name because of the idea that some mechanical quantities are found in nature only in multiples of discrete units called quanta. In physics, there is a distinct difference between *classical* theories, those of Newton and Einstein, as opposed to quantum theories. Quantum effects were first described on an ad hoc basis by Max Planck (1998), Einstein (Bohm 1979), and Niels Bohr (2005), while a *consistent* quantum theory was found in two different but mathematically equivalent forms: *matrix* mechanics by Werner Heisenberg and *wave* mechanics by Erwin Schrödinger.

Heisenberg and Schrödinger's mechanics were different mathematical approaches, but produced the same mathematical results (de Broglie 1990; Schrödinger 1989). Quantum mechanics is taken to describe the properties of light (especially lasers), and the microscopic world of atoms and molecules. Although it is the bedrock of all modern electronic technology, its results are baffling and counter-intuitive to the western mind, raising profound issues about the western perception of reality. It has puzzled more than many scientists that theories of completely different structures are used to describe the macroscopic universe (classical general relativity) and the microscopic atoms (quantum mechanics). This is the primary concern here, approaching a comprehensive, unfragmented view of the universe.

On Bridging the Tribal and Western Orders

It is at this point where discussion should begin in comparing a specific tribe's traditional knowledge and modern physics of the western intellectual tradition. However, it would not do much good to explain counter-intuitive ideas to a group with preconceived notions. I have watched non-Indians pose the questions, "What does it mean to be Indian?" and more frequently, "What is it like *being* Indian?" Indians struggle with the answer because there is no premise both groups agree upon to start discussion. Indians should be responding with a question to set the terms, such as, "Well, what does it mean for you to be white…or Swiss…or Italian…" In a congruent fashion there requires a comparison made of both groups approaches to the universe on a feature that fundamentally distinguishes one from the other.

It must be acknowledged that aspects of experience and inquiry that have the highest regard for tribal peoples can also exist within the western pyramid of knowledge, but presented in a drastically different form that makes it seemingly impossible for scientists to discern appropriately (Feyerabend 1975). An overall understanding of the Lakota universe is that there is an experience of the power that moves it, physically and non-physically, from an internal qualitative process. The Lakota name for it is "*wakan*" (White Hat Sr. 1999: 204). Descriptions of *wakan* by Lakota medicine men, when placed in a scientific format, are relevant to mechanism in modern physics. It would be inaccurate, however, to state that the Lakota understood the concepts of modern physics ages before the mathematical conclusions of physics were produced by western scientists. Herein lay a key difference: the Lakota felt power while science merely measured it. The Lakota then described power in terms of reality with fundamentally internal relationships observed as science attempted to predict it with abstracted theories of external mechanism.

Mechanism

There are a few salient features of mechanism. The first is, as far as possible, the world is reduced to a set of basic elements, usually taken to be particles. Particles usually include things such as atoms, electrons, protons and quarks, but electromagnetic and gravitational fields that extend continuously through space may be added. These elements are primarily external to each other in two respects. The first is that they are external to each other in space and second, more importantly, they are external in the sense that the fundamental nature of each is independent of the others. These may be understood in terms of a machine whose forms are determined externally to the structure of the machine (Einstein 1961).

Modern physics has taken the position that these elements interact mechanically and can be related *only* by influencing another externally; that is, by forces of interaction that do not deeply affect their inner natures. Contrastingly, the tribal order describes a universe in which the parts are fundamentally related in a manner modern physics would understand only as *internal.* Although the mechanistic view of existence admits an internal aspect, it is assumed that behavior can be explained (like above) as the result of constituent molecules (such as DNA), ultimately reducible to particles, that will be discovered to be only related mechanically and externally.

This view will never crown itself. What must be understood is that the externalistic-reductionistic-mechanistic approach *must* assume

that nothing cannot be treated in this manner. Its adherents will point to its success to justify and defend this assumption. This, of course, is in no sense a proof and to contend this assumption has no limit is nothing more than an *article of faith.* It is, of course, a modern counterpart of earlier faith in religious beliefs, based on organismic types of worldview, incompatible with and irrelevant to modern physics.

How far can faith in mechanism be justified, or can it at all? Physicists of any period have an unshakable faith in their correctness. Ironically, we could turn to the good Lord. Lord Kelvin, one period's leading theoretical physicist, thought physics was complete and all that remained was to work out the decimal points in computation (Kelvin et al. 1987). He did mention two clouds on the horizon that will characterize present discussion; the negative results of the Michelson-Morley experiment, and difficulties in describing black-body radiation. These two things were the points of departure for developing relativity and quantum theory, together changing physics by destroying the conceptual structure of Newtonian physics. And so in the early twentieth century arrived a development in which the mechanistic view became completely inadequate.

Relativity

The *Theory of Relativity* can be used as a useful step away from mechanism. Relativity introduced western man to space, time, and matter. For present purposes, Einstein's main idea was replacing the notion of separate and independent particles as constituents of the universe by fields that spread continuously rough space (Einstein 1961). This can be illustrated by means of a fluid, like water. In water, there can be a *vortex*, described as a constant recurrent pattern of form of movement of the whole that is stable.

Obviously, the movement gets weaker as distance from the vortex's center increases, the vortex's pattern does not significantly involve features far from the flow, and the vortex also has a certain independence from what is distantly happening in the water. Out of convenience, there is a desire by most to mentally abstract the *form* of the movement, as if it were a separate entity.

Now, think of two vortices far enough from one another so their flow patterns affect each other weak enough to be nearly independent. Think, then, of bringing the two vortices close enough for the movements to affect another strongly; if brought closer still, they can become a single vortex structure. Separate vortices ("entities" in physics), in this view, are relatively constant and independently

behaving forms that are abstracted from the whole, in perception and thought.

This was well-known to nineteenth century physics, however, it was implied in their work that real fluids, like water, are constituted of elementary atomic particles, which flow like grains of sand in an hour glass. Of course, then, the underlying reality of the water for physics was a structure of mechanical elements, in particle form.

Within the framework of relativity, Einstein argued elementary particles would be inconsistent with physical laws. He thought of a set of continuous fields pervading all space, in which "particles" would be treated as stable and relatively independent structures of limited regions in which the field was strong. These would, like vortices in water, gradually shade off into weaker and weaker fields. Such structures of field were shown to move through space as a stable unit (like a smoke ring vortex). As two of them came closer together they would begin to increasingly influence each other. Eventually, they merge. Each so-called particle is an abstraction of a relatively independent and stable pattern of movement of fields, spreading out through space, with no breaks anywhere.

Clearly this contradicts the assumption of separate *elementary* constituents of the universe that had been characteristic of the mechanistic worldview. However, it retains essential features of mechanism. For the field elements at different points in space were considered separately existent and not internally related in their basic natures. The separate existence of these basic elements was further emphasized by the assumption they were only *locally* connected. That is to say, the field at a given point could be affected only by fields at infinitely close neighboring points. The overall field was thus viewed as a type of mechanical system that was more subtle than a system of particles. Nevertheless, the field approach was still an important step away from the mechanistic worldview, even though it remained regarded as within the general framework of it.

Quantum Mechanics

Mechanism was completely altered by *Quantum Theory*. It overturned mechanism more fundamentally than the theory of relativity. It has three salient features.

All action is in discrete indivisible units, *quanta*. In Bohr's early forms of the theory, an electron had certain sets of discrete possible orbits.[1] He assumed the electron jumped from one orbit to another, without continuously crossing the intervening space. Action of every kind is of this discrete indivisible nature (particles or fields).

The apparent continuity that is commonly observed arises because the individual quanta are very small. An ordinarily visible movement therefore has a very large number of discrete jumps, each too small to be perceptible (except *possibly* with the most sensitive of instruments). All apparently large-scale (classical) motions are to be understood as constituted of discrete steps (Bohr 2005). This contradicts the older classical concept of continuity of movement, which is at the very basis of the mechanistic ideas of Newtonian physics (Newton 1999).

All matter and energy appear to have a dual nature, in manifesting either like a continuous wave or like a discrete particle, according to how they are experimentally treated. The electron, classically a particle, can under suitable conditions also behave like a wave, but the wave-length is so small and does not show up except in very refined observation. Light, classically a wave, can under suitable conditions behave like a (collection of) particle(s), but the energy is so low and does not show up except in very refined observation. That any system can show either wave-like or particle-like characteristics, according general environmental condition (here the observing apparatus) is clearly not comparable with mechanism. This variation of the fundamental nature of an entity to such conditions is far more like what is encountered with living and even conscious organisms than what is expected from a machine.[2]

Finally, a peculiar new property of *non-locality of connection* exists; that is to say, a close rapport between particles (or fields) that may be distant from each other. This violates the classical mechanical requirement of *locality of connection* (mentioned in Einstein's notions on the nature of the field). This latter requirement is that *basic* elements constituting the universe are strongly connected, only when in contact in space, or infinitesimally close together.

To tease out how these three key features of the quantum theory contradict basic mechanistic assumptions, consider that all action and interaction is through discrete indivisible quanta. This means that all parts of the universe are connected by indivisible links, *so that there is no way ultimately to divide the world into independently existent parts* (in principle, this extends to the observer and the observed). Moreover, the fundamental nature of each part (wave or particle) cannot but depend on its contextual web of indivisible quantum links. And finally, since indivisible interconnection may extend even to distant regions of space, *it follows that the very nature of each part may depend significantly on what is happening in places that are quite far from it.*

All of this is in general evident only under highly refined modes of observation. At ordinary levels of refinement (including

classical or Newtonian physics), familiar mechanistic conceptions furnish adequate approximation, and so the mechanistic program worked fairly well for hundreds of years (until observations were refined to reveal the more fundamental non-mechanistic structure). If scientists wish to go deeper, and if they wish to understand the basic nature of the universe, their aim is beyond the limits of the mechanistic approach. Analyzing the world in terms of independently existent elements, whose fundamental natures are *external* to each other, has broken down. Quantum theory also denies another well-known feature of classical physics – its complete determinism.

The laws of the quantum theory would not permit such a calculation because they are *statistical.* That is to say, they give only probabilities that certain things will happen, but do not determine in detail what actually will happen in each case. Quantum laws are not deterministic, though in the limit of a structure large enough to be observable by ordinary means, so many discrete steps are involved that the predictions of probability laws become nearly deterministic (as insurance statistics can be used to predict fairly accurately the fraction of the American Anthropological Association who will die in a certain way, though it can say nothing about precisely what will happen to each individual).

It must be emphasized that this question of determinism vs. indeterminism has little or no relationship to that of mechanism vs. non-mechanism. The essential point of mechanism is to have a set of fundamental elements that are *external to each other* and externally related. Whether these elements obey deterministic or statistical laws does not affect the question of the mechanical nature of the basic constituents. A pin-ball machine or roulette wheel operating according to "laws of chance" is no less mechanical than is a machine whose behavior is completely knowable and predictable.

How precisely can the physical view break from the mechanistic view while remaining compatible with relativity and quantum theory? Observe how quantum theory and relativity bear on each other in terms of the mechanistic worldview. The question is not easy for western thought to approach because it does not seem to be possible to relate the *basic physical concepts* of the two theories in a consistent way. Relativity requires strict *continuity*, strict *determinism*, and strict *locality*, in the formulation of its laws, while quantum theory requires *discontinuity*, *indeterminism*, and *non-locality* in such formulations. They appear to be in absolute contradiction. The present frameworks of these two theories and the two sets of *physical concepts* have not been brought together consistently and unified.

If we approach the question of looking at relativity and quantum theory together coherently, we may be led to consider a new kind of question. Instead of focusing on how the basic concepts of these two theories contradict each other, ask what they have in common. What is common to both is non-fragmentation of the universe. Each has this non-fragmentation in a different way. Yet, if non-fragmentation is their common factor, this is perhaps the best place to start in the search for new physical ideas, by which we may understand the novel and subtle features to be seen in these theories (and in the essentially mathematical formulation of their union in quantum field theories).

Each worldview holds inseparably within itself its own basic notions of order. The ancient Greek view incorporated the order of increasing perfection from Earth to the Heavens, and the order implied that each part is striving to reach its proper place and to fulfill its appropriate function in the universe. But, the worldview implicit in Newtonian physics is based on the notion that such an order is totally irrelevant, and that what is important is the mechanical order of successive positions traversed by each particle, and of the strength of forces, which they exert on each other. This latter order is now expressed mathematically in terms of *coordinates* (Descartes 1954). (These are grids, by which the locations of points can be accurately specified in terms of numbers.) As the word indicates, such coordinates are means of describing order and the order is of just the kind that is needed for thinking about a universe that would be basically mechanical in its nature. We are in this way led naturally to the question: Is it possible to develop a new order that is suitable for thinking about the basic nature of a universe of non-fragmentation? That is to say, *can* the western order move towards the tribal order?

Wakan

Wakan is an exceedingly difficult thing to understand, especially when we consider that Lakota medicine men, among the most knowledgeable concerning the Lakota perception, have found it difficult relating its meaning to another tribal member in the Lakota language, to say nothing of attempting to do the same thing in English. Presently, Albert White Hat, Sr. translates *wakan* as "power and energy" (White Hat Sr. 1999: 204). This is the clear understanding of the word and the Lakota have always understood it this way, but what of the nature of this power and energy? A medicine man named George Sword stated:

Wakan means very many things. The Lakota understands what it means from the things that are considered *wakan*; yet sometimes its meaning must be explained to him. It is something that is hard to understand... Every object in the world has a spirit and that spirit is *wakan*. Thus, the spirit of the tree or things of that kind, while not like the spirit of man, are also *wakan*... *Wakan* comes from the *wakan* beings. These *wakan* beings are greater than mankind in the same way that mankind is greater than animals. They are never born and never die. They can do many things that mankind cannot do. Mankind can pray to the *wakan* beings for help. (Powers 1977: 47)

Both *wakan* and spirit are given attention and are non-physical, qualitative aspects corresponding to the physical world. *Wakan* can also designate power, and within the Lakota understanding of the universe, a common description of spirits is that they are powerful in relation to other beings aside from also being energy or power. In fact, Good Seat, another Lakota, stated: "A spirit is wakan" (Walker 1991: 71). There is a spirit a part of a being, which makes it *wakan* and there is also a quality that moves through a being that makes it *wakan.*

Black Elk, the famous Oglala Lakota medicine man stated: "We should understand well that within all things are the works of the Great Spirit. We should know that He is within all things: the trees, the grasses, the rivers, the mountains, and all the four-legged animals, and the winged peopled..." (Brown 1992: 93). Another description of a quality that is *within* everything is given here. Black Elk is relating a description in which the *wakan,* the internal and qualitative, is fundamental to existence and it is the reason why Indians are preoccupied with it in the first place...not out of some touchingly adolescent urge to create beliefs and fantastic explanations solely out of fancy for them.

Black Elk says that the Lakota, in reflecting on the *wakan*, will live their lives in a particular manner. The Great Spirit, as Sword also related, is responsible for this *internal, qualitative* aspect of the universe. This is not "Indian *intelligent design*" or "Indian creationism" as a smug academic might quip. The Christian god is a creator and is not to be conflated with His creation; He works in his creation, but is not *of* it. This is among the primary set of contradictions that science apologetically circumvents dealing with religion and has resulted in the late Carl Sagan's (1998) work, "Billions and Billions: Thoughts on Life and Death at the Brink of the Millennium". *Wakan Tanka*, the Great Spirit to most non-Lakota, is in the universe and is intrinsically within.

William K. Powers, an anthropologist, and James R. Walker, a physician, who tried to relate the understanding of the Lakota into English, and with respect to the nature of the universe as it related to *Wakan Tanka*, he summarized: "The universe is composed...of energy; good and evil are thus two aspects of the same energy. The good aspects of energy are controlled by *Wakantanka*; evil aspects are controlled by the *wakan sica*" (Powers 1977: 51). It is clear that there are qualitative distinctions made, but perhaps it would be useful to give one where distinctions within *Wakan Tanka* are made.

For instance, *"Wakan Tanka* is like sixteen different persons...Therefore they are all only the same as one....Half of the good gods [have physical properties], and half [have no physical properties]. Half of those that [have physical properties] are [visible] and half that [have no physical properties] are [invisible]" (Walker 1991: 95). These spirits that compose *Wakan Tanka* are structurally-arranged as follows: "The sixteen aspects are hierarchically ranked in groups of fours, the major classes being (1) *Wakan akanta* 'superior *wakan*'; (2) *Wakan kolaya* 'those whom the *wakan* call friends or associates'; (3) *Wakan kuya* 'lower, or lesser, *wakan*'; and (4) *Wakanlapi* 'those similar to *wakan*'" (Powers 1977: 54).

Joseph Epes Brown (1992), in reflecting on the considerable amount of time he spent listening to Black Elk's words on *wakan*, stated: "Underlying the fluidity of appearance there is the binding thread of the *wakan* concept, the ultimate coalescence of the multiple into the unifying principle of Wakan-Tanka" (xiv).

From these descriptions by Lakota medicine men on *wakan*, a general principle may be derived. It must be noted that taking observations and then deriving a general principle is not the manner a tribal order operates. However, speaking to the worldview of a unified understanding between relativity and quantum theories in moving past the reductionistic-externalistic-mechanistic problems, *wakan* is a fundamental, qualitative internal process that unfolds and enfolds the secondary external process of the limiting idea of mechanism. *Wakan* as the internal interaction is instantaneous and can potentially explain interaction faster than the speed of light. *Wakan* is central to the tribal order - quite simple, but irrevocably and fundamentally changing modern physics, encompassing and explaining the western order. At first glance, it may appear redundant...

The Tribal Order

Among those who intimately know the mathematics, nobody knows what quantum theory is but all know how to use it. The only

thing clear about quantum theory is that it has a mathematical algorithm that statistically treats experimental results. A decent analogy of quantum theory can be made to an insurance sales representative. If an insurance sales representative had all members of the American Anthropological Association (AAA) in a single room (and if they were lucky enough for not a single Indian be present, lest he start the gas...), the insurance sales representative would be able to give a statistical answer of how many in the room would die by certain means.

In philosophical terms, quantum mechanics is epistemology (primarily concerned with how we know, secondarily concerned with what we know), not ontology (primarily concerned with what we know, secondarily concerned with how we know it). Modern physics is a worldview, in the same way that Indian systems are colorfully described as worldviews by anthropology (Diamond 1960).

In a mechanistic worldview, the universe operates much like a machine. Think of two cogs connected and turning each other by their inter-locked "teeth." Modern physics takes the position that everything interacts with each other externally (the outside of the cogs), and the interaction is not sufficient to warrant concern for internal processes thus far; this external interaction is thus *ultimate reality*. Mechanism posits that everything reduces to indivisible units of matter (quanta) which essentially operate like the above description, yet physicists cannot describe an individual molecule's behavior. Quantum theory cannot describe an individual molecule in the same manner an insurance salesman could only give a roomful of AAA members their death statistics, not how a particular member would die.

The Lakota system describes the same universe of cogs, but further Lakota investigation shows that these physical cogs (be they people, plants, animals or landforms or stars) fundamentally interact with each other internally, by the generalized principle *wakan*. The Lakota position can be such that this is ultimate reality (so to speak).

Mathematics cannot disprove either position - if there were two "ultimate" positions, they could be the western order and the tribal order. Physicists are taught the interpretation that the external interaction is primary and the internal would then be secondary. The thing is that there are things the external interaction interpretation (as ultimate reality) cannot explain. Non-locality of connection - an example is electrons when torn away from atoms, in plasma, concertedly moving towards a magnetic field shot through the plasma, although the electrons are not within affected space of the magnetic field.

This is not a problem for the tribal order. Taking the *wakan* as a generalized principle and applying it to electrons, we are no longer

bound in our analysis to external interaction. Internal interaction is fundamental and can occur instantaneously. The electrons, through the internal process derived from descriptions of *wakan*, offers an explanation for *non-locality of connection* while modern physics is at a loss.

The cold, hard reality is that mechanism, for nearly all of science, is *the* baseline assumption. However, this is not true for modern physics; all other fields (except perhaps where biology is bridging with physics) adhere to mechanism. For physics, mechanism is dead while other scientific fields, perhaps, are still contending with what this means. Mechanism was inadequate for the tribal order much in the same manner it is for modern physics. There are simply phenomena both approaches observe that are mechanism cannot deal with. Modern physics, it appears, can try new things.

News spread fast across Indian country when rumor got out that physicists were using the Hopi language to describe phenomena that the English language could not do so in an adequate manner (Abram 1996). Invariably, when old traditional Indians are told of the latest scientific advances, they shake their heads in a disapproving manner and reply, "Indians al*ready* knew that." In this case, Indians have always known, and stated, the universe is more than cogs in a machine. Indeed, chaos theory, self-organizing systems, and non-locality of connection certainly speak to the perspective that the universe is more than the sum of its parts.

What Lies Ahead

Percy Bridgman (1959) insightfully stated that while westerns use the syllogism to expand knowledge, Indians simply note many similar concrete cases and remembered what their own consistent experience had verified to be true. The previous insurance examples can continue to flesh out this operation.

Let us say that a westerner and an Indian were required to state the logic upon which to sell insurance to Aristotle. In the West the following propositional thinking is admissible to give knowledge: "Aristotle is a man; all men are mortal; Aristotle is mortal." An Indian would state: "Yeah, I met Aristotle, he was no different than the rest of us, so I assume he is mortal too." Both cases have an assumption. "All men are mortal," cannot be truly verified. We have not yet met all men and we infer from the limited number we have observed that our statement holds true. The Indian also assumes that all men are mortal but he requires empirical verification in remembering Aristotle. The Indian once met Aristotle and verified he was a man like the Indian.

This process of verification reduces substantially the number and kinds of statements that Indians would be willing to make. But it *substantially* enhances the veracity of statements they *do* make. Whereas the Western syllogism simply introduces doctrine using general concepts and depends on faith in the chain of reasoning for its verification, the Indian statement would stand by itself without faith and belief. The question of all men's mortality is still open for the Indian on the possibility that some men are immortal but have not yet been encountered.

This discussion makes it appear that no real difference exists. But if we investigate further we will discover that the idea of a man for the Indian is quite specific and exists within a much broader field of data than that of the Western thinker. Suppose the Indian had a dream or vision in which a creature resembling a man appeared. Such phenomena are reported in both Western culture and Indian experiences. The Westerner would immediately reject the idea that any spirit can appear in a dream or vision and be as "real" as ordinary wide-awake life experiences. During the Indian's dream the man-figure can do things that physical humans cannot do. He can become a bird, animal, or some other entity depending on the nature of the dream. Yet he falls within the definition of man that would be taken into consideration by the Indian when making a statement about human mortality. Obviously he is alive and a part of the Indian's world.

The westerner rejects the experience because it is not a material thing. He insists that the experience be "real" – i.e. a physical presence that can be subjected to some form of mechanical testing. The Indian does not believe that the world is wholly material, and allows for the existence of real but immaterial phenomenon. It is easy to see that when the Indians of the Standing Rock and Turtle Mountain reservations in North and South Dakota were taught various sciences, it was pronounced by a chief not as bad or untrue, but simply inadequate...(Beede 1919: 3).

Footnotes

[1] See ww.colorado.edu/physics/2000/quantumzone/bohr.html.
[2] See theory.uwinnipeg.ca/mod_tech/node154.html.

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