

# Response To Commentaries On "Electromagnetic Radiation and The Afterlife"

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I appreciate the broad spectrum of viewpoints and the diversity of opinions included among the critiques of my manuscript, "Electromagnetic Radiation and The Afterlife," as they stimulate a deeper understanding of the problem and its further development. Many of the questions raised in those critiques are far beyond our power to answer, such as those posited by Stanley Krippner.

I will respond first to comments on the empirical foundation of my hypothesis: the phenomenon of necrotic or degradation radiation, or "death flash." Since 1984, when the hypothesis was formulated in the present form, I have performed further experiments on the reversible and nonreversible (that is, lethal) perturbations of homeostasis. In the case of rapid irreversible perturbations, the death flash is observed not only from plants, but also from lower animals. The results of those experiments provide additional evidence of the universality of the phenomenon. The discrete pattern of that radiation is being analyzed in order to ascertain whether it corresponds merely to a stochastic process reflecting increasing chaos in the dying organism, or whether it contains deterministic components possibly related to the conservation of intrinsic information coded within the spatiotemporal structure of the electromagnetic field (Slawinski, 1987).

Nevertheless, I fully agree with Steven Rosen, Rupert Sheldrake,

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and Evan Harris Walker that some review of those data should have been presented, and that further systematic research is necessary. As Rosen and Walker noted, one must ask if there is an essential difference between electromagnetic fields associated with animate and inanimate matter. The answer to that question, documented in the references listed below, is that in general, the macroscopic properties and the discrete intrinsic pattern of necrotic and homeostatic steady-state radiation are different for living and nonliving objects.

During the changes of external and internal conditions of the object investigated, the pattern of electromagnetic emission from the living system reveals its sensitivity, feedback couplings, and adaptability, that is, its capability for homeostasis. Those responses show the living system to be an open synergetic system far from thermal equilibrium, a sort of dissipative structure. Such features are not observed in electromagnetic fields created by nonliving matter. Cyril Smith, in his critique, provides valuable comments pertinent to this problem, though one must bear in mind that the above findings reflect very recent and incomplete research, and that further development of methods, techniques, and concepts may provide additional evidence along this line. Thus, I find Sheldrake's example of the "electromagnetic consciousness of a car" inadequate to the problem under consideration.

Walker states that there is no spectral region of the electromagnetic field that could serve as a carrier of conscious identity. He claims that "all the radiation produced as a byproduct of chemical or direct neurological activity . . . would simply leave the body as thermal radiation, no more characteristic of any basic personality trait than of skin color." That is simply not true. As early as 1968, Allan Fraser and Allan Frey demonstrated that neurological activity generates electromagnetic radiation in the infrared region of the spectrum, and that the power of that radiation exceeds that of thermal radiation (Fraser & Frey, 1968).

There is ample evidence of the correlation between parameters of low level luminescence and the physiological state of an organism. Such correlations are used as diagnostic methods for early detection of cancer, inflammations, the status of the immune defense system, adaptability to external conditions, etc. Thermal radiation is a chaotic random field described by a stochastic process, with a very low degree of coherence, in which each photon is independent, as Walker correctly notes. However, that might not be the case for spontaneous and photo-induced low level luminescence such as necrotic radiation. Recent data suggest that biological luminescence might reveal a high degree of coherence in which photons are phase-correlated. Thus the potential

information capacity related to the intrinsic spatiotemporal order of the field would be much greater than that of thermal radiation (Popp, 1986, 1987; Chwirot, Dygdala, & Chwirot, 1985, 1986). Smith's commentary on my manuscript provides some didactic considerations of the power and degree of coherence of electromagnetic radiation available from thermal and metabolic sources in the human body.

I do not understand the relevance of Walker's comment on the "strongest electromagnetic activity in the body, the activity in the nuclei of atoms," as that activity has nothing to do with subtle weak electromagnetic effects associated with life processes. What does the electromagnetic repulsion among protons in the nucleus have to do with life processes, and even more, with consciousness? Life processes are more readily explained by electromagnetic forces than by the million times stronger and shorter range nuclear forces, which are not commensurate with structures and functions of animate matter.

The fact that brainwave activity does not result in a giant electromagnetic pulse when interrupted or stopped does not contradict the notion of necrotic radiation. The latter does not necessarily require giant pulses, but merely an increased *number* of pulses generated by neurons, synapses, and other structures. Walker's objections to the information transfer capacity, signal detectability, and analogy with RLC circuits do not take into consideration research on signal retrieval and resonance between electromagnetic fields and biological structures (Popp, Becker, Konig, & Peschka, 1979; Becker & Marino, 1982). Therefore his objections do not contradict that part of my hypothesis that relates to the death flash and information.

The second part of my response deals with a crucial aspect of the hypothesis: the concept of electromagnetic consciousness. As Michael Grosso notes, that concept presumes a relation between the physically detectable necrotic radiation, the essential conscious self, and the inner ineffable light encountered in the near-death experience. I agree that there are many difficulties with that thesis identifying consciousness with electromagnetic phenomena: the ability to encode or decode intrinsic personal information, in the broadest meaning of the word, covering both the formal and semantic or contextual notion; the question of whether such information could have any consequential permanence; how long it could maintain itself, etc.

I emphasized throughout my manuscript that the concept of electromagnetic information is only a model, a working hypothesis that seems to me best suited to our present biophysicochemical understanding of life and the mind/body problem. We do know that the state of the human mind, our feelings, intentions, and will, alter our physical

sensory-perception mechanisms, and our physiological states and their underlying biochemical activities. That is, nonphysical but real higher-order categories, which we call psychological, affect the biophysicochemical substratum: the nervous system, the endocrine system, indeed the whole body.

A thought is a psychological process, but it is also an energy that causes the neurons in the brain to fire in a certain pattern. That pattern produces low intensity ionic currents along certain paths in the cortex that can be detected with sensitive instruments through electrodes on the surface of the skull or even at a distance (Gulyaev, 1968; Gulyaev, Zabotin, Shlippenbakh, & Yegorov, 1980). Through the propagation of those ionic currents, a thought that starts out as a tiny perturbation of the electrical field can eventually develop into a relatively strong force producing a 90 mV potential. The thought fires the first neuron, which in turn causes others to fire. If we can detect the current produced by a thought outside the head (and we can), then the energy of that thought must be broadcast in the form of electromagnetic waves. How could that be if the thought, a psychological process, and the electromagnetic wave, a physical process, were totally different, incommensurate realities?

Such an interaction is best described by some form of psychophysical parallelism. Thoughts and corresponding waves might be considered as different aspects of the same "something," like two slices taken from a multidimensional figure at different angles. But that means that there is an unambiguous correlation or ordering between mental or psychological processes and the physiological or physical. That presumption is reinforced by the nature of photons/quanta of the electromagnetic field. Photons are the universal conveyors of information, the messengers of the relationship expressing a deep interconnectedness in nature, associated with transformations of energy and structure.

The validity of such psychophysical parallelism might be proved if specific correlations were experimentally demonstrated between types of mental processes of individuals and types of electromagnetic fields emanating from those individuals. The typology of electromagnetic fields must be based on the internal structure of the field related to the information content in the contextual sense. At this point, we cannot demonstrate scientifically such a correlation. Our limited present knowledge justifies Stephen Braude's objections as to the essentialist views of the mind/brain relationship and the hypothesis of electromagnetic consciousness. I do agree with Braude that whether emotions, motivations, and memories may be objectively coded in the structure of the electromagnetic field is open to debate. But is such coding impos-

sible? How can one prove that higher-order values or categories are not reflected in the internal subtle structure of an electromagnetic field?

As Grosso and Keith Harary point out, empirical arguments against electromagnetic theories of paranormal phenomena seem also to argue against the electromagnetic hypothesis of consciousness. That is a serious argument indeed. But must we identify paranormal processes as the basis of the afterlife? Can we confine postmortem existence exclusively to the paranormal? Perhaps our electromagnetic consciousness can employ other, nonparanormal, forces of nature, such as gravity, or can accomplish specific effects by the coherent summation of quantum fluctuations (Mattuck, 1982) in order to produce telepathic interactions in living persons. Photons belong to that class of elementary particles called bosons, and one of the fundamental properties of bosons is their capacity for Bose-condensation: the number of photons occupying a given space cell, the phasespace, determined by momenta and coordinates, is unlimited. That property leads to unimaginably great potential for energy accumulation and transformation, beyond what I considered in my original hypothesis of an electromagnetic consciousness.

Harary related consciousness "to some deep interconnectedness in nature that appears to be quite independent of human observers." That statement fits well into the electromagnetic model of consciousness, the fundamental reality being the pervasive electromagnetic field, the absolute with many analogies to psychological categories and divine features. Individual egos would be analogous to spatiotemporal congestions or packets in the field, just as photons can be considered packets of the electromagnetic field. Those congestions, temporarily individuated due to the resonant interactions with the biophysical body of a living being, would be liberated at the moment of death, enter a deep level of interconnectedness in nature, and participate in the atemporal, absolute field. Using Itzhak Bentov's (1977) analogy of the sea of the absolute, we would visualize the packet or quantum of consciousness as a packet of ripples on the surface of that sea. According to such an interpretation, mind and matter would be created of the same basic stuff, but viewed as its different aspects or slices because of our limited perception and abilities to categorize.

Several critics of my manuscript claim that the hypothesis of electromagnetic consciousness represents a reductionistic conceptual approach. That is a characteristic viewpoint of scientists who analyze ontological categories in the traditional way, distorted by post-Newtonian reductionistic materialism. Ontological properties of electromagnetic fields are a paradox, an enigma that cannot be comprehended as

a materialistic reality. Ontological properties of light or electromagnetic fields are analogous to psychological categories and divine attributes. The range and depth of those analogies seem to exclude a coincidental convergence and suggest that electromagnetic fields might presently offer the best model of reality. Perhaps the most consistent prejudice is to regard the psychic and physical world in opposition to each other. These issues are discussed by Arthur Young in his monograph *The Reflexive Universe* (1976).

The last problem I would like to address is the logic and structure of the arguments in my hypothesis. I do not use the word "theory" in that context, as some of my critics have; I write only about the framework of a biophysical hypothesis. A hypothesis is an attempt to answer a question, an assumption about the expected state of things. What I present in my manuscript is, in the best case, only a model of consciousness and the afterlife. It has a heuristic value showing that if a certain set of conditions regarding consciousness is fulfilled, than that consciousness can "jump" into "eternity." However, some of the commentators seem to have taken the hypothesis too literally. Such an approach seems to be a rather naive one, deeply rooted in a linear way of thinking.

The hypothesis is not elaborated rigorously enough to be verified, for example, by computer simulation, nor can the questions raised be answered by today's science. Nevertheless, certain assumptions can be falsified, namely the universality of necrotic radiation and whether that radiation is noise only, or contains hidden subtle information about the dying organism. If necrotic radiation is indeed universal but merely noise, that is, it does not reflect (or is not) the consciousness of the dying object, then the death flash may be an epiphenomenon, a one-bit information signal about the separation of psyche and body. And if the psyche is a nonphysical entity, then we cannot say anything unambiguous about its separation from the body, or about the implications of that separation, based on contemporary biophysical methodologies and concepts.

The above considerations explain to some degree why my manuscript did not really argue for the hypothesis, as Hoyt Edge emphasizes in his valuable critique. My intention is not to construct a correct hypothesis or theory (I do not believe that is possible), but to stimulate and deepen our thinking about this profound religious and metaphysical idea and to bring it nearer to the natural sciences.

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