Journal of Scientific Exploration, Vol. 23, No. 1, pp. 51–58, 2009 0892-3310/09

ESSAY

In Defense of Intuition: Exploring the Physical Foundations of Spontaneous Apprehension

ERVIN LASZLO

The Graduate Institute and the General Evolution Research Group
Villa Franatoni, 56040 Montescudaio, Italy
e-mail: ervin@ervinlaszlo.it

Abstract—The thesis advanced in this paper is that human experience encompasses not only elements registered by the exteroceptive and interoceptive senses, but also elements received intuitively, in a direct and spontaneous mode. Findings at the cutting edge of quantum physics and brain research support the hypothesis that the brain can receive information not only through nerve-signals conducted from the senses but also through quantum resonance at the level of cytoskeletal structures. Confirmation of this hypothesis would provide a physical foundation for the spontaneous intuitions that surface occasionally in consciousness. Recognizing that some varieties of intuitions are bona fide perceptions of the world beyond the brain and body would enlarge our view of the scope of human experience and support assumptions about the existence of subtle informational ties between humans, as well as between humans and nature.

Keywords: apprehension—intuition—information—nonlocality—quantum physics—quantum brain theory

Spontaneous apprehensions appear to be perceptions of the world beyond the range of the exteroceptive senses. Such perceptions are generally considered extrasensory. However, we can avoid long-standing and mostly fruitless debates on the reality of ESP by reserving the term "perception" for ordinary sensory perception and denoting the spontaneous mode of human experience with the term "apprehension" (in the sense defined by Webster's: "the faculty or act of apprehending, *esp*. intuitive understanding; perception on a direct and immediate level"). The distinction is important inasmuch as sensory perception tends to be relatively distinct and articulate, whereas spontaneous apprehensions are generally more diffuse, reaching consciousness in the form of vague if often meaningful intuitions.

In the reductionist-materialist culture inspired by classical science, spontaneous apprehensions are dismissed as hallucinations or fantasy. Classical empiricism claims that there can be nothing in the mind that was not first in the eye. However, this tenet, although widely accepted in the West, is exceptional in the annals of history and even in the spectrum of contemporary cultures.

Traditional people accepted intuitions as conveying real and meaningful information about the world. Shamans and medicine-men (and women) tuned themselves to spontaneous apprehensions through rigorous initiation and training; they believed that they derived power and vision through these apprehensions. In history spontaneous apprehensions were embedded in the conceptual framework through which a given culture interpreted the nature of reality. In mythical cultures the world was seen as a cosmic realm of spirits; in classical cultures, as overseen by a panoply of unseen but real gods. The Abrahamic monotheistic religions recognized the intuitions of their prophets as conveying fundamental truths about God and the nature of all creation. Oriental cultures have never limited their concept of reality to information conveyed by the senses.

The modern mentality of the Western and Westernized world takes as real only that which is manifest—literally "to hand." Because what modern people see is constrained by what they believe they *can* see, everything that is not conveyed to consciousness by eye and ear is dismissed from the modern view of the world. Elements of consciousness that originate beyond the range of the senses are dismissed as fantasy, or relegated to the subconscious domains of the psyche. They are recognized as meaningful only in the subjective context, and are ascribed interpersonal significance merely in the case of artists, poets, prophets, and mystics.

But are spontaneous apprehensions of the world merely subjective, lacking objective reality? Or could the intuitions that make up the woof and warp of artistic, religious, and sometimes even scientific creativity find realistic explanation in the context of contemporary science?

Toward a Physics of Spontaneous Apprehension[1]

Sensory perception is limited to the visible range of the electromagnetic spectrum, the audible range of sound, and the place and time of the corresponding EM and air waves. Spontaneous apprehensions, on the other hand, seem to embrace information originating beyond the sense-perceivable range and transcend the classical limitations of information-transmission in space and time. Thus modern science has difficulty explaining how spontaneous apprehensions could have physical reality. There are, however, findings at the cutting-edge of contemporary scientific research that open fresh perspectives. They speak to the possibility that space- and time-transcending transfers of information are physically possible not only among quanta (where they constitute the phenomenon of nonlocality), but also among human brains, and between human brains and nature.

Information in Nature

Spontaneous apprehensions seem to convey information on the world beyond the subject regardless of time and distance. The first question we shall consider is whether it is permissible to speak of information in the world in general, and not only of information in the human sphere.

In classical science, the assertion that information exists objectively in the world would have been considered a metaphysical proposition. This is no longer the case. It is now recognized that information is present throughout nature; as John Wheeler remarked, in some respects it is the most fundamental aspect. Already quanta behave in a curiously informed manner, appearing to make choices of their own, and responding to choices by other quanta. Either quanta have a form of consciousness of their own (a thesis entertained by some physicists), or they are embedded in a complex informational environment.

Atoms, molecules, and other physical (and not only biological and bio-psychological) entities embody information; it is what distinguishes one object or system from another. The information emitted by material (i.e. massive-particle based) objects is present in the radiation emitted by them and maps their physical properties. The information is present and measurable even in the absence of the objects that produced them (Citro, in preparation; Fraser & Massey, 2008); it is information carried and conserved in space. Thus space is not merely the passive backdrop of the concourse of material entities as in Newtonian physics, but an active matrix interacting with the material entities that occupy space-time.

Since the advent of general relativity the above proposition has been accepted knowledge. In a paper published in 1930 Einstein himself noted, "We have now come to the conclusion that space is the primary thing and matter only secondary; we may say that space, in revenge for its former inferior position, is now eating up matter." (cited in Wolf & Haselhurst, 2005) A few years later Erwin Schrödinger restated the same concept. "What we observe as material bodies and forces are nothing but shapes and variations in the structure of space." (Schrödinger, 1989).

In recent years a number of physical fields and forces have been ascribed to the interactive matrix that replaced the concept of passive space. In grand-unified and super-grand-unified theories all universal fields and forces are traced to origins in the quantum vacuum, a ceaselessly fluctuating sea of emerging and vanishing virtual particles. The quantum vacuum is also the locus of zero-point energies (energies that remain present when at the absolute zero of temperature conventional forms of energy vanish). The quantum vacuum appears to be a fundamental dimension of the physical universe.

The concept of a complex field that pervades cosmic space offers a logical basis for locating information in nature. According to a hypothesis this writer stated in detail elsewhere (Laszlo, 2004, 2006, 2008), the fundamental physical domain known as the unified field carries not only the universal fields and zero-point energies, but also information. The presence of material objects excites the ground state of the field and deforms it, thus creating a form of information. The radiation emitted by the objects propagates in the form of expanding wavefronts, and this, too, is information in the field. When two or more wavefronts meet, they produce an interference pattern. The patterns are analogous to the interference of light beams in ordinary holograms. Holograms carry information at their nodes on the entities and events that created the waves that make up the interference pattern. However, the interference patterns created by material objects through the

excitation of the fundamental physical dimension known as the unified field are not ordinary, but quantum holograms. They carry information on the events that created them in the quantum domain.

The question is, whether some elements of the information carried at the nodes of interference patterns in the unified field could be accessed by human brains. In light of recent work at the frontiers of quantum physics, quantum biology, and quantum brain research, the answer appears to be yes: a spontaneous access seems physically possible.

Quantum Receptivity in the Brain

The crucial finding supporting the above assessment is the discovery that the brain is not merely a classical biochemical system; in some respects it is a "macroscopic quantum system." Certain critical cerebral functions involve processes previously thought to be limited to the domain of the quantum.

The pertinent functions regard the reception and transmission of information at the cellular and subcellular level, communication in the most basic and elementary sense. Intercellular communication involves quantum effects and processes. Neurons and neuronal and subneuronal networks form synchronized oscillators that receive and send information through quantum resonance. This information propagates quasi-instantly throughout the living organism and does not require classical channels of signal transmission.

The various forms and characteristics of information transmitted through quantum resonance are not fully understood, but their physical basis is clear. It is nonlocality: the correlation of quanta beyond the classical limits of space and time.

Nonlocality is a well-researched phenomenon. Laboratory experiments designed to test the EPR hypothesis demonstrated that quanta which had at any time occupied the same quantum state remain correlated across finite times and distances. To some extent, such correlation—Erwin Schrödinger termed it "entanglement"—applies to every quantum throughout space and time.

Entanglement requires that quanta be in coherent states. In fact, only interaction in some form (measurement, and possibly certain acts of observation) renders quanta decoherent. However, macroscale objects can exhibit forms of quantum coherence as well. Since the turn of the century there has been experimental evidence that the state of entire atoms can be entangled, and in recent years quantum-correlations have been discovered also at the scale of living organisms.

It appears that the heat of living organisms—even of warm-blooded organisms—does not necessarily destroy the coherence which is a precondition of quantum entanglement. While classical quantum theory maintained that at ordinary temperatures Brownian movement makes quanta decoherent and thus incapable of entanglement, recent research (inter alia by Frecska & Luna, 2006; Kitaev, 1997; Pitkanen, 2006) suggests that the problem of "heat-decoherence" is not insuperable. There can be specifically organized networks of quantum particles—for example, networks where the particles are "woven" or "braided"—that are sufficiently robust to maintain quantum coherence at body temperatures.

Whereas at such temperatures classically organized quantum elements, so-called "qubits," become decoherent, networks of woven or braided qubits can conserve their coherence. As Parsons put it, "braiding is robust: just as a passing gust of wind may ruffle your shoelaces but won't untie them, data stored on a quantum braid can survive all kinds of disturbance" (Parsons, 2004).

Quantum effects in the living realm are not mere theory—they are essential for coordinating the processes that make life possible. The staggering number of physical and chemical reactions taking place in the living organism is not likely to be coordinated by limited and relatively slow biochemical signal-transmission alone. Only the "entanglement" of cellular and subcellular components can ensure a sufficiently rapid flow of multidimensional information to maintain the organism in its physically improbable state far from thermal and chemical equilibrium.

The cerebral structures responsible for the reception, computation, and transmission of quantum-resonance–based information are becoming better known: they are cytoskeletal structures. Throughout the cells of the organism cytoskeletal proteins are organized into networks of microtubules, and the elements of these networks are connected to each other structurally by protein-links and functionally by gap junctions.

Microtubules form complex networks in the brain. The brain has vastly more microtubules than neurons: approximately 10^{18} microtubules and 10^{11} neurons. However, microtubules may still be too coarse-grained to perform quantum-computation. According to Stuart Hameroff (1996), the "infoplasm" is the microtrabecular lattice, a web of microfilaments 7 to 9 nanometers in diameter. This lattice is the current microfrontier, the "ground floor" of the organization of living material (Frecska, 2008). The periodic lattice of microtubules forms a network within the network of neurons, and the microtrabecular lattice is a network embedded within the network of microtubules. The microtrabecular lattice is the most likely structure to perform quantum-resonance–based operations in the brain (Hameroff, 1996; Penrose, 1996).

In view of these considerations, Frecska proposed that there are two fundamental modes of perceiving the world rather than one: the "direct-intuitive-nonlocal" mode, and the classical "perceptual-cognitive-symbolic" mode. In this writer's view the direct-intuitive-nonlocal mode involves communication between microlattices in the brain and holographic interference patterns in the vacuum. Apprehension occurs when the frequencies are synchronous: then the quantum-level lattices resonate with the corresponding quantum holograms. In phase-conjugate resonance information is transferred from quantum holograms to the brain.

Walter Schempp has shown that quantum holograms are coherent, are mutually entangled, and carry nonlocal information on the entities that emitted the constituent wavefronts. He has also shown that the brain's object imagery is phase conjugate. Lending support to Karl Pribram's "holonomic brain theory" (Pribram, 1991), Schempp affirmed that "the conditions which make quantum holography possible are ideally suited to the hypothesis that the brain works . . . by quantum holography" (Schempp, 1997).

The Transpersonal Dimension of Nonlocal Information-Transfer

A transfer of information through phase-conjugate quantum resonance allows discrete individuals to experience nonlocal, so-called transpersonal communication. A series of experiments by Italian brain researcher Nitamo Montecucco showed that the brain-function of an entire group of subjects can become spontaneously correlated. In deep meditation the electrical activity of the left and right frontal hemispheres becomes synchronized. When several individuals meditate together, the electroencephalograph (EEG) wave-patterns of the left and right brain hemisphere become synchronized in the entire group. In repeated tests up to 12 meditators achieved a 50 to 70 percent synchronization of their EEG patterns without sensory contact (Montecucco, 2000).

It appears that in transpersonal communication conscious intention can produce specific effects. This seems to be the case in the practice of natural healers. Some healers perform remote healing: when they focus their consciousness on the patient, he or she may be beyond the ordinary sensory range without affecting the efficacy of the healing. The healers intentionally "send" what they call healing energy to the patient, and the latter's brain and organism respond. Phase-conjugate quantum resonance between the brain of the healer and the brain of the healee can account for the healing effect.

The effectiveness of remote healing has been confirmed in hundreds of experiments, and its physical reality has been demonstrated in experiments that measure various facets of activity in the brain of the healer and the healee. A rigorously monitored experiment in the presence of this writer demonstrated that the electrical activity pattern in the healer's brain is reproduced in the brain of the healee (Sági, 2003). The pattern, in the alpha and delta region of the EEG wave-spectrum, transfers precisely, with a delay of just under 3 seconds. This is noteworthy, as normally the alpha and delta regions show activity only in a highly relaxed meditative state or in deep sleep. It appears that entering altered states of consciousness facilitates the transpersonal transfer of information.

Transpersonal information-transfer has been demonstrated also by tests with functional magnetic resonance imaging (MRI). In an experiment carried out by Jeanne Achterberg and colleagues, 11 healers selected test subjects with whom they felt a bonded or empathic connection and placed them in an MRI scanner isolated from sensory contact. The healers sent energy, prayer, or good intentions—"distant intentionality"—at intervals that were random and unknown to the recipients. Significant differences between the "send" and "no send" (control) periods were found in the activity of the anterior and middle cingulate areas, precuneus, and frontal areas in the recipients' brains. The probability of the difference was calculated at $p = 0.000127$, that is, approximately one chance in 10,000 (Achterberg et al., 2005).

An impressive number of controlled experiments has shown that love, empathy, and profound goodwill increase the level and frequency of transpersonal information transfer (Benor, 2000; Grinberg-Zylberbaum et al., 1993). Jointly entering deep meditation has a similar effect: in experiments witnessed by this writer 12

persons in a deep meditative state achieved more than 90% synchronization of their EEG waves without sensory contact.

Conclusions

Spontaneous apprehension, the direct-intuitive-nonlocal mode of perception, appears physically real and experimentally demonstrable. Yet it is not the subject of sustained scientific research. The materialist-reductionist paradigm of mainstream science discourages attempts to investigate spontaneous apprehensions: they are *prima facie* implausible, if not categorically impossible. Scientists who are convinced that perception beyond the range of the senses does not, or is not likely to, exist are reluctant to investigate the pertinent phenomena. For the most part they content themselves with assuming that evidence for such perception is illusory, or at best anecdotal.

Yet sustained research on the spontaneous nonlocal mode of apprehending the world beyond the brain and body would be justified and meaningful. Positive results would confirm that the human brain can directly and nonlocally access some elements of the information in the world beyond the brain and body. This would reinforce the increasingly widespread belief that human beings (and by extension all things) are connected with each other and with nature in more subtle ways than through the stimulation of sensory organs.

Note

[1] A more detailed exposition is given in the author's latest book, *The Akashic Experience* (Laszlo, 2009), together with suggestions for further research.

Acknowledgments

The author wishes to thank Allan Combs, Larry Dossey, Ede Frecska, and Stanley Krippner for their valuable comments and important research materials.

References

Achterberg, J., Cooke, K., Richards, T., Standish, L., Kozak, L., & Lake, J. (2005). Evidence for correlations between distant intentionality and brain function in recipients: A functional magnetic resonance imaging analysis. *Journal of Alternative and Complementary Medicine, 11,* 965–971.

Benor, D. J. (2000). *Spiritual Healing: Scientific Validation of a Healing Revolution*. Southfield, MI: Vision Publications.

Citro, M. (in preparation). *The Science of the Invisible*.

Fraser, P. H., & Massey, H. (2008). *Decoding the Human Body-Field.* Rochester, VT: Inner Traditions International.

Frecska, E. (2008). Topological consciousness and quantum computation with loops. Personal communication.

Frecska, E., & Luna, L. E. (2006). Neuro-ontological interpretation of spiritual experiences. *Neuropsychopharmacologia Hungarica, 8*(3), 143–153.

Grinberg-Zylberbaum, J., Delaflor, M., Sanchez-Arellano, M. E., Guevara, M. A., & Perez, M. (1993). Human communication and the electrophysiological activity of the brain. *Subtle Energies, 3*(3).

Hameroff, S. (1996). Orchestrated reduction of quantum coherence in brain microtubules: A model for consciousness? In Hameroff, S., & Penrose, R., *Toward a Science of Consciousness, The First*

Tucson Discussions and Debates. Hameroff, S. R., Kaszniak, A. W., & Scott, A. C. (Eds.). MIT Press.

Kitaev, A. (1997). Quantum error correction with imperfect gates. In Hirota, O., Holevo, A. S., & Caves, C. M. (Eds.), *Proceedings of the Third International Conference on Quantum Communication and Measurement*. Plenum Press.

Laszlo, E. (2004). *Science and the Akashic Field*. Rochester, VT: Inner Traditions International.

———. (2006). *Science and the Reenchantment of the Cosmos.* Rochester, VT: Inner Traditions International.

———. (2008). *Quantum Shift in the Global Brain*. Rochester, VT: Inner Traditions International.

———. (2009). *The Akashic Experience: Science and the Cosmic Memory Field*. Rochester, VT: Inner Traditions International.

Montecucco, N. (2000). *Cyber: La Visione Olistica*. Rome: Mediterranee.

Parsons, P. (2004). Dancing the quantum dream. *New Scientist, 2431,* 31–34.

Penrose, R. (1996). *Shadows of the Mind: A Search for the Missing Science of Consciousness.* Oxford University Press.

Pitkanen, M. (2006). *Topological Geometrodynamics*. Frome, UK: Lunilever Press.

Pribram, K. (1991). *Brain and Perception: Holonomy and Structure in Figural Processing (John M. Maceachran Memorial Lecture Series).* Lawrence Erlbaum.

Ságі, M. (2003). Healing through the psi field: Two experiments. In Laszlo, E., *The Connectivity Hypothesis*. State University of New York Press.

Schempp, W. (1997). Quantum holography and magnetic resonance tomography: An ensemble quantum computing approach. *Informatica (Slovenia), 21*.

Schrödinger, E. (1989). *Schrödinger: Life and Though.* Cambridge University Press.

Wolf, M., & Haselhurst, G. (2005). Einstein's last question. *VIA: Journal of Integral Thinking for Visionary Action, 3*(1).