

Nonlocality and Intuition as the Second Foundation of Knowledge

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ABSTRACT

A two-input model of human information processing with the corresponding biological interfaces is proposed in this essay. It is argued that dual aspects of nature generally are reflected in the way we relate to it, and may appear on the different levels humans make representation of the environment. Evidence from neurosciences for two quite distinct forms of visual perception and the 'bicameral mind' concept are presented as existing examples of the argued principle. The local-nonlocal division of the physical world cuts to the deepest level of information processing resulting in two basically different but complementary foundations of knowledge. A dual-process approach in the way humans relate to the world emerges from this analysis, with the 'perceptual-cognitive' process (based on local effects) receiving awareness in the ordinary states of consciousness, while the 'direct-intuitive' (based on nonlocal connections) process transpiring mainly in the integrative forms of altered states of consciousness. The outlined dichotomy of knowledge can explain the differences between scientific and spiritual teachings, and provides ground of interpretation for *psi* research.

Key Words: consciousness, duality, nonlocality, psi, quantum brain dynamics

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The Need for a New Way of Looking at Humans

Between 1964 and 1966 a theory has swept across the community of physicists and cosmologists like a wave and profoundly changed our view on the Universe. The breakthrough happened subsequently to Arno Allan Penzias' and Robert Woodrow Wilson's (1965) measurement of the 3K cosmic microwave background radiation. Long after the discovery of the cosmological redshift in 1929, the detection of cosmic background radiation in 1964 provided the second and strongest evidence supporting Big Bang Theory. Interest in alternatives such as the

Steady State Theory of the Universe was suddenly curtailed. Within a remarkably short period of time most scientists had become fairly convinced that some version of the Big Bang scenario best fits observations. From that point we can witness how quantum mechanical concepts influence cosmological theories and we can say that the nearly 400 year old Newtonian-Cartesian view on the macrocosm got the final farewell in those years.

It may sound controversial that almost half a century following the cosmological paradigm shift, the current scientific view on the microcosm—on the nature of human phenomenon—has not been able to move away from the Newtonian-Cartesian tradition. On the other hand, one may also find it ironic that the materialistic-reductionistic paradigm carries Isaac Newton's name while he has spent more time on occult and theological studies than on the completion of *Principia Mathematica*: he wrote more than one million words on the subject of alchemy in private

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manuscripts and circulated among likeminded “*chymist*” colleagues such as Robert Boyle (2006 [1661]). How come that the Founding Father of the Age of Reason had been dealing with pseudoscience and superstition? Well, one possible answer² is that Newton was the last of the magicians as John Maynard Keynes opined (1947), and he possibly had a broader view on nature than we have. Science is a pretty over-exclusive approach to the world. Necessarily it has to be so. Its main purpose is to build a knowledge system, which has to be consistent not allowing anything shaky, poorly proven getting incorporated, especially not at its base. As science evolves, what lies outside its domain today may be part of it tomorrow. Perhaps Isaac Newton was much more ahead of us as we would suppose. Talking about science: if one’s life is at stake, a reliable, predictive method it offers is a sure bet. Nevertheless, I would not anchor my soul to an impersonal system like that. Like it or not, the scientific knowledge pyramid has no place for such soft, ephemeral concepts (like soul) emerging from vague, subjective experience instead of solid, measurable observations.

My point here is that the contemporary scientific world view on human experiences, on the essentials of human existence, and on the nature of consciousness has not gone through the same paradigm shift what cosmology has been able to do not very recently. The influence of quantum physics has not reached mainstream neuroscience yet. Occasionally it may appear on the periphery, and stays in marginality like the quantum-based Orchestrated OR Theory of consciousness proposed by Roger Penrose and Stuart Hameroff (1996), or Mari Jibu’s and Kunio Yasue’s work on quantum brain dynamics and consciousness (1995). Intriguingly, the different formulations of quantum consciousness frequently result in statements which sound unusual to scientific thinking but are common in mystical

teachings. Their approach is unique but some of their conclusion is not really new. What one may witness in this field is the renaissance of antique wisdom under quantum disguise. I know scientists who get irate by what they call “quantum craziness”. Yet not everyone with similar conviction can be judged as a gullible New Age thinker. Let me present an example, the reputable anesthesiologist and consciousness researcher Stuart Hameroff (2005) made this statement:

“...when the metabolism driving quantum coherence (in microtubules) is lost, the quantum information leaks out to the space-time geometry in the Universe at large. Being holographic and entangled, it doesn’t dissipate. Hence consciousness (or dream-like subconsciousness) can persist (after death—added by the author).”

The Tao of Physics (Capra, 1975) indicates that something akin has been happening in the science of the macro world. The Rigveda contains no detailed recipe for building a laser, yet it describes the world in a way quantum physics based cosmology does. Just the reader must look behind its “terminology”. One may wonder if that is merely a coincidence, nothing more than a good hunch. The wide array of metaphysical thinking, which is lurking behind cutting edge physics is difficult to be ignored, and makes hard to accept a simplistic explanation. So the question arises: where is that knowledge has coming from, what is the source of the wisdom of the wisdom traditions?

In this essay the primary goal is to locate another source, to introduce a different way of getting knowledge with the help of post-Copenhagen quantum theory. The secondary goal is to show that the proposal of a second foundation of knowledge is in line with the teaching of millennia old wisdom traditions. It will be discussed that besides the rational approach there is another way to nature’s secrets, what one may call the intuitive, contemplative, or visionary method of accessing knowledge, and it has physical foundation. Both paths to knowledge are relatively independent of each other and complementary to the other as well. As Rabbi Joel David Bakst (2001) puts it (in good agreement with Sufi and other mystical wisdom):

“According to the teachings of esoteric Judaism all knowledge, both spiritual and

² According to another—rather condescending—opinion, in his late years Newton had heavy metal poisoning which caused him mental affliction influencing his thinking and judgment in a deleterious way. Long after Newton’s death it was discovered that he had mercury and lead in his body, probably resulting from his alchemical studies (Johnson and Wolbarsht, 1979). This may explain Newton’s eccentricity in late life but not why he turned to alchemy in the first place. He had this devotion early on and only interrupted it for 2 to 3 years to produce the *Principia Mathematica*. In addition, there was theology that ultimately played a greater role in his life than alchemy or physics. Newton’s own view of gravity was that it was caused *deus ex machina*, by a direct divine input into nature (Lesney, 2003).



material wisdom, originally coexisted in a seamless unity within a higher dimension. Together these two modes of wisdom comprised a larger, all-encompassing Universal Torah (Torah meaning ‘Teachings’). A collapse, however, ensued in which the database of all knowledge split itself into ‘spiritual’ and ‘material’ planes of existence. Thus, we have the basis for the historical conflict between ‘religion’ and ‘science’. Yet, any given mystical or technological truth can only be one of two sides of the same puzzle. Thus, the material world is also a mode of spirituality, only externalized and concretized. Vice versa, the spiritual world is a mode of the material reality, only internalized and spiritualized. The ultimate truth is not revealed through the supra-natural alone nor is it only discovered through scientific development—it is more than both.”

The Fallacy of Neuroscience

In order to draw a new picture of human experience one has to move away from mainstream neuroscience, which carries the burden of radical reductionism. Reductionism may not be necessarily radical if it involves describing a phenomenon from another level. In this essay I am not distancing myself entirely from reductionism; on the contrary, I will provide arguments from material sciences in order to substantiate some of the teaching of mystical traditions and the findings of parapsychological research. The problem is there, when a complex system, a multifaceted phenomenon (isn’t a human being that one?) is reduced to one aspect. Therefore, not every form of radical reductionism is materialistic. For example, an orthodox psychoanalyst may say we are nothing more than a bunch of sexual complexes, or a social psychologist may reduce us to a cluster of social roles. On the other hand, one can formulate a materialistic-reductionistic view which is not radical—this is my approach.

The main fallacy of neuroscience probably is the postulation that every human experience results from the activity of one network—the neuroaxonal—together with the assumption that classical physics’ ideas are sufficient to explain how it is we are aware and sentient. Leading neuroscientists emphasize the neurological correlates of consciousness, as did Francis Crick (1995), who expressed his reductionist view in a radical statement:

“You, your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules. As Lewis Carroll’s Alice might have phrased it, ‘You’re nothing but a pack of neurons.’”

There are other preconceptions rooted in the outlined radical reductionism and serving the foundation of current Western scientific thinking on humans. The current consensus is that neurons are the only building blocks of information processing in the brain and consciousness emerges from neuroaxonal activity. All information comes through the sensory organs, and the brain can only process information which has passed through the senses. This neuroscientific view follows the tradition of English empiricism word by word: “There’s nothing in the intellect that wasn’t previously in the senses” (Locke 1979 [1690]). For empiricists the world is unlayered, there is only one reality, the reality of the perceptual domain. To put it briefly: one input—one reality. My counterproposal to be detailed below is: there are two inputs, two ways of knowledge, and two layers of reality (which are ultimately one in accordance with the Torah as cited above) resulting from the locality-nonlocality dualism of the physical Universe (Table 1 and 2).

Table 1. Duality and complementarity in physics

mirror symmetries	(i.e., string duality)
electricity	magnetism
mass	energy
strong	weak (S-duality)
particles	waves
fermions	bozons
local effects	nonlocal connections

The dualistic nature of the outside world has to be reflected in the manner we relate to it. Within the perceptual realm neuroscience offers the best example: the duality in visual perception is well documented by the research of Mortimer Mishkin and Leslie Ungerleider (1983) and their approach has been extended to other modalities such as hearing and touch (Table 3). Similar dualism of human knowledge was introduced by Julian Jaynes (2000) with the ‘bicameral mind’, but that concept was built on a left-right hemispheric distribution of work, not on two different (local and nonlocal) input receiving networks as it is proposed in this essay.



Table 2. Duality and complementarity in knowledge	
Perceptual-Cognitive (rational)	Direct-Intuitive (visionary)
learning by observation from the outside (objective)	learning by observation from the inside (subjective)
based on local effects (energy transfer)	based on nonlocal connections (quantum correlations)
electrochemical	quantum physical
neuroaxonal network is the medium (in the brain)	subcellular matrix is the medium (in the body)
operates with symbols	utilizes holographic principles
linguistic (not necessarily verbal)	ineffable
transferable	non-transferable (can be shared)
splits to subject-object	no subject-object split
performs modeling	direct access
precise, it has little problems with replicability	nebulous, it has big problems with replicability
peaks in Western scientific thinking	the source of contemplative traditions

Table 3. Duality and complementarity in visual perception	
Ventral stream (“what or who” channel)	Dorsal stream (“where and how” channel)
involved in apprehension	involved in prehension
processes object identification	processes object localization
contour-specific mode	locus-specific mode
detail oriented	action oriented
related to foveal vision	related to peripheral vision
focal	ambient
projects to the temporal lobe	projects to the parietal lobe
inputs from the parvocellular layer of the LGN*	inputs from the magnocellular layer of the LGN*
constructivist approach	ecological approach
*LGN: lateral geniculate nucleus	

Table 4. Organizational levels that play a role in the human experiences
higher?
culture/society
organism/brain/personality
subpersonalities/unconscious complexes
“sub-brains” (hemispheres, MacLean’s triune brain)
cortico-thalamic feedback loops
brain modules/neural networks
neurons/axons
synapses/neural membranes
microtubular network
microfilamental lattice
citosol
protein complexes
hydrophobic packets
van der Waals (London) forces
electron superpositions/photon polarizations
space-time geometry (Akashic field?)*

*At the bottom rung others would not put space-time geometry—an already outdated concept some experts believe—but entangled quantum holograms in the universal (“Akashic”) field (Laszlo, 2009).



The one input model of human knowledge falls short of interpreting extrasensory perceptions or the *psi* phenomenon. Its followers rather deny the validity of the findings of well-designed parapsychological research than face its consequences. Out of body experiences, mystical insights, shamanic visions are taken illusory and by definition illusions have no informative values in the realm of perceptual reality. For the skeptics' defense, mainstream neuroscience doesn't provide any ground for an ontological explanation due to its governing preconceptions and in lack of an extended, multilayered network model. For their criticism, most skeptics are not skeptic at all, not in the original meaning: skepticism in Ancient Greek philosophy was about deferring judgment and not passing it eagerly on the ground of dominating theories.

In order to go beyond the existing mental framework, one must avoid the trap of radical reductionism. Since there are more organizational levels than one (Table 4), I assume that several networks may interact in a multidirectional (bottom-up and top-down, vice versa), interrelated, causative processes contributing to human experiences. What we are is result of nested, interrelated networks. As I plan to point out, at the bottom (or top, it doesn't matter since directions make no sense in this regard) of our existence there is a non-biological web embedding us nonlocally in the Universe.

The Principle of Nonlocality

It is one of the two central pillars of quantum physics. 'Nonlocality' means that if two elementary particles were once part of the same quantum system, then they remain in immediate interaction (remain entangled), regardless of their position in space and time, their connection isn't lost with separation. If the quantum state of one particle changes, then the state of the other quantum entangled particle will also change simultaneously—no matter how far apart they are from each other in space and time. 'Signal nonlocality'—a new fertile term in 21st century physics (Sarfatti, 2005)—means that a change in the state of a system induces an immediate change in an interconnected (entangled) system. Nonlocality is the direct influence of one object on another, distant object, and it literally

means “spooky action at distance” as Albert Einstein expressed his concerns (Einstein *et al.*, 1935). However, the second central concept of quantum mechanics, the Heisenberg's Uncertainty Principle limits its effect (not letting it to be too spooky) and saves the theory of special relativity (not allowing a fully controllable signal to transfer faster than light). The Nonlocality Principle works on the parapsychologist's side by providing physical explanation for the *psi* phenomena, however, the Uncertainty Principle works against it by making *psi* effects poorly controllable.

A couple of years ago, Dean Radin stated on a radio interview (2009) that with the concept of nonlocality the compass of parapsychological interpretations starts to stabilize in one direction, while not long ago it was spinning frantically. In the singularity our Universe was in a quantum state with all its elementary particles entangled, and the field of *psi* has been established at the first moment. The expansion of the Universe has not changed the interconnectedness of its components. Calling brain entanglement for the rescue of parapsychology raises the question: where is the interface in the brain, what brain structure is able to maintain quantum correlations with the outside world? Based on its sheer size, the neuroaxonal network doesn't seem to be a good candidate for receiving nonlocal signal transfer. A subcellular network (perhaps the lipoprotein membrane complex) seems to be a better medium for enabling the brain/body to receive nonlocal information and to transmit it toward the neuroaxonal network (Figure 1). A tentative function of subcellular components by forming a “quantum array antenna” of the brain is discussed extensively in our book (Strassman *et al.*, 2007). A quantum-biological model of information processing is proposed there, in which the subcellular matrix serves as medium for quantum holography.

The proposed subcellular medium is not restricted to the brain tissue; it spreads across the whole body, and provides a space- and time-independent holographic image of the Universe inside the body via nonlocal connections, in other terms: by quantum correlations (Figure 1). Nonlocal information about the physical Universe provides the missing link between objective science and



subjective experience, including extrasensory perception. Based on the principle of nonlocality and with the “quantum array antenna” of subcellular networks, the Universe emulates itself not only within the brain but within the whole body. Therefore, there is another way for us to build a representation of the outside world—besides the ‘locality’ based sensorial perception resulting from particle and energy exchange. Since the Universe can emulate itself on all levels (Pitkanen, 2006), a faint hologram of the Cosmos emerges inside the body and regardless how pale it is, it is able

to present wholeness, and can elucidate teachings like: ”The kingdom of God is within you” (Luke 17:21), or: “Look inside, you are Buddha” (Humphreys, 1987). The Hermeneutic wisdom of “As above, so below (or: As within, so without)” obtains a fresh perspective, and there is hope for the integration of similar teachings into Western rational thinking. Subcellular matrix can be the mediator of the Jungian ‘collective unconscious’, and subcellular quantum holography can explain a very common but obscure phenomenon known as ‘intuition’.

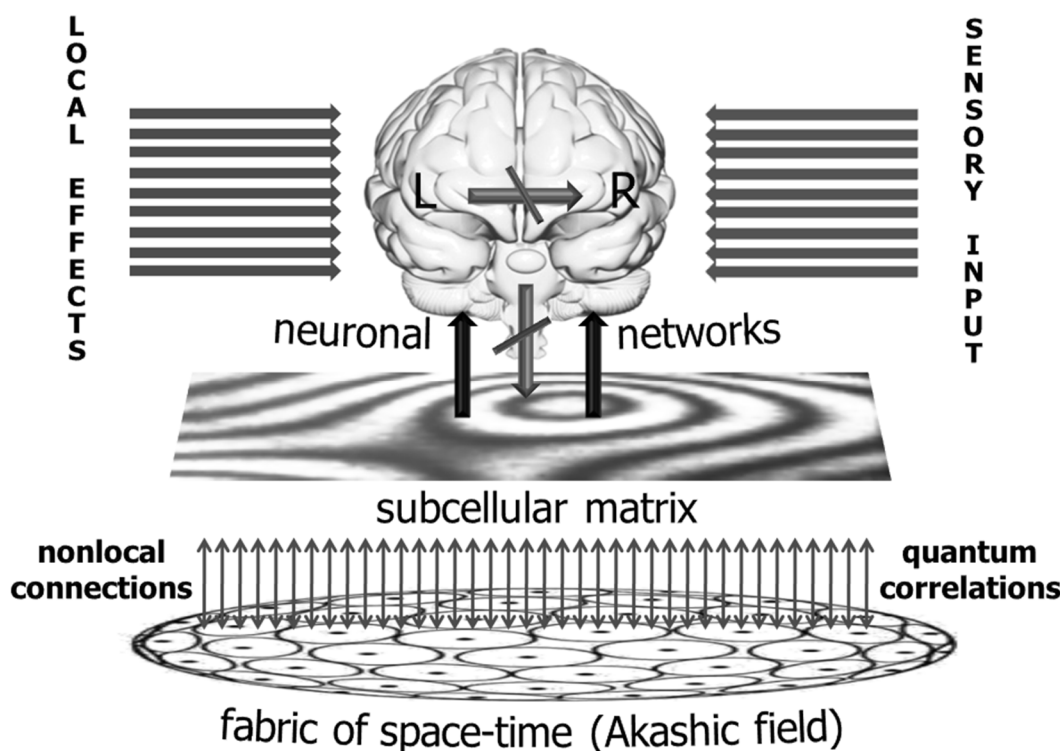


Figure 1. Nested networks with two inputs: A proposed hierarchy and speculative interaction of networks related to human experiences. Crossed grey arrows between the left and right hemispheres, as well as between the neuroaxonal and subcellular networks, denote inhibitory effects (left–right hemisphere and up–down network dominances) in the ordinary state of consciousness. Nonlocal interactions (marked with uncrossed grey double arrows) are persistent and independent from the state of consciousness. It is primarily during the integrative forms of altered states of consciousness, or in the trance-like state of a ganzfeld experiment when a minimal and uncertain information transfer may occur emerging into awareness from the subcellular matrix to the neuroaxonal system (shown by black arrows). The nature of the latter, very important coupling mechanism is unclear; perhaps it occurs at the synaptic membranes. The outlined dualism of human knowledge shouldn’t be mixed with Julian Jaynes’ (2000) ‘bicameral mind’, since the concern here not as much a left-right hemispheric distribution of work, but rather an up-down division between neural and subneural functions.

Figure 1 depicts the two inputs for human knowledge and understanding: 1. sensory signals resulting from local interactions (energy transfer by particle interactions) and 2. nonlocal signal transfer based on entanglement (quantum state correlations). Both inputs provide an inner

representation of the environment: one in the brain and one in the body. Two networks, the neuroaxonal system and the subcellular matrix are the media of those representations: one with a symbolic the other with a holographic form of storage. Sensory signals provide the input for the ordinary state of consciousness



and the outcome of this information processing is denoted here as ‘perceptual-cognitive’ form of knowledge.

The ‘perceptual-cognitive’ mode is neuroaxonally based, relies on sensory perception, cognitive processing, and symbolic (verbal, visual, logical language) mediation. This form of information processing is an indirect way of achieving knowledge compared to the ‘direct-intuitive’ method (to be described below). In accordance with the indirect nature of its processing, this mode splits the world into subject and object, and then performs modeling. Its linguistic feature makes this mode easily transferable but culturally bound. The ‘perceptual-cognitive’ method of information processing has been evolved evolutionally for the purpose of task solving, represents a “coping machine” at work, and reaches its peak in Western scientific thinking. The ‘perceptual-cognitive’ is the “outsider’s” approach; it presents everything as an inanimate object without consciousness (Table 2).

The Nonlocal Input and Altered States of Consciousness

Contemplative and spiritual practices induce and rely on integrative forms of altered states of consciousness (ASCs). An integrative ASC—for example, *mokhsa* (Hinduism), *samadhi* (Yoga), *satori* (Zen), *fana* (Sufism), and trance-like state in the ganzfeld experiment or shamanic rituals—may result in complex behavior, creative outcome, healing and at last but not least it can provide some sort of knowledge (insight, divination, extrasensory perception, or premonition) according to its practitioners. One shouldn’t mix them up with disintegrative ASCs such as psychosis, delirium, or drunkenness. The learning activity of everyday awareness (ordinary states of consciousness) relies on the ‘perceptual-cognitive’ way of information processing that is using the local interactions of the physical world. This will be contrasted below (detailed also in Table 2) with another mode of information processing the ‘direct-intuitive’ mode, which is supposedly the base of knowledge revealed in integrative ASCs.

The introduction of a ‘direct-intuitive’ channel is necessary for an ontological interpretation of meaningful and at times verifiable revelations surfacing in integrative ASCs. David Lewis-William and David Pearce

write in their book entitled “Inside the Neolithic Mind” (pp. 50): “In altered states of consciousness the nervous system itself becomes a ‘sixth sense’...” I can but grossly agree with a correction that it is not the nervous system but the subcellular matrix which acts as a ‘sixth sense’. The ‘direct-intuitive’ mode of accessing knowledge is based on subcellular structures, provides direct experience (no subject-object split), and is not bound by language or other symbols. Since this channel lacks symbolic-linguistic mediation, it has universal characteristics, and shows a good degree of transcultural similarity. The latter feature may explain why mystics get better agreement comparing their experiences than do materialistic scientists while searching consensus between competing models (Watts, 1972).

‘Direct-intuitive’ is a way one relates to things from their inside, and in the eye of the “insider” one always senses consciousness connected to them (Laszlo 2007). The shamanic method, learning by transformation (when the subject becomes one with the object to be learnt about) belongs here, and according to Luis Eduardo Luna (personal communication) the insights and visions it had provided were the driving force of pre-Columbian South American civilizations. The ‘direct-intuitive’ experience might have been the source of ancient myths and wisdom all around the world. Giving credit to intuitive knowledge means that the teachings of wisdom tradition (like the above-mentioned Rigveda) should be considered as starting point for developing modern scientific theories, and deserves to be tested as “working hypotheses” by the rational method. ‘Direct-intuitive’ knowledge is to the ‘perceptual-cognitive’ like foveal vision is to the peripheral (Table 3). None of them can be perfect with only one side of the complementary pair. Tunnel vision is a pitiful condition; we should avoid it in our rational knowledge system.

Visionary experiences may result in knowledge not fully transferable by linguistic means. However, that kind of knowledge can be shared directly. Matti Pitkanen commented on it (personal communication):

“Sharing of mental images by quantum entanglement could be one mechanism that makes possible instantaneous sharing of information. It might be that limits in the speed of propagation of the information



posed by the light velocity do not produce problems here, since the person becomes part of a system which can be arbitrarily large. Interpretation is, however a problem, since it must be carried out in the conceptual framework provided by the cultural background."

While nonlocal connections are continuously present in our body, in ordinary states of consciousness there is only a very limited and mostly unconscious shift of the nonlocal information into the neuroaxonal system—since the coping apparatus, the “survival machine” is mostly focused on the more reliable local signals coming from the perceptual organs—so only a little or nothing nonlocal can get into the focus of the eye of the 'I'. In integrative forms of ASCs (e.g., meditation and contemplation), coping, planning, and task-solving functions are put into the background along with the agent (*ego*) bearing those functions. Thus, a chance appears for fragments of nonlocal information—present already in subcellular networks—to be projected and transferred into the neuroaxonal network, and to be experienced also by the ego. This outlined hologram can be a stage for out-of-body experiences: consciousness does not leave the body, but its introspective attention sweeps the “matrix”, *i.e.*, the field of nonlocal correlations mediated by the subcellular network. In this way out-of-body experiences can give occasion to valid—though poorly reliable—information.

Gaining control is the *modus operandi* of the “coping machine”, mastering the environment, manipulating peers is essential for the functioning of the ‘perceptual-cognitive’ mode, and this “control freakiness” is entirely incompatible with the ‘direct-intuitive’ approach. Lao Tse defines wisdom as “complete willingness to be the plaything of chance circumstances.” Surrender opens the doors of a new way of perception. Every success of the “coping machinery”, such as power, position, money, fame, or other forms of social acceptance empowers the ego, unless the individual interprets his or her achievements as gifts from “above” and considers self as a “vessel”, a mediator of majestic powers. Identifying too strongly with the agent of the ‘perceptual-cognitive’ processing, having a strong ego suppresses the ‘direct-intuitive’ way. Wisdom traditions usually recommend a humble attitude for

approaching the spiritual realm. Without humility its full potency remains hidden beyond the veil. “It is easier for a camel to go through the eye of a needle, than for a rich man to enter into the Kingdom of God.” (Matthew 19:24)

The Two Realms of Reality

The ‘perceptual-cognitive’ foundation of knowledge is a result of the brain’s interactions with the local aspects of the physical world. The ‘direct-intuitive’ perception of the world derives from the nonlocal features of the Cosmos. In other words: the local Universe of the classical, Newtonian-Cartesian worldview is the reality of our ordinary consciousness, based on the rational ‘perceptual-cognitive’ process. On the other hand, the Mind’s interfacing with the nonlocal aspect of the Universe generates the reality of the integrative ASCs. Therefore, the following teaching of esoteric tradition is substantiated: “There are two realms of reality. The physical or phenomenal world is not the only reality; another non-physical (*i.e.*, not classical physical) realm exists.” For example, The Buddha rejected learning by doctrine. His true understanding of the nature of reality was based on the direct experience (*i.e.*, ‘direct-intuitive’), and on the communion of the spirit (in my words: subcellular holography of the Universe with help of quantum entanglement).

Besides stratification of reality according to different states of consciousness, another corollary to these hypotheses is that intuition becomes a valid source of information. Intuition is more than some vague offshoot of a multimodal, parallel-processing function of the ‘perceptual-cognitive’ mode. It belongs entirely to a separate—the nonlocal—channel, which means that when we are talking about intuition and psychic processes, or any phenomenon belonging to the field of parapsychology (*e.g.*, *psi*), there is a quantum hologram with nonlocal correlations underlying the process. Nonlocality is to the physicist what interconnectedness is to the mystic, and the quantum hologram is the foundation through which to understand virtually all *psi* phenomena.

Rational knowledge reflects regularities of sequential events observed from the local aspect of the Universe while visionary truth results from experiencing correlations originating from quantum entanglement



within the nonlocal frame of reality. Measurement and replication are the cornerstones of scientific discovery. Both are inherently related to the principles of 'local realism' and lose their significance in the interconnectedness of the nonlocal realm. The uncertainty in the measurement of quantum correlations and in their psychological effects helps to understand why so many eminent scientists are reluctant to accept the existence of poorly replicable paranormal events and mystical phenomena. Studying, experiencing nonlocal realms (the "Mystical Beyond") needs different standards crystallized already in contemplative techniques which are not in shortage of meticulousness in their approach.

The described dualism in information processing conveys messages to researchers of artificial intelligence (AI): their efforts are narrowed down to the rational, 'perceptual-cognitive' mode, but modeling the visionary, 'direct-intuitive' one is not in their focus. I am dissatisfied by the recurrent futuristic idea of many distinguished thinkers—some of them Nobel laureate—about replacing neurons with silicon chips, and "downloading" one's consciousness into an artificial brain. Clearly, this kind of thinking—so characteristic to current AI research—carries the bias of radical reductionism.

Concluding Remarks

Addressing a multidisciplinary audience carries significant risks: it may overestimate the knowledge base of representatives of one discipline and hurt the intelligence of others. The presented essay was originally targeted to listeners coming from parapsychological research. Professional physicists may find the author's explanation of core physical

concepts—like nonlocality—superficial. On the other hand, going into more details the topic can easily go over the heads of graduates in human sciences. The author, who is coming from the field of neuroscience had the opportunity to cross-reference and discuss his concepts in person and in workshops with leading authors like Ervin Laszlo, Matti Pitkanen, Richard Amoroso, Nassim Haramein, Istvan Dienes, and most recently with Amit Goswami (2011). It is one issue to reach consensus on a workshop where the participants share their unorthodox orientation and motivation to break grounds. Even there it is not easy: on the United Theories Conference (2006) one could witness how several participants coming from common grounds had problem accepting others' model of quantum consciousness (please, remember what I just said above comparing consensus readiness of scientists and mystics). It is another, more difficult issue to move these concepts to the general audience.

Dean Radin warned me in an email (Aug. 19, 2011) and his comments stand for all of us navigating the murky waters of nonlocality and psi:

"It takes a fair bit of knowledge from physics and the neurosciences to appreciate why QM [quantum mechanics] is relevant to *psi*. Without that knowledge, it can seem like hand waving nonsense. And if one only has knowledge of QM from an orthodox physics perspective, the *psi* connection can seem like a misuse of the QM formalisms. It is unfortunate that there is indeed misuse of quantum concepts by some (including people who sell products like Quantum Toothpaste!), and this just makes it all the more difficult when presenting these ideas."



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