

Journal
of
Near-Death Studies

Editor's Foreword • *Bruce Greyson, M.D.*

The Theory of Essence. III: Neuroanatomical and Neurophysiological Aspects of Interactionism • *J. Kenneth Arnette, Ph.D.*

Near-Death Experiences and the Theory of the Extraneuronal Hyperspace • *Linz Audain, J.D., Ph.D., M.D.*

Book Reviews:

Light and Death: One Doctor's Fascinating Account of Near-Death Experiences, by Michael B. Sabom • *Reviewed by John C. Gibbs, Ph.D.*

The Truth in the Light: An Investigation of Over 300 Near-Death Experiences, by Peter Fenwick and Elizabeth Fenwick • *Reviewed by Michael Perry*

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JOURNAL OF NEAR-DEATH STUDIES (formerly ANABIOSIS) is sponsored by the International Association for Near-Death Studies (IANDS). The Journal publishes articles on near-death experiences and on the empirical effects and theoretical implications of such events, and on such related phenomena as out-of-body experiences, deathbed visions, the experiences of dying persons, comparable experiences occurring under other circumstances, and the implications of such phenomena for our understanding of human consciousness and its relation to the life and death processes. The Journal is committed to an unbiased exploration of these issues, and specifically welcomes a variety of theoretical perspectives and interpretations that are grounded in empirical observation or research.

The **INTERNATIONAL ASSOCIATION FOR NEAR-DEATH STUDIES** (IANDS) is a world-wide organization of scientists, scholars, near-death experiencers, and the general public, dedicated to the exploration of near-death experiences (NDEs) and their implications. Incorporated as a nonprofit educational and research organization in 1981, IANDS' objectives are to encourage and support research into NDEs and related phenomena; to disseminate knowledge concerning NDEs and their implications; to further the utilization of near-death research by health care and counseling professionals; to form local chapters of near-death experiencers and interested others; to sponsor symposia and conferences on NDEs and related phenomena; and to maintain a library and archives of near-death-related material. Friends of IANDS chapters are affiliated support groups in many cities for NDErs and their families and for health care and counseling professionals to network locally. Information about membership in IANDS can be obtained by writing to IANDS, P. O. Box 502, East Windsor Hill, CT 06028.

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Editor's Foreword

This issue of the Journal contains two articles describing overarching theories that can accommodate near-death phenomena. Counseling psychologist and physical chemist Kenneth Arnette first introduced his theory of "essence" in our Fall 1992 issue as an innovative approach to the perennial mind/body problem, using insights from theoretical cosmology and relativity theory. In our Winter 1995 issue he incorporated the physics of electromagnetism and quantum mechanics into his theory of essence to elaborate a testable model of mind/body interaction. In this issue, Arnette extends his dualistic theory to neuroanatomical and neurophysiological aspects of interactions at the microscopic level of analysis, and answers some objections that had been raised to his previous speculations.

In our other theoretical article, physician and medicolegal consultant Linz Audain proposes a different and equally innovative approach to a neurobiological understanding of near-death experiences (NDEs). Audain posits the concept of an extraneuronal "hyperspace," a segment of the nervous system outside the confines of our three-dimensional existence, and applies this model to the enigmatic phenomena of veridical out-of-body perceptions, precognition, and "fear-death" experiences. Neither of these authors presents his theory as a finished work, but rather as a framework and stimulus for further study.

We conclude this issue of the Journal with three reviews of recent books on near-death phenomena. First, psychologist John Gibbs reviews cardiologist Michael Sabom's *Light and Death*, in which Sabom, one of the earliest researchers to study NDEs scientifically, offers both an analysis of new cases, including a detailed examination of the first published case of an NDE during documented absence of brain activity, and a Christian interpretation of his findings. The important challenges Sabom raises about the role of theology in near-death research, both in furthering our understanding and in biasing our perspectives, far exceed the limits of a book review, and will be the focus of the Summer 2000 issue of the Journal. Next, Canon Michael Perry reviews *The Truth in the Light*, a comprehensive analysis of more than 300 NDEs by British neuropsychiatrist Peter Fenwick and pediatric and family

counselor Elizabeth Fenwick. Finally, transpersonal psychologist Jenny Wade reviews theologian Phillip Berman's *The Journey Home*, a popular assimilation of personal experience and professional insight into near-death and other mystical experiences.

Bruce Greyson, M.D.

The Theory of Essence.

III: Neuroanatomical and Neurophysiological Aspects of Interactionism

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Eastern Washington University

ABSTRACT: This article continues the construction of a dualistic interactionist theory of the near-death experience (NDE), the theory of *essence*, which was begun in two previous articles (Arnette, 1992, 1995). The present work represents an extension of the theory to the microscopic level of analysis, in order to specify in detail the mechanism of essence-brain interaction and to address some general and specific objections to interactionism and the theory of essence. In the theory construction process, a second issue is addressed: that of the apparent multiplicity of causes of NDEs or NDE-like experiences. I show that this multiplicity is simply a manifestation of the mode of essence-brain interaction and is accurately predicted by the theory.

How can thoughts and ideas, decidedly abstract entities, arise from mere neurons or collections thereof? Conversely, how do thoughts influence neurons and, thereby, the functioning and actions of our bodies? These questions are a modern rendering of an ancient dilemma, the philosophical mind/body problem, which inquires as to the nature of our conscious experience and indeed of our very humanity. The present work, the third in a series of related articles, approaches these questions from the context of information provided by the near-death experience (NDE) and, in the process, sheds theoretical light on the apparent multiplicity of causes of NDEs and NDE-like phenomena.

In two previous articles (Arnette, 1992, 1995a) I put forth components of an explanatory theory of the NDE, the theory of *essence*, built

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upon an empirical foundation provided by the NDE data. This theory is a form of mind/body dualism called *dualistic interactionism*, holding that humans are composed of two parts comprising two different substances—the physical body composed of matter, and the essence composed of a nonmaterial substance—which interact during physical life to produce mind.

In the first article (Arnette, 1992), hereafter referred to as Part I, I explored the similarities between the predictions of Albert Einstein's (1961) theory of general relativity and certain aspects of the NDE (Moody, 1975), such as the tunnel, timelessness, and weightlessness. I interpreted the NDE from a relativistic perspective that yielded, for example, the notion that the NDE tunnel is identical to the wormhole (Misner, Thorne and Wheeler, 1973), providing a pathway to other universes.

In the second article (Arnette, 1995a), hereafter referred to as Part II, I proposed a connection between essence/body interactions as described by NDErs and the interactions between electric dipoles as described in electromagnetism and quantum mechanics. For example, I proposed that the NDE phenomenon of thought reception (Moody, 1975) was analogous to the radiationless process of fluorescence energy transfer (Stryer, 1978). In this manner, I interpreted additional elements of the NDE within the framework of physics and chemistry, providing a level of organization and explanation of the near-death phenomena that materialistic theories have thus far been unable to offer.

In the present article I continue the construction of the theory of essence and present an extension of the theory to the microscopic level of analysis, in order to specify in more detail the mechanism of essence/brain interaction and to address some general objections to interactionism, as well as some specific objections to the theory of essence. As I will discuss below, the lack of an interaction mechanism has long been an objection posed by materialists to interactionism. In the process of constructing this mechanism, I will address a second issue: the apparent multiplicity of causes of NDEs or NDE-like experiences. I will show that this multiplicity is simply a manifestation of the mode of essence/brain interaction.

The Perceived Inadequacies of Interactionism

In the centuries-old argument between materialists and dualistic interactionists over the mind/body problem, materialists have identified the violation of scientific conservation principles and the lack of a

mind/brain interaction mechanism as the key weaknesses in the interactionist position (Broad, 1925; Cornman, 1981; Taylor, 1992). Hermann von Helmholtz was the first to propose that a dualistic conception of mind is ruled out by the principle of the conservation of energy (Hergenhahn, 1986), which states that "[e]nergy may be transformed from one kind to another, but it cannot be created or destroyed; the total energy is constant" (Halliday and Resnick, 1970, p. 126). For systems such as living organisms, the relevant principle is the first law of thermodynamics, which incorporates the energy conservation principle and states in part that a change in the energy of the system is accompanied by a change, of equal magnitude and opposite sign, in the energy of the surroundings, so that the total energy of the system plus surroundings (that is, a *closed system*) remains constant (is conserved) for any process (Levine, 1978).

James Cornman (1981) stated the apparent incompatibility of dualistic interactionism and energy conservation as follows: supposed mental states, such as a pain or volition, in interacting with the brain, should result in an increase in the total energy of the affected neurons through their firing; there can be no corresponding mental energy loss, however, because the presumed nonphysical mind has no mass, and therefore no energy. Thus, if interactionism were true, a net increase of energy in the brain would occur and the energy conservation principle would be violated for the closed system consisting of the universe.

Many years earlier, C.D. Broad (1925) had answered this objection, suggesting that the mind acts on the synapses of the brain by changing their resistances and thus directing the flow of neural currents without adding or subtracting energy to or from the physical system. In this way, Broad proposed, the mind could act causally on the brain and thus influence behavior. Cornman (1981) recited Broad's argument and replied that Broad had ignored another conservation principle, the conservation of linear momentum, and its concomitant problems for interactionism.

Cornman's (1981) view of this issue was that by selecting one neural pathway over another, the mind would change the direction of the neural impulse, and thus the total linear momentum of the brain. But since linear momentum must be conserved in the absence of the influence of an outside, physical force (Halliday and Resnick, 1970), and since the nonphysical mind presumably has neither mass nor electrical charge, no mental phenomenon can exert such a force in the brain. Thus the conservation of linear momentum, if not energy, poses an unsolvable problem for the interactionist, according to Cornman and many other materialists.

With respect to these historical objections to interactionism, a goal of the present work is to show that these objections are based on two classes of misconceptions. First, the interactionist position has generally been misunderstood, painting dualists into an unnecessarily small and rigid corner concerning interactionist possibilities. Second, Cornman (1981) has misapplied principles from physics due to some inaccurate notions of neurophysiology.

In addition to these general, historical objections to interactionism, in Parts I and II of this model I drew specific objections from two sources. First, V. Krishnan (1999) correctly pointed out that many questions and issues concerning the theory of essence went unanswered in the first two articles. Among Krishnan's comments were the following: (1) since the body and the essence can share some properties, the theory is not truly dualistic and the essence is actually material; (2) science does not know what matter really is, and therefore we cannot say what matter is not; (3) something that is not matter could not generate an electric field; (4) a substance with an electric field could not be free from gravity; and (5) it is unclear how the essence comes into existence. These issues show the need for the further explication of the theory of essence presented below.

Juan Gómez-Jeria and Carlos Madrid-Aliste (1996) provided a second source of objections to the theory of essence. In their article discussing the relationship between evolution and human consciousness, these authors asserted that

[i]f we accept that consciousness is a nonphysical thing... then we need to answer scientifically *when* nonphysical consciousness or nonphysical brain properties appeared.... The next question to answer is *why* they appeared at [a given] stage and not a previous one. The only reasonable *scientific* answer would be because at [a given stage] the physical structures of the central nervous system made it possible (p. 260; italics are the authors').

But this line of reasoning is unavailable to the dualist, the authors claimed, because ultimately the nonphysical mind would have to possess physical properties and a causal relationship with the physical body. Thus, they concluded that

human [consciousness] states exist because of the particular form of brain evolution attained in *Homo sapiens sapiens*. Within this context, Kenneth Arnette's (1992) attempt to revive dualism by using NDE data is untenable. (p. 261)

The authors thus (1) perpetuated the unnecessarily restrictive definition of dualism, as I will discuss below; (2) implied that the nonphysical

mind necessarily arose within this universe; and (3) implied that a dualistic theory is fundamentally incompatible with evolutionary theory, and perhaps also with neuroscience in general. Nothing could be further from the truth. In the present article, I will show, among other points, that the theory of essence is completely compatible with both neuroscience and the evolution of human consciousness.

The NDE: A Multiplicity of Causes?

Two recent materialistic theories of the NDE have attempted to explain the fact that the NDE, or at least experiences somewhat *similar to the NDE*, can be triggered by a variety of events, such as psychological trauma, the effects of drugs, or traumatic physical injury. Juan Saavedra-Aguilar and Gómez-Jeria (Saavedra-Aguilar and Gómez-Jeria, 1989; Gómez-Jeria and Saavedra-Aguilar, 1994) have proposed a physiological model of the NDE that they claim unites the biological and psychological domains and integrates the various triggers. Their model hypothesizes that a traumatic event triggers a stress response in the brain, which causes the release of certain neurotransmitters. This, along with the accompanying decrease of oxygen availability in the brain, affects the limbic system, creating abnormal excitation in limbic tissues and eventually leading to temporal lobe dysfunction similar to that found in temporal lobe epilepsy. The features of the NDE are caused by "afterdischarges propagating through limbic connections . . . towards more distant regions" (Saavedra-Aguilar and Gómez-Jeria, 1989, p. 212).

This model has not been challenged in the literature, and yet is open to serious criticism in that it completely ignores the medical research of Michael Sabom (1982) and Melvin Morse (Morse, 1983; Morse, Conner and Tyler, 1985; Morse, Castillo, Venecia, Milstein and Tyler, 1986; Morse, Venecia and Milstein, 1989; Morse and Perry, 1990). These research results demonstrated that, although the various triggers can induce NDE-like experiences, it is nonetheless true that psychological stress is not a causative factor for the NDE; that hypoxia or hypercapnia, drugs, neurotransmitters, and neuropeptides are not causative factors; and that the features of the NDE and of temporal lobe epilepsy are only partly compatible, with most of the key features of the NDE completely missing in epilepsy. Furthermore, although the authors claimed to address this issue (Gómez-Jeria and Saavedra-Aguilar, 1994), the problem of accurate visual perceptions by NDErs (Sabom, 1982; Morse

and Perry, 1990) remained unexplained in their model. This point is crucial, since no materialistic theory to date has been able to explain these observations (Arnette, 1994; 1995a; 1995b).

Morse and his colleagues (Morse, 1983; Morse, Conner and Tyler, 1985; Morse, Castillo, Venecia, Milstein and Tyler, 1986; Morse, Venecia and Milstein, 1989; Morse and Perry, 1990) proposed a physiological/genetic model that bore some similarity to that of Saavedra-Aguilar and Gómez-Jeria (Saavedra-Aguilar and Gómez-Jeria, 1989; Gómez-Jeria and Saavedra-Aguilar, 1994). Morse's model proposed that a variety of factors, such as psychological stress, psychoactive drugs, hypoxia or hypercapnia, or direct electrical stimulation, result in disinhibition of the temporal lobe of the cortex. This, in turn, activates a genetic program built into the structure of the temporal lobe, causing the person to perceive out-of-body experiences (OBEs) and/or NDEs, which are then recorded as memories (Morse, Venecia, and Milstein, 1989).

This model possesses three *apparent* strengths: (1) it integrates various suggested causes of NDE-like experiences into a single model; (2) these suggested causes are not dependent on one another in a chain of events, but rather can act independently to cause the NDE; and (3) temporal lobe dysfunction is abandoned as an explanation, and a genetic program is instead invoked. The genetic component of that model preserves the uniformity of the core NDE (Moody, 1975; Ring, 1980; Sabom, 1982).

Morse's model, however, was not as promising as it initially appeared. First, it ignored the results of Morse's own research, in which he had found that stress, drugs, and hypoxia or hypercapnia were insufficient to explain the NDE. Second, as with other materialistic models, the accuracy of NDE visual observations remained unexplained. Additionally, his model, like *all* materialistic models, was vulnerable to two general objections: (1) there is no physiological basis for retaining the memory of the NDE (Arnette, 1994; 1995b); and (2) since the NDE offers no survival advantage, there can be no genetic or evolutionary basis for the experience (Arnette, 1995b).

As a final note on Morse's model, even its authors acknowledged its inconclusiveness. After summarizing their model, they concluded that

it is just as likely that such an area [temporal lobe] represents the seat of the soul, an area of our brain that serves as a trigger point for the release of the soul at death. (Morse, Venecia, and Milstein, 1989, p. 51)

Thus, while describing their materialistic NDE model, Morse and colleagues admitted that a decidedly dualistic model is at least as good a fit to the data. As I will show, this "seat of the soul hypothesis" (Morse

and Perry, 1990) is consistent with the theory of essence and is much more promising than materialistic theories.

Two Fundamental Questions

A Definition of Dualism

In Part II, I asserted that because essence is not composed of matter, it does not have the exclusionary property of matter. It is therefore possible for essence and body to occupy the same three-dimensional space. In addition, essence can have location and possess shape. Consequently, I conceive essence as occupying the same space as the body and being bound to it in such a way as to move with it and interact with it in space and time. The key notion behind this body/essence binding and interaction is electromagnetism. Just as the body generates an electromagnetic field that varies in time and extends in space, so too, I posit, does the essence. The electromagnetic properties of body and essence allow the binding of each to the other, in a manner analogous to dipole/dipole attraction (Arnette, 1995a; Jackson, 1975; Lorrain and Corson, 1970). Further, in the bound state the respective electromagnetic fields intermingle and interact, allowing reciprocal causal influence between essence and brain. This is analogous to the phenomenon of dipolar rotational relaxation (Arnette, 1981, 1995a).

But this picture of interaction has been met with a question of some importance, which may be stated as follows: does not the proposal that the essence possesses physical qualities, such as an electromagnetic field, violate the prime tenet of dualism, which is that the mental substance is nonphysical (Gómez-Jeria and Madrid-Aliste, 1996; Krishnan, 1999)? This question goes to the heart of what is meant by the term "dualism."

The problem of dualistic interaction has traditionally been stated very simply as follows (Taylor, 1992): if the brain is physical and the mind is nonphysical, then how can the brain and mind interact? This is intended to be a rhetorical, unanswerable question, refuting interactionism. But if one examines this argument, it becomes evident that the premises *contain* the conclusion. That is, this usage of the term "nonphysical" implicitly *defines* a nonphysical entity as one that cannot interact with something physical. Then, of course, interaction is impossible by definition.

But this definition does great injustice to the dualistic position by unnecessarily requiring the dualists' concept of mind to emphasize the absence of physical characteristics, while ignoring more general, basic

aspects of dualism. This state of affairs owes its origins to the philosophical works of René Descartes, who first delineated a specific conception of interactionism, and to the responses to his work.

Descartes' (1641/1986) *Meditations on First Philosophy* changed the philosophical landscape on the mind/body issue by proposing explicit and radical differences between mind and body, thus starting an enduring controversy. Therefore, in working towards a reasonable definition of dualism, it is vital first to understand Descartes' position, which I reviewed in detail in Part II. To summarize, Descartes' view of the nonphysical mind included the following properties: (1) the mind can survive the death of the body; (2) mind is a thinking substance; (3) the mind is not extended, and so does not occupy space to the exclusion of other objects, and does not have shape, position, or motion; and (4) the mind is physically indivisible.

These are indeed radical distinctions between mind and body, and during the intervening centuries Descartes' distinctions have been sharpened by materialists to consist of the following description of the dualistic position: the nonphysical mind has neither matter nor energy, is not localizable, is not extended in space, has no physical properties whatsoever, and works independently of the brain (Bunge, 1980). This is even more radical than Descartes' own proposal.

Must modern interactionist theories be constrained by Descartes' original vision and the baggage subsequently strapped onto it? Why should we expect Descartes' view, proposed at the very beginning of the scientific age, to have sprung forth full-blown and irrefutable? Indeed, Descartes was responsible for the origination of an early form of the scientific method and for the invention of analytic geometry, both of which were required for the later flowering of science (Viney, 1993). From his position in history, then, it would have been *impossible* for Descartes to propose a complete, scientific theory of interaction.

One should therefore ask: which of Descartes' stated mental properties are truly needed for a definition of dualism, and which are unnecessary? It seems clear that the concept of mind as a thinking substance that survives bodily death and that is physically indivisible is fundamental to the dualist view. But what of the concept of extension and its properties? Since no one has ever seen the nonphysical mind or measured its properties in any way, it is reasonable to suggest that this substance does not share the property of the exclusionary occupation of space displayed by matter. But if the mental substance is in fact a substance in its own right, there should be no *a priori* reason that it could not exist in space and time, have shape, or have location.

A consistent and useful definition of dualism, then, should not be constrained to focus on properties (and particularly on extension) but rather should attend to the more fundamental aspects of the mind/body distinction. I propose that a reasonable definition of dualism should focus on three highly related but somewhat different concepts: reduction, substance, and survival. First, one may ask whether mind can be reduced to brain. That is, can consciousness be reduced to a product of brain functioning, or is consciousness itself irreducible? Second, are humans composed of a single substance, matter, or might we be a combination of matter with some other, currently unknown, building block? Third, is what we know as death the complete termination of our existence, or is survival of death in some nonphysical form possible?

Obviously, materialism has ready answers to the three questions. First, consciousness is the direct result of the living brain, and has no other source. Second, the universe as a whole, and human beings in particular, are composed only of matter, existing together with energy. And third, death is the termination of our bodily processes, and thus the end of our consciousness. Interactionism, of course, answers differently on all three counts, embracing a position of irreducible consciousness, two distinct substances interacting during physical life, and the mind's survival of death. In this conception of dualism, the mind could conceivably have certain physical properties, yet the theory would still be dualistic; in this context, "nonphysical" means *nonmaterial*, but not insubstantial. Thus, this triangular definition of dualism clearly distinguishes between materialist and interactionist perspectives without undue focus on physical properties.

Matter as an Example of Substance

One might then ask as to the nature and definition of "nonmaterial substance." In particular, one could challenge the idea of essence, suggesting that positing such a substance is arbitrary and unprecedented. But in fact we need look no further than general relativity for insight into the possible nature of substances other than matter.

The theory of general relativity (Einstein, 1961; Hawking, 1988; Misner, Thorne and Wheeler, 1973; Thorne, 1994) has caused a revolution in the scientific view of the nature of matter, energy, space, and time. (I discussed space and time in the context of the theory of essence in Part I.) Just as space and time are closely related, so relativity demonstrates that matter and energy are also intimately intertwined. Relativity provides a mathematical relationship between the

two: matter and energy are linearly related. The energy contained in a given amount of matter is the mass multiplied by the speed of light squared. From an energetic point of view, this relationship provides a basic *definition* of matter. Since the speed of light is a very large number, a small amount of matter is equivalent to a huge amount of energy. For example, a few pounds of the proper isotope of uranium are sufficient to cause an atomic blast that can level a large city.

One can thus view matter as a form of condensed energy, which can be released under the proper conditions. A corollary of this principle is that the substance called matter has a certain *energy density*, given by the linear relationship discussed above. Consider the possibility, then, that other substances, representing alternative relationships with energy, are possible. Specifically, one can propose that an entire series of substances is theoretically possible, with the substances differing from each other in their energy densities. The definition of substance, in this view, would therefore be *any form of condensed energy*.

For clarity, it is helpful to consider a specific example. Matter could be viewed as a particular case of a general substance/energy (E) relationship, to wit:

$$E = S_i c^i$$

In the case of matter (substance S_2), the proportionality constant is c^2 ; each possible substance would be represented by a distinct value of the index i . Essence, for example, could be represented by substance S_1 . In that example, essence would be related to energy through the proportionality constant c , and essence would therefore be *much less energy-rich* than matter.

The energy-density difference between S_1 and S_2 would be much more fundamental than, say, the observed changes in the density of matter during phase changes, such as liquid water turning to water vapor. The present concept of substance would require that nonmaterial substances display basic differences from matter in the way those substances are *constructed* from energy, and one could accordingly expect important property differences among the substances S_i . It is not unreasonable, for instance, to propose that substances S_1 and S_2 , being very different in energy density, could simultaneously occupy the same three-dimensional space. It is important to emphasize that S_1 is *not* merely some less-dense form of matter, but is an entirely different substance.

A useful way to conceptualize the potential properties of S_1 is to examine the series S_2 , S_1 , S_0 . Substance S_0 would be identical to energy itself. S_1 (essence) would lie between energy and matter (S_2) in terms of energy density and physical properties. Thus if S_1 could be examined with traditional scientific instruments, it would appear to be much more similar to energy than is matter. This idea receives support from the NDE literature: several of Raymond Moody's (1975) research participants described their disembodied selves in terms of energy (Arnette, 1995a). For example, one NDEr described himself as "a little ball of energy" (Moody, 1975, p. 50).

Although the various S_i would exhibit considerable differences, they could also conceivably share some properties. Again, consider matter: despite the fact that energy undergoes a radical transformation to become matter, signatures of that energy remain in the material form. For example, on the subatomic scale, electrons display both wave-like and particle-like properties (Eyring, Walter and Kimball, 1944; Landau and Lifshitz, 1977). Another signature is the electric charge associated with elementary particles—protons being positively charged and electrons being negatively charged—and the electromagnetic fields generated as a result of those charges (Halliday and Resnick, 1970). It is then fair to propose that other substances could also retain energetic signatures analogous to, or even perhaps identical to, electric charge. Supposing that the fields generated by substances S_1 and S_2 are similar in nature, these fields would form the basis of body/essence binding and interaction, as I described in Part II.

A final point concerns gravity (Krishnan, 1999). In Part I, I suggested that the essence is not constrained by the spacetime of this universe, thus enabling the essence to observe and enter wormholes that are otherwise invisible; and that because gravity is the warping of spacetime by mass, the essence would neither cause nor be affected by gravity. It is therefore quite feasible for the essence to possess an electric field but be unaffected by gravity.

Suppose, for the sake of argument, that substance S_1 (and therefore the essence) is for some reason subject to the force of gravity. It is important to remember that gravitation is by many orders of magnitude the weakest force known in nature (Halliday and Resnick, 1970), and would be expected to have a negligible effect on S_1 . For example, the massless photon, the smallest unit of energy, is correctly predicted by relativity theory to be influenceable by gravity, but the amount of mass needed to observe this effect experimentally is literally of stellar proportions (Hawking, 1988; Thorne, 1994). S_1 , lying between S_0 and S_2 in

its properties, would be more easily influenced than photons, but certainly much less subject to gravity than is matter. Thus the influence, if any, of gravity on the essence should be unobservable in a terrestrial environment, as many NDErs have reported (Arnette, 1992; Moody, 1975; Ring, 1980).

The preceding discussion shows that relativity theory provides a matter/energy relationship that can serve as a prototype for the definition of other possible substances, and for hypotheses concerning the properties of these substances. The concept of substances with energy densities different from matter is *not* unprecedented. Kip Thorne (1994), a prominent cosmological theorist, has noted that relativity theory posits that "exotic material," with a *negative* energy density relative to an observer traveling near the speed of light, could conceivably be used to construct artificial wormholes, and that this material actually exists in the vicinity of black holes.

Neuroanatomical Aspects of Interactionism

Now the task remains to go beyond the general notions of essence/brain interaction given in Part II and propose a more detailed description of interaction at the anatomical and microscopic levels. As mentioned above, the theory of essence conceives of mind as being formed by and consisting of the overlapping electromagnetic fields of the brain and essence, with the mutual influences of these fields providing the basis for reciprocal causation between brain and essence (Arnette, 1995a). Thus the brain is far from being irrelevant to interactionism, as some have implied (Bunge, 1980; Dennett, 1992; Gómez-Jeria and Madrid-Aliste, 1996). Instead, the brain is the crucial *interface* between the essence and the physical world (Arnette, 1995a). But a complete interactionist theory must go further and explain *how* the essence and brain interact on a detailed level. And such a discussion must first focus on the anatomy of this interaction.

For the present purpose, I will present a brief general overview of the brain and its functioning. A reasonable perspective in this regard is provided by Aleksandr Luria's (1973) model of brain structure and function. While it is a fallacy to assume that any parts of the brain function independently, it is nonetheless true that there is considerable localization of function. Luria's model recognizes the interdependence of the various brain regions but also organizes brain functions according to structure. Luria's conceptualization divides the brain into three principal functional units, as follows.

Unit I interacts with the other two units to regulate cortical and emotional arousal, which arises from external stimuli, metabolic processes, intentions, and plans. Unit I is particularly involved in attention and attentional shifts. The anatomy of this unit includes the reticular and limbic systems, the thalamic nuclei, and the anterior frontal lobes. Unit I, except for the frontal lobes, constitutes the phylogenetically oldest parts of the mammalian brain.

Unit II consists of the cortex posterior to the central sulcus, and is responsible for obtaining, processing, and storing information. This unit is divided into three cortical zones, each with somewhat different functions. The primary zone receives sensory signals from peripheral brain regions; the secondary zone processes this information and forms perceptions; the tertiary zone performs complex information processing, involving the coordination and simultaneous use of many cortical areas, and stores information.

Unit III consists of the cortex anterior to the central sulcus, and serves to program, regulate, and verify information. This unit is also divided into three zones. The tertiary zone monitors behavior by comparing incoming and outgoing information, formulates intentions and plans, and controls behavior; the secondary zone prepares motor programs; the primary zone executes the motor programs by sending the appropriate signals to skeletal muscles.

In the present context, the regions of greatest interest are the cortical zones, especially the tertiary zones of Units II (temporal lobe, temporo-occipital region, and superior and inferior parietal lobes) and III (prefrontal lobes). These regions carry out the highest of the brain's functions, executing complex mental activities and coordinating the functions of other cortical regions. It is in these areas that information enters, judgments are made, and decisions for action go out to the body.

Luria (1973) noted that the tertiary structures of Unit II are uniquely human. These zones provide for "the *transition from direct, visually represented synthesis to the level of symbolic processes*" so that "the *tertiary zones of the posterior cortical region play an essential role in the conversion of concrete perception into abstract thinking*" (Luria, 1973, p. 74; emphasis is the author's). The tertiary zones of Unit III make use of the results of Unit II's operation. Again quoting Luria:

[W]hereas in the second, afferent system of the brain [Unit II] the processes go from the primary to the secondary and tertiary zones; in the third, efferent system [Unit III] the processes run in a descending direction, starting at the highest levels of the tertiary and secondary zones, where the motor plans and programmes are formed, and then

passing through the structures of the primary motor area, which sends the prepared motor impulses to the periphery. (1973, pp. 82-83)

Luria then pointed out that Unit II consists entirely of efferent neurons and possesses modally specific individual analysis zones, while Unit III does not display such specific organization and consists completely of afferent, motor-type neurons. A final point from Luria's work is that humans possess the most highly developed frontal lobes in the animal kingdom, and

that is why in man, through the progressive corticalization of functions, processes of programming, regulation and verification of conscious activity are dependent to a far greater extent on the prefrontal parts of the brain than the processes of regulation of behaviour are in animals. (Luria, 1973, p. 93)

The crucial role of the prefrontal lobes in the qualities that appear to be unique to humans (such as planning, judgment, and abstract and symbolic thinking) has been demonstrated by studies of the behavior of individuals with focal damage to, removal of, or disease processes within their prefrontal regions (Luria, 1973; Pearlman and Collins, 1990).

Even with all the progress made to date in neuropsychology, we still do not understand how these highest cortical regions execute their functions (Collins, 1990). We *do* know that these regions are multiply connected to and, to a large extent, oversee the involvement of other cortical and lower brain regions (Collins, 1990; Luria, 1973), but how this is all accomplished is something of a mystery (Penfield, 1975). The theory of essence does not attempt a complete answer to this question, but does hold that the tertiary regions of Units II and III in Luria's model are crucial to our functioning as humans because these are the *interfacial* regions between the essence (the seat of consciousness) and the remainder of the brain.

Specifically, the theory posits that the essence is superimposed on the entire central nervous system (CNS). By means of the electromagnetic interaction mechanism outlined above and explained in more detail below, the essence potentially can gather information from anywhere in the CNS; but the most integrated, organized, complete information is available from the efferent neurons in the Unit II tertiary areas. Likewise, there must be an entry point in the biological system for information (commands) from the essence concerning the actions of the body; the afferent neurons of the Unit III tertiary regions provide this opportunity. Thus, the essence fills a gap, as it were, between the "upstream" functions of Unit II and the "downstream" functions of Unit III.

The essence occupies a role that mediates between the tertiary areas of these two units—coordinating them, bridging them, and interacting with them to receive, analyze, and provide information. Thus, these areas (and especially the prefrontal lobes) are *necessary* for us to be human in all senses of that word, but are *not sufficient*: the essence is required as well.

Regarding the evolution of human consciousness (Gómez-Jeria and Madrid-Aliste, 1996), there is absolutely nothing in the theory of essence that is inconsistent with evolutionary principles. The essence works in concert with the brain, and the expression of the essence (and therefore consciousness) through the brain is enhanced as the sophistication of the interface increases. If consciousness offers a survival advantage, which certainly seems plausible, then the presence of the essence would be expected to drive the evolutionary process to produce an increasingly complex brain with ever-growing interfacial regions reflecting more specialization for the purpose of linking the essence with the body. This picture is in complete harmony with Luria's (1973) comments quoted above and with many of the concepts discussed by Gómez-Jeria and Madrid-Aliste (1996).

As to the question of when the essence arose during the course of evolution (Gómez-Jeria and Madrid-Aliste, 1996), there is no reason why the existence of the essence should depend in any way on a terrestrial evolutionary process. It is in fact highly problematic to suggest that substance S_1 evolved from, or was in some other manner produced by, substance S_2 within earth's environment. As I discussed in Part I, the theory of essence proposes that wormholes provide passageways to other universes. During an extended NDE, the dissociated essence may travel through a wormhole to another universe. Often, NDErs report encounters with deceased individuals the NDEr had known during physical life (Moody, 1975; Ring, 1980). The data provided by Kenneth Ring (1984) in his discussion of extended experiences and by Morse (1983) in his report of a child's NDE also indicate that NDErs sometimes meet individuals waiting to return to physical life. These data imply that the individual essence has a continuous existence, both existing before and continuing beyond terrestrial life.

The theory of essence thus views wormholes as *two-way* portals. The essence comes through a wormhole into this universe, our familiar four-dimensional spacetime, in order to join with a physical body and live a physical life; and when that life is over, the essence returns to its original spacetime through a wormhole. The essence did not "evolve" in the context of this universe. Gómez-Jeria and Madrid-Aliste (1996, p. 267) have already objected to this type of reasoning, equating the

concept of "other dimensions" with pseudoscience. However, modern theoretical cosmology treats the existence of higher dimensions as fact, and the existence of other universes (that is, other spacetimes) as a strong possibility (Halpern, 1992; Hawking, 1988; Misner, Thorne and Wheeler, 1973; Thorne, 1994; Wolf, 1988). Thus, the theory of essence, far from being unfriendly to biological science, instead incorporates it logically while simultaneously integrating the NDE data and the results of general relativity.

Neurophysiological Aspects of Interactionism

Having proposed specific anatomical regions for maximal essence/brain interaction, I next address interaction at the microscopic, or neuronal, level. Richard Taylor (1992) has phrased this issue as: how can an idea fire a neuron, and conversely, how can a neuron generate an idea? Indeed, this appears to be a fundamental question for any mind/body theory. The response to this question begins with a description and analysis of the neural firing process.

The Mechanism of Neural Firing

The firing process (Carlson, 1986; Stryer, 1988) of any given neuron begins with the transmission of electrochemical signals, known as *action potentials*, to that neuron from other neurons. Consider as an example the case of the firing of unmyelinated, excitatory neurons. Neuron A interfaces with neuron B at the synapse, where A's terminal button lies across the synaptic gap from B's post-synaptic membrane. The action potential migrates down A's axon to the terminal button by a process called *orthodromic conduction*, where it causes the release of neurotransmitter molecules into the synaptic gap. The neurotransmitters then diffuse across the gap, and bind to receptors on the post-synaptic membrane.

Binding of the receptors by neurotransmitters opens ion gates in the membrane, thus allowing the passage of sodium ions from the gap, through the membrane, and into the cytoplasm. This influx of sodium ions lowers the difference in electric potential energy between the interior and exterior of the neuron's cell body. When the potential difference moves from its resting value of -70 millivolts to less than -65 millivolts, the threshold value, the cell is depolarized and the *excitatory post-synaptic potential* is formed.

This excitatory post-synaptic potential may be sufficiently large that the potential at the axon hillock, where the cell body and axon meet, is

driven past the threshold value and the neuron fires. However, if the excitatory post-synaptic potential is below that threshold value, it dissipates without effect. Thirdly, the excitatory post-synaptic potential may be summed spatially or temporally with other excitatory post-synaptic potentials and/or inhibitory post-synaptic potentials (generated by inhibitory neurons); again, when the potential at the hillock passes threshold, the neuron fires.

At the hillock, when the potential passes threshold, ion gates are again opened and sodium ions are allowed to pass through the membrane. The potential difference increases as the sodium migration continues, reaching equilibrium at +50 millivolts. The +120 millivolt change (from -70 to +50 millivolts) is the action potential. As the sodium ions enter the hillock, potassium ions are electrostatically forced out of the axon ahead of the sodium influx. This reciprocal ion flow sets up eddy currents that spread in all directions from the hillock.

Those currents that are transmitted to the cell body eventually die out. Those transmitted down the axon are maintained by orthodromic conduction, in which the sodium/potassium ion exchange is replicated at regular intervals down the axon. The action potential generates its own replication by opening sodium channels in the neighboring segment of axon. Thus the action potential is transmitted to the terminal button, where the firing process begins again.

In the wake of the action potential, work must be done to return that segment of the axon to its original status so that it can conduct the next electric field pulse. Sodium ions must be pumped out of the cell, across the cell membrane, and back into the extracellular fluid. Potassium ions must be pumped in the reverse direction. This ionic rearrangement opposes the natural direction of diffusive flow, thus requiring the input of energy. Once the original ionic distributions are regained, this segment of the axon (or of the post-synaptic membrane) is ready to fire again. It is, in a sense, reloaded and awaits retriggering.

Relevant to Cornman's (1981) objections cited above and to the essence/brain interaction mechanism, there are several important points to be made from the preceding discussion. First, the potential at the axon hillock is the *sole criterion* for neural firing. Second, the energy associated with neural firing is expended *in advance* of the actual firing of the neuron, when the sodium and potassium ions are transported against the diffusive flow.

Third, it is the action potential, an electric field pulse, that is propagated along neural pathways; *no material particles* are transmitted along the axon. Although ions are transported across membranes, the action potential's direction of propagation is *perpendicular* to the

direction of ionic motion. Fourth, when an axon branches, the action potential sets up eddy currents in, and is propagated along, *all* branches. And fifth, the process at the synapse involves the release, diffusion, and binding of neurotransmitters, which are chemical processes; the meaning of "the resistance at the synapse" is thus not clear, and any such resistance would appear to be irrelevant to the process.

In light of these points, Cornman's (1981) misconceptions become clear. First, no redirection of neural impulses occurs; the impulses are transmitted along all axons at all branch points. Second, since the action potential is a field without mass, there is no linear momentum to be conserved. The laws of electromagnetism, not the laws of classical mechanics, apply to neural firing. Third, the energy of a firing neuron is supplied biologically in advance of the firing, and so a nonphysical mind (that is, the essence) would not need to supply this energy to the neuron. Additionally, the preceding discussion reveals Broad's (1925) misconception: the "resistance" at the synapse is an ill-defined concept that is not relevant to the neural firing process, and thus provides no apparent way for the mind (essence) to influence the brain.

A Mechanism of Essence/Neuron Interaction

This examination of the mechanism of neural firing serves both to dispel misconceptions about the process and to reveal the mode in which the essence can interact with the brain. The relevant conclusion here is that the potential at the axon hillock is the *sole criterion* for neural firing. Because of this fact, the firing of a neuron can be accomplished *without the depolarization of the cell body*.

Such a conclusion may seem startling, but in fact has already been experimentally demonstrated. In his surgical experiments with epileptic patients, neuroscientist Wilder Penfield (1955, 1975; Penfield and Rasmussen, 1950) applied electrical stimulation to the exposed neurons of the temporal region of the brain while patients were fully conscious. The stimulation resulted in the patients' experiencing full, vivid, and accurate memories from both the recent and distant past. These experiments helped reveal the function of various brain regions, and also show that imposed, nonbiological fields are capable of firing neurons by pushing the potential at the hillock beyond the threshold value.

The proposed interaction mechanism, then, between essence and the brain's neurons is this: the essence and brain occupy the same three-dimensional space and are bound together by electromagnetic

forces. Essence and brain interface with each other through the interpenetration and reciprocal causal influence of their respective electromagnetic fields, which vary in time. A thought, idea, or mental image, the basic unit of our conscious experience, is defined as the three-dimensional configuration of the essence electric field at a given point in time. During the essential thinking process, the essence field fluctuates and changes in configuration, and these fluctuations are sensed at the neurons' axon hillocks; when the essence field drives the hillock potential past threshold, the neuron fires. This is how an idea can fire a neuron.

Conversely, neurons affect the essence by way of a complementary electromagnetic mechanism. When signals from the body are conducted to the brain, these signals are sensed by the essence as fluctuations in the brain field. These fluctuations contain information collected from the various senses and the central nervous system. The essence receives this information through the interaction of essence and brain fields, especially in the interfacial regions (the tertiary areas of Luria's Units II and III). Thus neurons cannot create an idea, for the essence drives thought. But neurons can, through this mechanism, contribute information that helps form thoughts, ideas, and images.

The picture that emerges from this proposed mechanism is one of constant interaction and communication between essence and brain through the fluctuations in the electromagnetic interface. Signals generated by the brain and nervous system are continually sensed by the essence, which in turn continuously influences the brain by virtue of the essential thinking process and the associated field fluctuations. It is not clear whether energy must move between brain and essence during these interactions, but it is probable that very small amounts of energy do move. If that is the case, then there is clearly an energy *exchange* process, as I implied in the dipolar relaxation analogy discussed in Part II.

Since the two fields, and thus the two substances, constantly intervene on each other, it is therefore reasonable to propose that the two substances are in a *dynamic equilibrium*. In this picture, energy is always moving from essence to brain, and from brain to essence. The flow is balanced, such that the net exchange is zero over time even though energy is constantly flowing. This is the case with chemical systems at equilibrium, in which individual molecules are constantly decomposing but are also continuously being regenerated, and with physical systems in thermal equilibrium, in which thermal energy is constantly exchanged but with no net transfer of heat (Levine, 1978).

Implications for the Multiplicity Problem

The final task of the present work is to address several sources of NDE-like experiences, proposed by materialists as causes of and explanations for the NDE. The goal is to show that these sources have a common mechanism of action that is predicted by the anatomical and physiological aspects of the theory of essence, thereby demonstrating that the theory has significant predictive power and the ability to unite many seemingly diverse phenomena.

As mentioned above, Part II of this model developed the idea that the attractive force between body and essence was analogous to, and could be modeled as, the interaction between two electric dipoles (Arnette, 1995a). A dipole is defined as a positive charge held at a fixed distance from an equal negative charge, and represents the simplest distribution of charge separation. Part II discussed this model in the context of binding the body with the essence, but such a model may be used on any size scale to describe electromagnetic interactions. In fact, it is common in the field of neurology to use dipole approximations in modeling cortical pathophysiology (Baumgartner, Sutherling, Di and Barth, 1991; Sutherling, Crandall, Levesque, Darcey and Barth, 1992). In this paper I used the dipole model to describe the interactions of the essence with the interfacial regions of the brain, the tertiary areas of Luria's Units II and III.

Because both the essence and brain electric fields change with time, the simplest model of their interaction would employ two *oscillating* dipoles, each with its own frequency of oscillation. An attractive force between these dipoles results when the two oscillation frequencies are matched—that is, when the dipoles are *tuned* to each other (Arnette, 1995a). The physics of even a simple system such as this one is highly complex and well beyond the scope of this article; I refer the reader to Paul Lorrain and Dale Corson (1970, pp. 595–620) for a detailed discussion.

The important point for the theory of essence is that the electric field intensity, and therefore the lines of force, between the oscillating dipoles depend on the relative values of the oscillation frequencies. When the oscillations are in phase, the dipoles tuned to each other, the dipolar fields interfere constructively and the force is attractive; as the dipoles move out of phase, constructive interference is replaced by destructive interference and the attraction dissipates.

In terms of the essence/body system, this tuning mechanism means that deviations of *either* the essence or body oscillation frequencies from their matched values can result in partial or complete essence/body

dissociation. From the bodily side, partial dissociation can occur when, for example, the firing rates of the neurons in the interfacial regions of the brain are significantly altered from their normal ranges. Complete dissociation can occur in cases such as grave illness, severe physical injury, or physical death, when the entire body's electrochemical system is nearly or completely shut down.

Consequently, the theory of essence predicts that factors affecting neural firing rates in the tertiary areas of Units II and III or in the entire body can lead to NDEs or NDE-like experiences. Further, the theory predicts that some sources of frequency shifts causing partial dissociation, such as drugs or temporal lobe epilepsy, will have additional effects that lead to deviations from the standard NDE phenomena. This is because there is still a connection between the essence and the brain, which continues to function and is influenced in multiple ways by the source of the frequency shift.

The theory thus leads to predictions that are empirically falsifiable, in the sense that Karl Popper (1959) has used this term. Opportunities to test these predictions arise from the various factors suggested from within the materialist paradigm for explanations of the NDE. Several of these factors were mentioned in connection with the models of Morse and colleagues and Saavedra-Aguilar and Gómez-Jeria discussed above, including electrical stimulation, hypoxia, drugs, temporal lobe disturbances, psychological stress, and the action of neurotransmitters.

Sabom (1982) reviewed many of these factors, and found each of them lacking in explanatory power due to mismatches between the symptoms caused by each factor and the core phenomena of the NDE. Yet, several of the factors do have some area of commonality with the NDE, often in the form of symptoms of dissociation: feelings of detachment from one's body, emotions, and/or thought processes; observing one's body from outside it; and distortions in the perception of time and/or space (Steinberg, 1994). This paradoxical situation can be resolved by considering the physiological effects of these factors in the context of the theory of essence.

Endogenous Electrical Stimulation

Endogenous electrical stimulation of the brain's interfacial regions accompanies complex partial seizures, formerly referred to as temporal lobe epilepsy. Eric Lothman and Robert Collins (1990) wrote that "[i]n every instance seizures arise because of an abnormal, excessive, paroxysmal, synchronous discharge in a population of neurons," with

these discharges being "both transient and readily differentiated from the normal background activity of the brain, features encompassed by the term *paroxysmal*" (p. 276). These seizures affect both the temporal and prefrontal lobes (Unit II and III tertiary areas, respectively).

Complex partial seizures therefore meet the requirements of the theory of essence for inducing partial essence/body dissociation. The clinical literature supports this theoretical prediction. Complex partial seizures and similar disorders can cause dissociative symptoms (Loewenstein and Putnam, 1988) that differ significantly in intensity and frequency from those in normal populations (Persinger and Makarec, 1993); OBE-like experiences (Persinger, 1995); and autoscopic phenomena (seeing one's own body) similar to NDEs (Devinsky, Feldmann, Burrowes, and Bromfield, 1989). Also in accordance with the prediction, there are significant differences between temporal lobe epilepsy and dissociation (Brown, 1994) or NDEs (Sabom, 1982).

Exogenous Electrical Stimulation

Exogenous electrical stimulation of interfacial regions also has effects that are consistent with the theory's predictions. I cited Penfield's (1955, 1975) experiments with temporal lobe stimulation above as evidence that imposed electric fields could fire neurons. In fact, more than memories could be stimulated by this method: "[the patient] may feel as though he were far away and yet can perceive the scene, may seem to see himself and know what is happening to his body, as though he were a secondary observer" (Penfield and Rasmussen, 1950, p. 173).

More recently, it was reported on the television show *Turning Point* (Donvan, 1994) that neurologist William Sutherland has verified Penfield's observations, employing subdural platinum-iridium electrodes to map the brains of epileptic patients prior to surgery. In one of his patients, for example, electrical charge was delivered to the temporoparietal lobe (a tertiary area of Unit II), resulting in the patient reporting an OBE. And finally, electroconvulsive therapy has been shown in some cases to cause autoscopic phenomena (Devinsky, Feldmann, Burrowes, and Bromfield, 1989) and in at least one case even a full-blown NDE (Floyd, 1996).

Psychoactive Drug Action

Several authors have claimed that the features of the NDE can be reproduced by the ingestion of psychoactive drugs. Two drugs frequently mentioned in this regard are the anesthetic ketamine (Collier, 1972; Jansen, 1990, 1997; Rogo, 1984; Morse, Venecia and Milstein, 1989) and

the hallucinogen lysergic acid diethylamide (LSD) (Grof and Halifax, 1977; Morse, Venecia and Milstein, 1989). Sabom (1982) has pointed out that the reaction to such drugs is highly idiosyncratic, in sharp distinction to the core NDE, and that many of the drugs' effects have nothing to do with the NDE.

It nevertheless appears that what similarities do exist between the NDE and drug action are strong enough that theorists continue to make a connection (Jansen, 1990, 1997; Morse, Venecia and Milstein, 1989). The basic line of reasoning is this: drugs bind to certain receptors in the brain, which then trigger NDE-like events; this action mimics the effects of endogenous neuropeptides and neurotransmitters that cause similar effects in times of intense stress, pain, and physical injury (Jansen, 1990, 1997; Morse, Venecia and Milstein, 1989; Saavedra-Aguilar and Gómez-Jeria, 1989).

From the perspective of the theory of essence, similarities between drug action and the NDE are due to a partial essence/brain dissociation caused by the alteration of neural firing rates in the brain's interfacial regions. That the dissociation is partial and that drugs have effects in other parts of the brain account for those drug effects that are idiosyncratic and unlike NDEs.

Consider first the physiological effects of LSD. This drug is an antagonist of the neurotransmitter serotonin (Carlson, 1986; Pierce and Peroutka, 1990), affecting prefrontal cortical serotonergic function (Breier, 1995) and serotonergic cortical function in general (Aghajanian, 1994). An antagonist, by definition, inhibits or blocks the action of a neurotransmitter (Carlson, 1986) and thereby alters the firing rates of the associated neurons from their normal values.

Similarly, ketamine is an antagonist of N-methyl-D-aspartate (NMDA) (Jansen, 1990, 1997; Lahti, Koffel, LaPorte and Tamminga, 1995) and acts on thalamocortical pathways (Saletu, 1987) as well as through cerebral mechanisms (Gordh, Karlsten and Kristensen, 1995). It is significant that NMDA receptors have also been implicated in epileptic seizures (Lothman and Collins, 1990). Thus both LSD and ketamine fulfil the requirements of the theory of essence for partial dissociation of the essence from the brain.

Psychogenic Frequency Shifts

Individuals faced with life-threatening situations have reported dissociative symptoms with similarities to NDEs (Noyes and Kletti, 1976a, 1976b). Even though Russell Noyes (1978), a major researcher in this area, has stated that these experiences differ significantly from those

of NDErs who are physically near death, the notion of psychological stress continues to be highlighted as a key causative factor for NDEs (Ferris, 1991; Morse, Venecia and Milstein, 1989; Saavedra-Aguilar and Gómez-Jeria, 1989).

In this regard, the theory of essence holds that changes in the dipolar oscillation frequencies of both the body and the essence can have psychological, rather than physiological, origins. Consider the case of a life-threatening situation or otherwise highly stressful event. The endangered individual first makes a cognitive appraisal that establishes the presence of a threat (Folkman, Lazarus, Gruen and DeLongis, 1986; Lazarus and Folkman, 1984). The perception of a threat can in turn initiate the "fight-or-flight" response, the activation of the sympathetic nervous system (Rice, 1987), which has strong effects throughout the body. This may occur even with the purely mental re-experiencing of the event.

Sympathetic nervous system activation at a sufficiently high level can potentially alter the brain's as well as the entire body's oscillation frequency, which could consequently induce essence/body dissociation. It is in accordance with the theory, then, that dissociative symptoms are associated with posttraumatic stress disorder (Brown, 1994; Brende and Benedict, 1980; Steinberg, 1994), incest (Ellenson, 1985; Greer, 1994; Kluft, 1990; Lester, 1989; Maltz, 1988; Silon, 1992), and physical abuse (Carlson, 1994). Additionally, the essence may itself shift in frequency due to the perception of a threat. This could be viewed as a defensive effort by the essence to avoid physical and/or emotional pain, a hypothesis that is consistent with the general view that dissociative symptoms in incest survivors serve an adaptive and defensive function (Greer, 1994; Lester, 1989; Silon, 1992).

A final psychogenic factor, which has not been cited directly in the literature as a cause of NDEs, is that of meditative states. According to the present theory, shifts in the essence frequency, probably with concomitant shifts in the body's frequency, can be induced consciously and willfully through meditation and related techniques. This would probably require training and practice, and may bear some relation to Eastern philosophical and religious traditions. It has in fact been shown that meditative states can result in altered states of consciousness (Khatami, 1978) and OBEs (Dane, 1975-76; Grosso, 1976).

Shifts in the Equilibrium of Glucose Oxidation

A final source of frequency changes lies in the most vital chemical reaction occurring in the brain: the oxidation of glucose. The brain

depends completely on the oxidation of glucose for all its energy needs (Powers, 1990); glucose and oxygen react to form products, including water and carbon dioxide, and energy is released in the process. As with any chemical reaction (Levine, 1978), glucose oxidation is an equilibrium between reactants and products. Thus the reaction can be slowed or stopped by an increase in the concentration of the products, such as carbon dioxide, or a decrease in the concentration of reactants, such as oxygen. As the reaction slows, so necessarily must the rate of neural firing.

The theory of essence posits that a decrease in neural firing causes a shift to lower dipolar oscillation rates in the brain and/or body, which at some point must lead to essence/body dissociation. Certainly at the point of physical death, which could be defined as the complete cessation of the glucose oxidation reaction, dissociation must begin. Short of death, other physical conditions such as severe physical injury or illness can effect at least a partial dissociation.

Again, the literature supports this contention of the theory. Autoscopic phenomena have been associated with toxemia of pregnancy and severe infection (Devinsky, Feldmann, Burrowes and Bromfield, 1989). Dissociative symptoms can be associated with physical illness (Ross, 1994). Full-blown NDEs are very often triggered by cardiac arrest (Sabom, 1982), drowning, physical injury, and illness (Moody, 1975; Ring, 1980). And hypoxia, the lack of oxygen, and hypercapnia, an excess of carbon dioxide, have been cited as integral factors in materialistic theories of the NDE (Morse, Venecia and Milstein, 1989; Saavedra-Aguilar and Gómez-Jeria, 1989).

Perhaps most telling are the results of a technique known as carbon dioxide therapy (Meduna, 1950), in which carbon dioxide levels in the blood of subjects was intentionally elevated. Of all the suggested factors for NDE causation reviewed by Sabom (1982), this was the *sole* factor having effects closely resembling the NDE. The strong similarity between the NDE and the effects of carbon dioxide therapy led Sabom (1982) to propose that the build-up of carbon dioxide in the brain was a trigger for the NDE. From the perspective of the theory of essence, this proposal makes chemical and electromagnetic sense and is eminently reasonable.

Conclusion

The preceding discussion demonstrates that the theory of essence has strong predictive validity, integrating the effects of four classes

of factors (internal and external electric fields, psychoactive drug action, psychological factors, and glucose oxidation equilibrium factors) into a single mechanism that accurately predicts effects along a continuum from psychiatric dissociative symptoms through OBEs to complete NDEs. While the theory does not treat the temporal lobe as the "seat of the soul," as Morse has suggested, it does present the tertiary areas of the brain as, in some sense, the "anchor of the essence."

The present work has shown that interactionism is a viable scientific concept, once liberated from its historical shackles. The triangular definition of dualism, in terms of substance, reduction, and survival, removes the focus on physical properties or the lack thereof, and frees dualists to employ the results of more than three centuries of scientific inquiry. In so doing, the interactionist discovers that the physical and nonphysical can in fact be compatible and complementary, rather than contradictory. The resulting theory corrects the misconceptions of dualism's critics, while supplying a reasonable picture of dualistic interactionism. Of course, this picture generates many new questions, and many old ones remain. But this is axiomatic in science, and provides directions for future inquiry.

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Near-Death Experiences and the Theory of the Extraneuronal Hyperspace

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ABSTRACT: It is possible and desirable to supplement the traditional neurological and metaphysical explanatory models of the near-death experience (NDE) with yet a third type of explanatory model that links the neurological and the metaphysical. I set forth the rudiments of this model, the Theory of the Extraneuronal Hyperspace, with six propositions. I then use this theory to explain three of the pressing issues within NDE scholarship: the veridicality, precognition and "fear-death experience" phenomena.

Many scholars who write about near-death experiences (NDEs) are of the opinion that explanatory models of the NDE can be classified into one of two types (Blackmore, 1993; Moody, 1975). One type of explanatory model is the metaphysical or supernatural one. In that model, the events that occur within the NDE, such as the presence of a tunnel, are real events that occur beyond the confines of time and space. In a second type of explanatory model, the traditional model, the events that occur within the NDE are not at all real. Those events are merely the product of neurobiochemical activity that can be explained within the confines of current neurological and psychological theory, for example, as hallucination.

In this article, I supplement this dichotomous view of explanatory models of the NDE by proposing yet a third type of explanatory model: the Theory of the Extraneuronal Hyperspace. This theory represents a

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combination of the two types of explanatory models in that it relies on current neurobiological concepts yet attempts to link them to the possibility of the existence of a hyperspace. The reader should be forewarned that the Theory of the Extraneuronal Hyperspace that I offer below is not at all exhaustive. Rather, it is offered merely as the beginning of what I hope will be a long debate within the scientific community as to the nature of the interaction that exists between the neurological and the metaphysical.

Accordingly, I have organized this article as follows. First I will discuss the definition and explanatory models of the NDE. Next, I will discuss three phenomena that need to be explained by any explanatory model of the NDE: the veridicality, precognition, and "fear-death experience" phenomena. Finally, I will offer and apply my Theory of the Extraneuronal Hyperspace.

Definition and Explanatory Models of the NDE

Definition of the NDE

Of the many current definitions of the NDE, there are three that are of particular relevance to this article. A first definition is Raymond Moody's (1975) characterization of the 15 elements of the typical NDE. That definition is relevant to the extent that the issue under discussion in this article is whether or not these 15 elements described by Moody, such as a ringing noise and dark tunnel, are real events or merely the products of the imagination.

A second relevant definition is Kenneth Ring's (1980) five-stage model of the NDE. The issue once again is whether some of the stages described by Ring, such as the out-of-body stage, are real or imagined events. Finally, Bruce Greyson's (1985) typology of NDEs is relevant. Greyson proposed that there are three possible types of NDE: those dominated by transcendental features, affective features, or cognitive features. Most relevant to this article is the question of the extent to which the transcendental features, such as seeing mystical beings, and cognitive features, such as a life review, are real experiences.

Explanatory Models of the NDE

Traditional models. Traditional models of the NDE abound. A first and popular hypothesis is the *dying brain hypothesis* (Blackmore, 1993), or, when the cause of death is hypoxia, the *hypoxic brain hypothesis*

(Moody, 1975). Simply put, both hypotheses maintain that NDEs are not real experiences, but are merely the natural result of a dying brain. A second hypothesis, the *pharmacological hypothesis* (Moody, 1975), maintains that the NDE is the result of drugs that were administered or taken by the individual. A third hypothesis, the *hallucination hypothesis* (Moody, 1975), points to the similarities between the NDE and certain kinds of hallucinations, such as autoscopic hallucinations, in which individuals are able to see a visual image of themselves from the neck up.

Several authors have recently argued that the NDE represents memories that are activated by the stress of being near death. Melvin Morse, David Venecia, and Jerrold Milstein (Morse, Venecia, and Milstein, 1989) have argued that these memories are genetically coded. Jean-Pierre Jourdan (1994) has argued that the stress of being near death results in the blockage of those receptors responsible for the formation of new memories. Consequently, internal memories are awakened, resulting in the experience that is the NDE. Finally, Juan Gómez-Jeria and Juan Saavedra-Aguilar (1994) have argued that prior memories combine with the information contained in near-death stimuli to result in a credible "story" that is told by the subject as an NDE.

Moody (1975) discussed and, in some cases, refuted a number of the preceding hypotheses and explanatory models. Nevertheless, I believe that research on traditional explanatory models of the NDE is valuable research that should continue. Having said that, it seems to me clear that the real challenge faced by *any* explanatory model of the NDE is to address the three anomalous phenomena that I will discuss below.

Metaphysical models. Two decades before Moody named the NDE, Carl Gustav Jung (1955) confronted with such an experience in one of his patients, speculated on the possibility that thoughts and perceptions might have a separate metaphysical existence. Indeed, since the time of Jung's writing, there have been several scholars who have speculated that the out-of-body experience occurs outside the confines of our three-dimensional existence (Greene, 1983b); and some scholars have argued that the NDE occurs outside of the confines of our three-dimensional existence (Ring, 1980, 1982; Sabom, 1982). Ring (1980), in particular, has argued that at death, consciousness occupies a fourth dimension. Kenneth Arnette (1992, 1995) has argued that the tunnel in NDEs may very well be a cosmological wormhole, through which experiencers travel to another universe in which three-dimensional conceptions of time and space are no longer valid. Deno Kazanis (1995) has argued

that the mysticism of the NDE is simply a reflection of cosmological dark matter.

Perhaps the author who has been most explicit in modeling a hyperspatial approach to NDEs is Gordon Greene. In a series of articles, Greene (1980, 1981, 1983a, 1983b, 1999; Greene and Krippner, 1990) has set forth a topological model of the relationship that exists between the third dimension and higher dimensions. He has used this model to comment on the nature of the life review within the NDE (Greene, 1981), the experience within the NDE of simultaneously possessing two bodies (Greene, 1983a), and the separation of consciousness from the physical body in NDEs (Greene, 1999).

In his hyperspatial analysis of the life review, Greene wrote that the motivation for his analysis was that "any purely neurological theory cannot account for the paranormal effects surrounding some NDE life reviews" (1981, p. 120). He argued further that the present challenge for near-death research is to understand "the laws of topological transformation between space and hyperspace" (p. 121). Greene then went on to suggest that when a three-dimensional being achieves sufficient "depth" in hyperspace, and time achieves a dimension of space, then both past and future may be seen. This phenomenon explains both the life review and the phenomenon of precognition, in which a near-death experiencer returns with predictions about the future. Presciently and insightfully, Greene ended that article by speculating that the neurological and hyperspatial explanations of the NDE were not necessarily mutually exclusive. He wrote: "It may be that [the two explanations] account for the vision on different levels" (p. 129). I shall have more to say below about Greene's speculation about a possible relationship between the neurological and hyperspatial explanations of the NDE; but first I will consider the nature of the veridicality, precognition, and "fear-death experience" phenomena, three anomalies that pose a remarkable challenge to traditional explanatory models of the NDE.

The Veridicality, Precognition, and Fear-Death Experience Phenomena

The Veridicality Phenomenon

The veridicality phenomenon arises when near-death experiencers return from their NDEs with veridical or truthful accounts of things, processes, or people that they observed during the time that they were presumably dead, near death, or, at a minimum, unconscious. For

example, Ring (1980) gave an account of a woman with lifelong blindness who discussed the resuscitation equipment and procedures that she observed during her NDE. Blind from birth, she could not possibly have had personal knowledge of these things. Indeed, accurate observations by the blind constitute some of the most objective evidence for the existence of the veridicality phenomenon, in that it is difficult, if not impossible, to argue that the blind individual is fabricating or prevaricating about things previously seen. Ring has continued his work in identifying these kinds of cases (Ring and Cooper, 1997; Ring and Lawrence, 1993). Cases of veridical observations have also been discussed by others (Moody and Perry, 1988).

The veridicality phenomenon presents the traditional explanatory model of the NDE with a significant problem indeed. Consider, for example, the proposition that the NDE represents the activation of previously genetically encoded memories (Morse, Venecia, and Milstein, 1989). The problem that such a theory confronts is that genes were encoded at least one generation *before* the resuscitation technology was developed. It becomes difficult therefore to explain how NDErs can observe resuscitation technology and procedures that had not even been discovered at the time that their genes were encoded. Other traditional explanatory models that take the NDE-as-memory approach (Gómez-Jeria and Saavedra-Aguilar, 1994; Jourdan, 1994) confront a similar temporal problem of how the memory of the event could possibly precede the actual occurrence of the event.

The Precognition Phenomenon

The precognition phenomenon arises when some NDErs are able to make predictions about the future after their experience. A dramatic example of this phenomenon was seen in the case of Dannion Brinkley, one of Moody's NDE subjects. Brinkley returned from his NDE with predictions about the Persian Gulf War and the fall of the Soviet Union years before those events actually came to pass (Brinkley and Perry, 1994). Others (Lundahl, 1993; Ring, 1982) have discussed the precognition phenomenon in greater detail.

Traditional explanatory models of the NDE confront a different sort of temporal problem in their attempts to explain the precognition phenomenon. In the case of the veridicality phenomenon, the issue concerns how someone can have a memory of an event that is happening in the present. In the case of the precognition phenomenon, there is no possible memory or other traditional frame of reference; the individual is

actively making a prediction about an event that has not even occurred. Even within the traditional model, it sounds remarkably unpersuasive to argue that the individual's active prediction is based on the memory of an event that has not yet occurred.

The Fear-Death Experience Phenomenon

Finally, the "fear-death experience" phenomenon is based on a study by Ian Stevenson, Emily Cook, and Nicholas McClean-Rice (1989–1990), in which they reported that 83 percent of hospital patients with NDEs subjectively believed that they were near death. However, only 45 percent of those hospital patients were actually objectively near death, while 55 percent were not. Stevenson, Cook, and McClean-Rice referred to the latter group of patients as individuals with "fear-death experiences." Others (Floyd, 1996; Gabbard and Twemlow, 1991) have studied, corroborated, and expanded upon this phenomenon originally identified by Stevenson, Cook, and McClean-Rice.

In contrast to their explanation of the veridicality and precognition phenomena, traditional explanatory models of the NDE are on surer footing in explaining the fear-death experience. Specifically, the emphasis of traditional models on the stress of being near death (Morse, Venecia, and Milstein, 1989) is consistent with the fear-death experience's emphasis on the fear of being near death as a critical factor. The problem that arises is that many of the aspects of the conventional NDE, such as precognition (Floyd, 1996), are also present in fear-death experiences. Accordingly, the difficulties that are encountered with traditional explanations of those aspects of the NDE are also present with traditional explanations of the fear-death experience.

In view of these three anomalous phenomena and the efforts of the traditional explanatory models to explain them, the question that arises is whether any insights can be gleaned from the Theory of the Extraneuronal Hyperspace, to which I now turn.

NDEs and the Theory of the Extraneuronal Hyperspace

As discussed above, there are near-death scholars who have actively considered the possibility of a hyperspatial theory of the NDE. In addition to those specific individuals, it is testimony to the openmindedness and scientific integrity of near-death researchers that many of them are calling for and engaging in discussions about the NDE that extend beyond the traditional explanatory model.

As an affirmation of this openmindedness, reconsider Jung's suggestion that there might be in the human organism a "nervous substrate . . . which is absolutely different from the cerebrospinal system . . . that can evidently produce thoughts and perceptions" (1955, p. 124). I argue that this substrate of the nervous system may very well be an *extraneuronal hyperspace*. Under my Theory of the Extraneuronal Hyperspace, neurotransmitters are important not only because of the effect they have in the three-dimensional realm, but because of the effect they have beyond the third dimension, in hyperspace.

Six Propositions of the Theory of the Extraneuronal Hyperspace

I propose that there are six basic propositions of the Theory of the Extraneuronal Hyperspace.

The transduction proposition. The first proposition is the *transduction proposition*. Specifically, neuroscientists have asked how the human brain controls thought, and this particular question has generated an impressive body of theories and empirical research. I argue that an equally plausible but unasked question is *how thought controls the brain*. In answering this question, I postulate that the brain is itself an organ of signal transduction. The theme of signal transduction is a powerful and recurrent one within the neurosciences. For example, the Pacinian corpuscles transduce pressure to electrical signals, while the eye transduces photons to electrical signals. It seems plausible that the signals received by the brain, a separate neural organ, are also transduced by it.

The complexity proposition. The second proposition, a *complexity proposition*, refers to the nature of the signals that are transduced by the brain. Although conceivably any kind of neuronal signal is a potential candidate for transduction by the brain, it seems more plausible that signals that have already been made complex within the cortex are the chief candidates for transduction by the brain. For example, neuroscientists now believe that vision involves a building up of the simple signal registered by the neurons of the retina. Although the signals move from the retina to the occipital lobe, they do not remain there, but are channeled through ganglia of increasing complexity, such as the parvocellular-blob system (Kandel, Schwartz, and Jessell, 1991).

It seems reasonable then to argue that these signals that have already been made complex are the prime candidates for becoming more complex. I shall use the term *extraneuronal element* or *cognon* to refer

to any signal, simple or complex, that has been transduced by the brain. The extraneuronal element or cognon is the most basic unit of analysis for understanding the extraneuronal hyperspace; its closest intuitive approximation is that it is the most basic unit of a "thought." Aggregations of extraneuronal elements are, of course, possible.

The hyperspace proposition. The third proposition of this theory, the *hyperspace proposition*, concerns the place to which the brain transduces these extraneuronal elements or cognons and their aggregations. It seems plausible, for the following four reasons, to argue that extraneuronal elements are transduced into an energy form and a space beyond the three dimensions, that is, a *hyperspace*. One reason is that such a transduction from three-dimension space into the hyperspace through an Einstein-Rosen "hyperspace tunnel" is possible at the level of theoretical physics (Rucker, 1984). As noted above, some scientists have already begun to think of the NDE tunnel as a wormhole into another dimension. I suggest that comparable means of interdimensional transport exist in connection with the physical brain to allow transduction of energy or matter. A second reason to accept the hyperspace proposition is that it can explain how the massive amount of electrical information processed and received by the cortex can be stored and processed. A third reason is that a hyperspace explanation explains how those who leave their bodies in an NDE can see and hear those around them, but cannot themselves be seen or heard (Brinkley and Perry, 1994): they are, at that point, inhabitants of a dimension higher than, and subsuming, our three-dimensional world.

A fourth reason to appeal to a hyperspace explanation of consciousness is to explain the empirically observed phenomenon of *time delays of consciousness*. With respect to actions consciously willed by individuals, a series of experiments by different investigators have demonstrated that "conscious action takes something like a second to a second and a half before it can be effected, while . . . consciousness of an external event does not seem to occur until half a second after that event has taken place" (Penrose, 1989, p. 439). The most interesting aspect of these experiments however, is that the individual does not perceive any time as having elapsed.

One possible explanation for this anomaly is that perceptions or thoughts live in hyperspace, where time is a manipulable variable. Indeed, the ratio of hyperspace time to three-dimensional time is extremely, if not infinitesimally, small, so that things that take a long time in the three-dimensional world take very little time in hyperspace. For example, the beings whom Brinkley met in hyperspace were able to

show him his entire life in review and the future of Earth spanning more than 20 years, all in less than 30 minutes of three-dimensional Earth time (Brinkley and Perry, 1994); this point regarding the timelessness of the life review in a higher dimension was also made by Greene (1981). Accordingly, in the experiments mentioned above, volitional movement recorded by electroencephalogram (EEG) shows that three-dimensional time has elapsed, but in the consciousness, which lives in hyperspace, no time or very little time has elapsed.

The bidirectionality proposition. A fourth proposition on which I premise the Theory of the Extraneuronal Hyperspace, the *bidirectionality proposition*, states that there can be transduction both *into* and *out of* the extraneuronal hyperspace. Note that the hyperspace remains a part of the nervous system. It is therefore not *extraneural*, but merely *extraneuronal*, raising the possibility of not just central and peripheral nervous systems, but an extraneuronal nervous system as well.

Conceivably, there can be transduction of certain types of signals into or out of the extraneuronal hyperspace through preferred loci in the brain, for example, speech through Wernicke's area in the left hemisphere. But these are only *preferred* and not *required* loci. The Theory of the Extraneuronal Hyperspace therefore explains the empirically observed phenomenon in which humans who have had their corpus callosum surgically severed, although having no connection between the left and right hemisphere, are ultimately able to "learn to speak" with the right hemisphere (Penrose, 1989, p. 385). This is possible because it is primarily thought that preexists and controls the neurons, rather than the other way around. New hyperspace channels can therefore be forged through different loci in the brain, to make the transduction of thought out of the extraneuronal hyperspace possible.

I am willing to concede that sensory input from the outside world can alter the shape of consciousness in hyperspace. There is, after all, transduction of sensory input *into* the hyperspace. However, it is the nature and quality of the input that matters in that instance. Here I mean only to emphasize that, holding the nature of input constant, activity in hyperspace can affect the location through which thought is transduced out of the hyperspace into the three-dimensional brain.

The matrix proposition. A fifth proposition, the *matrix proposition*, concerns the manner in which the extraneuronal elements or cognons organize themselves in the extraneuronal hyperspace. I will call this organization the *extraneuronal matrix*, which is equivalent to "the mind." Positing the existence of an extraneuronal matrix makes possible the explanation of a number of puzzling phenomena. For example, if there

are specialized sensory cognons within the extraneuronal matrix, then it becomes possible to explain how we can "see with our mind's eye": the explanation is that such visualization is occurring in hyperspace.

However, transducing into the three-dimensional brain what has been seen in hyperspace is a problem fraught with great physical difficulty; for example, neurons have to be resynapsed. Those rare individuals who are able to transduce out of the extraneuronal space with relative neuronal efficiency are often very productive artists. For example, my productivity as a musical composer is limited simply because the quantity and quality of music that I hear in my mind's ear far outstrips my capability to transduce it from my extraneuronal space into my three-dimensional brain; Mozart had no such problem. This explains why blind persons who have NDEs can now see: their separation from the body means that transduction out of the extraneuronal hyperspace through nonfunctioning three-dimensional neurons in the optical system is no longer necessary. As another example, anesthetized surgical patients are able to respond to the surgeon's request that they control their own blood flow simply because their minds remain functional despite the anesthetized state of their brains.

The tunnel closure proposition. A sixth proposition on which I premise the Theory of the Extraneuronal Hyperspace, the *tunnel closure proposition*, is that states of physical alertness correspond to the degree of closure of the Einstein-Rosen hyperspace tunnel and the amount of transduction in both directions through the hyperspace tunnel. For example, sleep and NDEs correspond to different states of limited and reversible closure of the hyperspace tunnel. Death, on the other hand, corresponds to a permanent and irreversible closure of the hyperspace tunnel, as well as an irreversible separation of the extraneuronal matrix from the physical body. At the point of death, the most recent extraneuronal matrix becomes a part of what some have called the *metaconsciousness* (Whitton and Fisher, 1986): evidence from regression to apparent memories of past lives suggests that the most recent extraneuronal matrix, along with prior extraneuronal matrices, may be accessible through hypnosis, although a new extraneuronal matrix is formed with each new incarnation.

The Veridicality, Precognition, and Fear-Death Experience Phenomena

Based on these six propositions of the Theory of the Extraneuronal Hyperspace, the three phenomena discussed above—veridicality, precognition, and the fear-death experience—are reduced to one question.

That is, what is the nature of the interface between the three-dimensional body and hyperspace? The reason that the question of the interface is most significant is that the veridicality and precognition phenomena can be explained mainly by assuming the *existence* of an extraneuronal hyperspace. However, the mere existence of an extraneuronal hyperspace is not sufficient to explain the fear-death experience.

Specifically, precognition is possible because time is a manipulable variable in the hyperspace. Accordingly, as Greene argued (1981), when an individual reaches the appropriate level or dimension in hyperspace, he or she is able to see the past and the future, giving rise to the subjective experiences of the life review and precognition. Veridical observations are possible because the individual is actually seeing and hearing three-dimensional activity from the vantage point of hyperspace. As discussed in the matrix proposition above, the sight and sound sensory modalities remain functional, and indeed become even more functional, once they have been separated from a three-dimensional body.

With regard to the fear-death experience, I suggest that neurotransmitters play a clear role in inducing the experience. However, it is possible to integrate neurotransmitters into the Theory of the Extraneuronal Hyperspace. One possibility is that the neurotransmitters, in addition to their effect on the physical neurons of the brain, have a simultaneous extradimensional impact that cannot be detected by our present instruments. Under this explanation, the neurotransmitters make possible a temporary closure of the hyperspace tunnels, allowing a temporary separation of the extraneuronal matrix from the physical body. A second possibility is that the neurotransmitters may affect another three-dimensional object that in turn has the extradimensional effect on the hyperspace tunnels.

Conclusion

In sum, an explanation that integrates neurotransmitters into a discussion of hyperspace makes it possible to understand veridical observations, precognition, and the fear-death experience as real phenomena. It is not necessary for the theory to ignore these phenomena, or to assert that they do not really exist.

Of course, the Theory of the Extraneuronal Hyperspace, if true, has implications beyond the NDE. Consider for example, the mystery of the concussion, in which an individual who has lost consciousness after a blow to the head regains consciousness with no evidence of neuronal damage (Andreoli, Bennett, Carpenter, Plum, and Smith, 1993). One

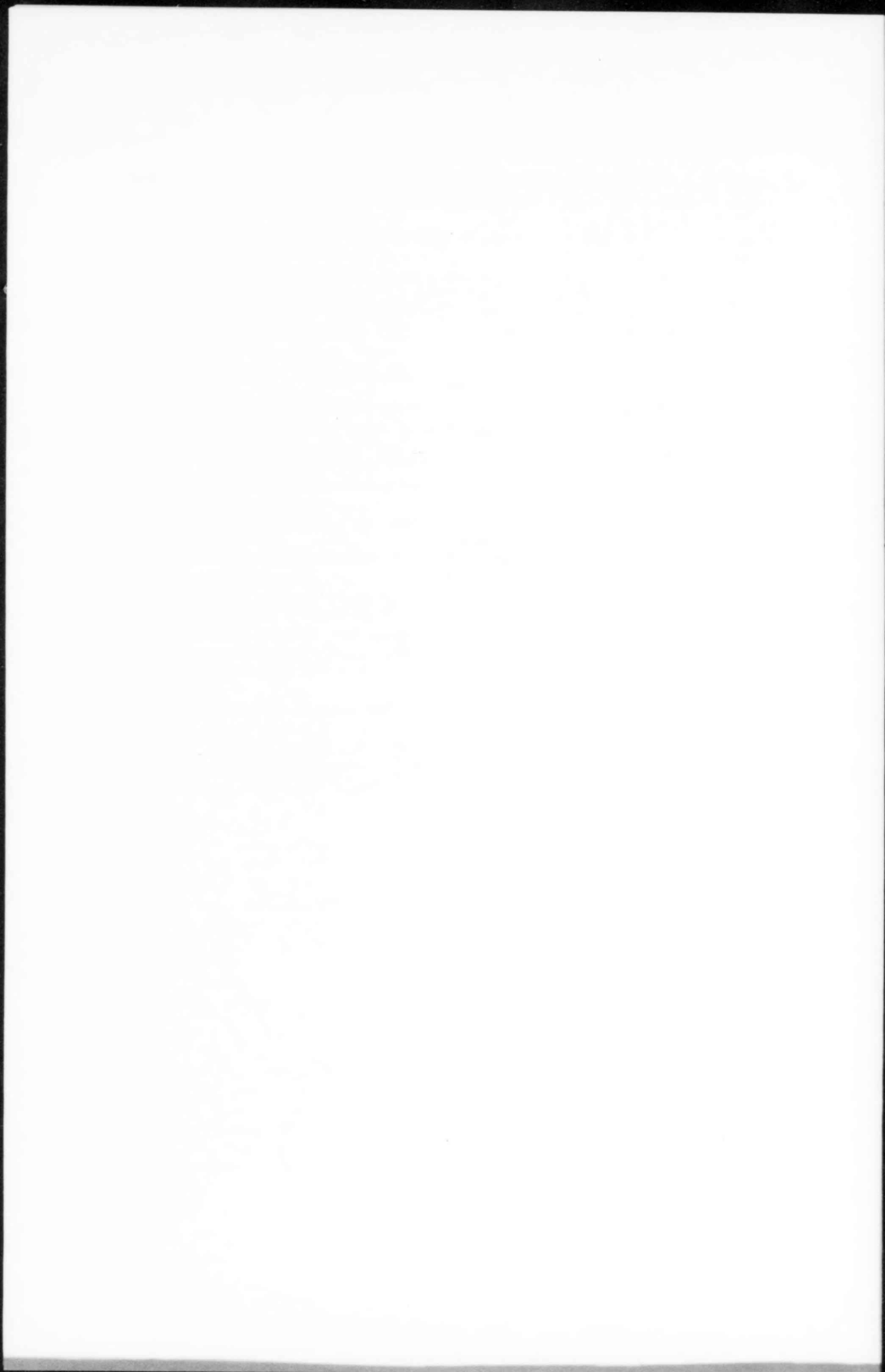
speculation from the Theory of the Extraneuronal Hyperspace as to why this might be so is that a three-dimensional displacement of the brain, perhaps the ventricles, may result in an extradimensional displacement, perhaps of the extraneuronal matrix, with a temporary closure of the channels of transduction and, consequently, loss of consciousness. Extradimensional realignment produces a reopening of the channels and regaining of consciousness in the three-dimensional world. Yet no damage can be observed in the three-dimensional brain because the real damage was extradimensional.

This then is work for another day. For now, I offer the Theory of the Extraneuronal Hyperspace as a beginning in many respects. But in other respects it is also a continuation, a continuation of the voices of the many of us who believe that we scientists have underestimated the role of the hyperspace in our daily lives, as well as our deaths. With this continuation then, it is my fervent hope that someday our voices will be heard not occasionally, but collectively, as a single, wonderful, and intellectually mellifluous chorus.

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BOOK REVIEW

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Light and Death: One Doctor's Fascinating Account of Near-Death Experiences, by Michael B. Sabom. Grand Rapids, MI: Zondervan, 1998, 240 pp. \$12.99.

Light and Death is cardiologist Michael Sabom's second fascinating book presenting his research on the near-death experience (NDE) and its aftereffects. Sabom's landmark first book, *Recollections of Death: A Medical Investigation*, published 17 years ago, remains in my opinion the most important scientific study of the phenomenon. *Recollections of Death* was described, in a review appearing in this journal, as "sober and objective" (Grosso, 1981, p. 172). Although these terms generally characterize his new work as well, Sabom in *Light and Death* brings to bear not only science and medicine but also religion—specifically, Biblically conservative Christianity. This addition makes for a book that is sure to spark controversy.

Although *Light and Death* is more popularly written than was *Recollections of Death*, Sabom the scientist and medical researcher is very much in evidence in both books. In *Recollections of Death*, Sabom explained that interviewing each participant as soon as possible after the near-death event was important not only because then the details would still be "fresh in his [or her] mind" but also because "an early interview would minimize the possibility that the content of the patient's experience has been influenced by discussions with family members, by reading materials on the subject and so forth" (p. 11). In the new "Atlanta Study" reported in *Light and Death*, this concern with collecting fresh, unadulterated data continues. Sabom used previously uninterviewed, naive hospital cases and refrained from using the possibly ideologically

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influenced International Association of Near-Death Studies (IANDS) participant pool.

Other "sober and objective" methodological features evident in both books are: generally adequate sample sizes (in *Light and Death*, 160 patients, although one subsample totaled a mere 12 participants); use of standard and relatively neutral interview protocols; documentation and classification of participants' near-death physical crises; tape recording and transcribing of participants' interview responses wherever possible; standard questionnaires to quantify key variables such as "depth" of the NDE independently; and comparisons using nonNDE and other control groups (we will note faith-defined participant groups used uniquely in *Light and Death*).

Beyond common methodological scruples, research findings are similar in both books—although, as we will see, faith-related aftereffect findings are emphasized in *Light and Death*. The Atlanta study in *Light and Death* replicated Sabom's previous findings that: NDEs represent a fairly reliable pattern; NDEs are not more prevalent or deeper as a function of particular educational, social, or religious background, or type of near-death crisis event; NDEs *are* more prevalent and deeper, however, in cases where the near-death was prolonged or severe; attitudinal and other aftereffects such as reduction in fear of death are attributable not just to the near-death event but specifically to the NDE; and the accuracy of NDE visual recollections of the medical scene is substantiated by medical records. One recent reviewer (Glynn, 1997) evaluated Sabom's evidence as "the hardest to quarrel with [in the literature], given his initial skepticism, the meticulous care of his methods, and the unique access he had to patients and their medical records" (pp. 116–117).

The accuracy finding is also supported in the new 1998 book through a case study. Although Sabom in *Light and Death* did not re-employ his widely noted 1982 baseline role-play control group, he did present meticulously the extraordinary surgery case of Pam Reynolds. Removing her brain aneurysm required an astounding medical procedure: cooling and removal of all blood from her body! Her body was accordingly in a state of advanced clinical death for over two hours: no heart beat or blood pressure, no breathing, no brain waves. Is it mere coincidence that Reynolds also had the deepest NDE of all participants in the Atlanta study? Most pertinent to the present point is that Reynolds—despite her closed eyes, plugged ears, and extraordinary degree of clinical death—recalled even the peculiarities of her surgery's procedures and instruments with astonishing accuracy.

Although this case study is prominent, the main focus of *Light and Death* is on faith-related aftereffects. Again, Sabom replicates his previous findings. Sabom had found in 1982 especially among his NDE participants a post-NDE "deepening of religious beliefs, a changing of vocational interests (e.g., becoming hospital volunteers) and a focusing on more humanitarian concerns" (p. 157), as well as "a new personal interest in the caring and loving aspects of human relationships" (p. 132). Similarly, in 1998 Sabom found that "intrinsic [faith or] beliefs were strengthened at the expense of . . . extrinsic religious behavior," such as (in the words of one participant) "the little country club things that go on in the churches" (p. 88). Other replicated aftereffects include a diminishing of interest in material gains; an increase in one's desire to pray or meditate; and an increase of belief in God and life after death. In the light of such faith-related aftereffects, Sabom concludes in *Light and Death* "that the NDE involves the general revelation of God" (p. 212).

NDE research is not always consistent, however. Indeed, a major stimulus for the Atlanta study was a contradiction between certain findings by Sabom and those of psychologist Kenneth Ring. Despite the deepening-of-intrinsic-faith finding, Sabom had also found in 1982 that

no change in the basic type of religious belief occurred—that is, no agnostic became a [Christian] believer [although belief in God increased], no Protestant a Catholic, no Catholic a Jew. This strengthening of previous beliefs was usually evidenced by a *marked increase in formal religious activity* or personal commitment. (p. 130; emphasis added).

In contrast, Ring (1984) and others found a *decrease* in formal religious activity such as church attendance as well as changes in basic religious orientation, especially, away from conservative Christian beliefs and toward a more universal spiritual perspective.

Realizing that "much of the religious controversy surrounding the NDE hinged on this . . . apparent contradiction" (p. 16), Sabom made its investigation a major thrust of the Atlanta study. Paralleling Ring's Religious Belief Inventory, Sabom devised and administered a Spiritual Beliefs questionnaire to assess religious orientation. Using the Spiritual Beliefs questionnaire, he divided his sample into conservative Christian NDErs (defined by agreement with items such as "The Bible is inerrant [without error]" and "Nonacceptance of Jesus Christ as Lord and Savior condemns one to hell in the afterlife"), liberal Christian NDErs, nonChristian but God-Believing NDErs, and nonNDEr controls. The 1998 results replicated his 1982 findings and again contradicted Ring's: Sabom again found that very few of his NDErs "changed

their religious doctrine or affiliation following their NDE" (although I wonder whether NDE survivors still classifiable as "conservative Christian" might nonetheless have become less likely to agree specifically with the Spiritual Beliefs Questionnaire item that non-believers in Christ are condemned to Hell), and that "church attendance *increased* in conservative Christians, liberal Christians, and God-believers alike" (p. 140).

Sabom resolves this apparent contradiction in *Light and Death* by acknowledging in effect that his participants, although "fresh," did bring particular life contexts or frames of meaning and expectation to their experience. Sabom observed that, after all, "the presuppositions we bring to an issue [or experience] can direct our conclusions" (p. 213). More specifically: "All NDErs are imbued with a sense of increased spiritual fervor, but the direction in which this fervor is expressed is determined by other influences" (pp. 140–141), a point of which theology professor Carol Zaleski (1987) has made us well aware. Hence, the presuppositions and influences of Ring's free-thinking New England, IANDS-influenced (read: New Age-oriented) sample directed those participants toward universalist fervor regarding their experience, whereas the presuppositions and influences of Sabom's Bible Belt rural Southeastern participants generally directed *them* toward aftereffects in terms of conservative or liberal Christian activities and beliefs. Indeed, one NDE survivor, after joining a Christian church and thereby gaining new influences, reinterpreted the entities she had met from being "Spirit People" to being "Jesus and the Angels" (Cox-Chapman, 1998, p. 17).

Sabom's point is best articulated in external validity terms. There would appear to be good external validity or generalizability to diverse human populations for the statement that NDEs tend to induce in the experiencer movement toward a more intrinsic faith in God centered on a profound love—and *away* from the *trappings* of conventional or traditional religious social activity ("the little country club things that go on in the churches"). Consistent with this "intrinsic" movement are the earlier-noted faith-related aftereffects that may reflect "general revelation." There is *poor* external validity to claims that NDEs prompt abandonment of, say, Christianity in favor of more universalistic or mystical orientations; such an effect is observed only for those samples that are culturally influenced in such a direction.

Within broad parameters of love, then, the NDE *per se* appears to be quite adaptable—an attribute that researchers such as Ring in his most recent works (Ring, *in press*; Ring and Valarino, 1998) have evaluated

in a positive light:

This [divine vision of love] is not, of course, to suggest that the knowledge that stems from the NDE is meant to substitute for one's own faith or spiritual tradition. No, it is rather that the lessons from the Light are more akin to Type O blood in transfusions: They are the "universal donor" to spirituality and religion in that they fit easily and well into a variety of well-established spiritual traditions and world religions. And, more than that, as Carol Zaleski . . . has shown, the modern NDE has served not to undermine but to *revitalize* religious faith by providing fresh and compelling stories from ordinary people that ultimately coincide with perennial spiritual teachings from around the world. In this sense, the NDE generally serves to reinforce one's preexisting faith by *adding* something compatible to it, not by competing with it. On the other hand, while the spiritual teachings of the NDE are obviously not meant to provide the basis of a new religion, much less a cult (!), it is certainly possible that they can offer to those who are not themselves religious, or even to antireligious persons, a point of view that furnishes a credible experiential basis governing moral conduct in the world. In the end, one might say there is only the magnificence and incomparable radiance of the Light. But what one *makes of* this Light is an individual matter. (Ring and Valarino, 1988, p. 302)

Similarly, Patrick Glynn (1997) suggested that

the cumulative theology of the near-death experience—if it can be called that—tends to add to its plausibility. For it tracks very closely with that of the Bible—and with a core moral vision in many respects common to all major religions—while failing to confirm some of the detailed doctrines, and certainly the prejudices, of particular sects. (p. 130)

Sabom's "general revelation of God" is similar to Ring's "universal donor" knowledge and Glynn's "core moral vision." Sabom would disagree with Ring and Glynn in at least one crucial respect, however. Whereas to Ring the NDE's adaptability to specific religious directions is a plus, to Sabom this adaptability entails a *potential* spiritual danger—especially for those NDErs or interested observers not rooted in conservative Christianity. For example, Sabom sees universalistic or New Age religious directions from the NDE (humans as essentially divine, universality of heaven, reincarnation, etc.) as not merely different but rather as wrong and misleading in a spiritual sense. New Age-oriented directions from the NDE have been prominent, promulgated by writers such as Ring. Apart from the question of Ring's current position on such directions (they are not featured in his 1998 *Lessons from*

the Light), the issue of what to make of them—whether they are benign adaptations or pernicious adulterations—remains a prominent one. As noted, Ring's finding of post-NDE decreases in church attendance and increases in mystical or universalistic orientation contradicted Sabom's findings and stimulated the Atlanta study.

In addition to Sabom's empirical work on the issue, Sabom addresses the issue in theological terms and elaborates on the "danger" he sees in *Light and Death's* final chapter. In this controversial chapter, Sabom the scientist and medical researcher is much less in evidence; instead we find Sabom the conservative Christian. Unlike the NDE, Sabom writes, the Bible provides us with a clearly directional "road map" for faith. What we make of the NDE is not merely "an individual matter" but requires discernment with the Bible as a guide:

The near-death experiencer is not *directly* meeting God or the *actual* spirits of deceased persons. . . . An uncritical acceptance of the identity of godlike [and other] figures in an NDE can readily lead to attributing falsehood to God; a more objective measure is needed to assess the veracity of commentary from such "Jesus" figures. Here the Bible is our only reliable yardstick. (pp. 214, 221–222; emphasis added)

To some extent, Sabom's thesis is not controversial. That NDE encounters are neither "direct" nor "actual" is consistent with his earlier point regarding contextual "direction" or influence and is supported not only by the Bible but by any sophisticated consideration of the NDE and related phenomena (Zaleski, 1987). Generally, "dying people often employ symbolic [or metaphorical] language that evokes their life experiences" (Callanan and Kelley, 1992, p. 9). In death-bed visions or "nearing death awarenesses," spiritual "travel" may be expressed in the imagery of airplanes, boats, or buses, especially by pilots, sailors, or bus drivers, respectively (Callanan and Kelley, 1992); that the dying persons will not actually "travel" to heaven in their familiar vehicles is obvious. Similarly, in the NDE, an experiencer with mainly rural or outdoor life experiences may describe the tunnel as a valley or cave and the border as a stream, while the lifetime urban dweller may describe a cylinder and a door, respectively. Whatever the tunnel and the border phenomena are, they are only metaphorically and not "directly" or "actually" experienced.

The same point pertains to the light. Generalizing from his interview data, researcher and theologian Philip Berman (1995) concluded: "If we are prepared to meet the Buddha, or Christ, or Shiva, that is what we will call what we encounter" (pp. 104–105; see also Moody, 1975; Osis

and Haraldsson, 1977). In Sabom's *Light and Death* data, the light or spiritual presence was significantly more likely to be identified as "Jesus" or "Lord" by Christians—interestingly, conservative or liberal status made no difference—and as "God," "Supreme Being," or "Source" by non-Christian/God-believing experiencers. Consistent with Sabom, researcher Mally Cox-Chapman (1998) suggested that "experiencers describe their experience in their own cultural context" and reported that

A truck driver said he shot through a tailpipe toward a brilliant light. . . . Jews will call them angels. A person who has had no religious training or conviction described him as he saw him: A Being of light. (pp. 17–18)

It should be noted that these encounters do not conform *entirely* to the experiencers' familiar cultural context and expectations (see Gibbs, 1985, 1997). Maggie Callanan (personal communication, November 18, 1998) provided hospice care for Danny, a terminally ill 25-year-old man who was an atheist. Whereas Danny's mother urged Callanan to help convert Danny into a Christian before it was too late, Danny just as vehemently proscribed any such appeals. One morning, Danny awoke from a semi-comatose state emotionally transformed. His anger and despair had vanished as tears of joy streamed down his face. He exclaimed that he had flown toward and into an all-enveloping, loving light. "Now I know," he said, "that a being of love waits for me." The experience totally dissolved Danny's nihilistic ideas of death. Incidentally, Danny still resisted talk of God or Jesus. His mother stopped attempting to convert Danny, rejoiced in this experience that gave her son such joy and took away his fear of death, and reconciled with her son before he died.

Apart from being surprised at having any such experience, experiencers often "report surprise at the manner in which their experiences unfolded and at what they learned," a "fact" that "adds a dimension of credibility" (Glynn, 1997, p. 130). Cox-Chapman (1995) called such facts "intriguing":

George Jehn, who had only known his best friend Tom as bald with the diabetes that killed him, gets choked up every time he describes seeing his deceased friend during his near-death experience with a full head of curly dark hair. Elinor's father loved having friends and family around. The fact that it still seems odd to Elinor that her father would have turned down her company ["All he said to me was, 'Sweetheart, don't come'"] gives credence to the possibility that her vision is not simply a construct of her imagination. (p. 134)

Then there are what I (Gibbs, 1997) call the "secondary surprises," that is, the startled reactions or even astonishment of persons who hear from the NDEr information that the NDEr is unlikely to have been able to learn in any ordinary way. The parents of a girl who had been comatose were shocked by the accuracy of their daughter's recollection of "vivid details" pertaining to their exact locations, clothing, and activities at home during her hospitalization (Morse and Perry, 1990, p. 7). Dying individuals may share that a friend or relative has died; sometimes the news had been deliberately kept from the dying person, so the announcement or query is startling (Callanan and Kelly, 1992; Kübler-Ross, 1991). Jenny Wade (1996) noted surprising "accounts of meetings with predeceased relatives who were unknown to the subject during life (such as a grandfather or aunt), whose identifications were later confirmed by photographic or anecdotal evidence" (p. 229). Atwater (1999) provided an illustrative case:

The family of Carroll Gray of Atlanta, Georgia is still shocked by the fact that at the age of two, while "dead" of hypothermia, she spoke with a grandfather who had died several years before she was born. After Carroll recovered from her ordeal, not only did she accurately describe the man she saw—by picking out his picture from a family album she had never seen before—but she relayed numerous and exact details about the two-bladed pocket knife he let her play with and his gold watch and chain. . . . She also said her grandfather told her the shiny things belonged to her.

Although her family was overwhelmed by what she told them, no one would give her the "shiny things" as promised to her in death, until, when she was twenty years old, her mother, while sorting through papers, was flabbergasted to find the grandfather's missing will. In it, he had bequeathed his watch, chain, and gold knife to his granddaughter and namesake. At the time of his death, he had no granddaughter or namesake, nor did anyone have any inkling that he expected to have one. . . . Carroll was finally presented the treasures her grandfather said she could have when she "died" at the age of two. (pp. 1-2)

Such accounts of both primary and secondary surprise strike me as too frequent to be dismissed.

Although like other researchers Sabom interprets NDE figures as having indirect or subjective aspects, he too would not ontologically dismiss these accounts as simply illusory—especially given his own findings. Rather, the controversy enters with how Sabom proposes to assess the veracity of the impressions imparted by the figures and the light. Sabom does not go along with the benign assumption, shared among many other researchers, that the light will manifest itself in whatever

form best suits the individual experiencer's needs (see, for example, Berman, 1995; Glynn, 1997; Kübler-Ross, 1991; and Rommer, in press). Rather, Sabom's point is that such NDE figures or forms require discernment; for example, that they may be evil angels masquerading as Jesus in an effort to mislead even conservative Christians. By this argument, the former atheist Danny was misled by a deceiving spirit into thinking that a being of love awaited him, whereas in truth—given Danny's ostensible nonacceptance of Jesus as Lord and Savior—hell awaited him.

Sabom's appeal, then, is to the need for some objective yardstick or road map by which to judge the truth of NDE content. For Sabom, the Bible is that objective criterion of good and evil in the spiritual realm, indeed, is "our *only* reliable yardstick" (p. 222, emphasis added). I have a few caveats here. First, surely other proposed criteria for determining spiritual authenticity (such as those proposed by William James [1903]: immediate luminousness; philosophical reasonableness in light of established knowledge; and moral helpfulness for conduct and character) deserve at least some note. Second, although the Bible may be inspired, reading its truth requires construction or interpretation in a way that reading a road map or yardstick does not. Divine reality is mediated through symbol or metaphor not only in the NDE but in the Bible as well (see, for example, Akenson, 1998; Dunn, 1985; Kane, 1994, as quoted later; and Kugel, 1997). I wish to make a related comment, for what it is worth: when I think of the dying, joyful Danny knowing he's headed for love, I find it hard to believe that he was actually headed for hell; I feel that Danny was right, and that any map or map reading that says otherwise is inaccurate.

There is much more to *Light and Death* than its controversial final chapter. My preference goes to those chapters in which Sabom the scientist and medical researcher is more in evidence. I have already mentioned Sabom's superb recounting of the Pam Reynolds case. Also superb (if less spectacular) are his astute discussions of the definition of death (chapter 3), the role of authority and expectation in physical health and survival (chapter 4), the medical benefits of intrinsic faith and loving family involvement (chapter 5), the therapeutic role of prayer (chapter 6), psychic or "precognitive" aftereffects among Christians and nonChristians alike (chapter 8), and the inadequacy of current reductionist explanations including those of the prominent critic Susan Blackmore (1993) (chapter 10). Even the nonChristian student of the NDE should find these chapters well worth the purchase of the book.

Although Sabom did not "bring [his] theology along" (1998, p. 17) in *Recollections of Death*, he did suggest "that the NDE may involve God" (p. 193). Given my own predilections (Gibbs, 1999), my preferred conclusion for Sabom's *Light and Death* would have harkened back to his inspiring final thoughts in *Recollections of Death*:

My involvement in the lives and deaths of the people in this book has made me humble to the ways of the universe, much like Albert Einstein, who once wrote:

Everyone who is seriously involved in the pursuit of science becomes convinced that a Spirit is manifest in the Laws of the Universe—a Spirit vastly superior to that of man, and one in the face of which we, with our modest powers, must feel humble.

For it is precisely this "Spirit" which has been acknowledged time and time again by the majority of those encountering an NDE. . . . And it is precisely this "Spirit" which seems to live on in the lives of those who were touched by some ineffable truth encountered face to face at death's closest moments.

For now we see through a glass, darkly; but then face to face; now I know in part; but then shall I know even as also I am known. (I Cor. 13:12) (p. 186)

That we see through a glass darkly and should be humble to the ways of the universe is espoused not only by Einstein and Sabom but as well by the eminent philosopher Robert Hillary Kane (1994), who—unlike Sabom—applies this stance to Biblical truth:

We must take seriously the image of seeing "only through a glass darkly." . . . Christians can and should believe that the Bible, and especially the New Testament, contains a large chunk of what is worth knowing about the supreme reality. . . . [But] in view of the uncertainties of transmission, translation, and interpretation, well known to Biblical scholars; in view of what the Bible does not discuss or what it says conflicting things about; and in view also of the continuing revelations of Christian experience, believers in the Bible have no . . . right to hold that it (on their interpretation or any other particular interpretation) is the whole and final truth. . . .

If they [Christians] are true to their beliefs, they must hold that there is some profound truth in the claim that God suffered in Christ out of compassion for the human race. They should insist that this message of divine compassion to the point of participation in human suffering will be part of the final accounting of things religious, and is an important message to all humans, not just to Christians, though it is not wholly understood at present. In other words, they need not

say that the doctrine fails to be objectively true, only that it is not the whole truth and not now completely understood. This is what it means to call it a "mystery." (pp. 167, 169–170)

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BOOK REVIEW

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The Truth in the Light: An Investigation of Over 300 Near-Death Experiences, by Peter Fenwick and Elizabeth Fenwick. New York, NY: Berkley Books, 1997, x + 278 pp., \$12.00.

The Truth in the Light will probably be classed as a popular rather than an academic book; but do not dismiss it for that reason. Peter Fenwick is a very distinguished English neuropsychiatrist and, amongst many other honors, is President of British branch of the International Association for Near-Death Studies (IANDS—UK). Both he and his wife Elizabeth have an enviable clarity of expression and are able to write with that disarming simplicity that comes from a real mastery of the subject. They have provided a book that is exactly the right one to give to any intelligent inquirer who wants to know what the near-death experience (NDE) is and what the brain scientists make of it, and who ought to be asking many of the critical questions about it that the Fenwicks address. And experts on the NDE, such as subscribers to this Journal, will come across many insights that will help set their own thoughts in motion.

Nearly all the cases the Fenwicks quote were obtained by invitation after television or radio programs, or press articles. Over 350 "moving and sincere personal testimonies" were obtained in this way, mainly from southeast England, with a scattering from the rest of the United Kingdom. American readers will, of course, have to translate references to items and institutions like *Marks and Spencers*, *Aga cookers*, the *RAF*, the *Samaritans*, *Macmillan nurses*, and *sixth-formers doing their A levels*; but they should have no real difficulty in this.

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The database from which they are taken is thus a self-selected sample, so the statistics the Fenwicks quote need to be taken as illustrative rather than scientific. But Fenwick knows the literature and can be trusted to tell us whether a case he quotes is typical or not—and it is important to quote those that are not, because they may prevent us from making sweeping generalizations about all NDEs falling into one pattern, or from failing to see similarities between the NDE and other, better-understood, neurophysiological or neuropsychiatric phenomena.

The bibliography is a disappointment. Beginners need to be given a short list of books with comments on them. Serious researchers need a full bibliography (and page references in the text) so that they can check up on details. Neither will be served by an incomplete and unannotated list of about three dozen assorted books and articles. But that is a niggle. Let it be said at once that this book is a delight. It is as though we are looking over Fenwick's shoulder as he examines all these accounts that have come to him, as he uses his professional expertise to understand what might be going on, and as, time and time again, the straightforward medical explanation fails to cover all the data and he has to admit that the NDE is something very strange indeed, and raises all sorts of philosophical and metaphysical questions that are not the normal province of the medical fraternity.

Fenwick acknowledges that much of the imagery of the near-death world is psychologically constructed: "The near-death world [is] a psychological world without any reality in physical space" (p. 154); "the 'realm' to which people travel is something created entirely by their minds, and will be different for everyone" (p. 159); "the visual imagery [of the NDE] is largely a product of the individual and is very personal" (p. 170). The "barrier" is a psychological construct indicating that the person undergoing the experience has all but reached a point of no return. There are certainly such things as childhood NDEs, but when they are recounted from memory by adults, they are interpreted in the light of an adult's rather than a child's understanding (p. 181). The "feeling of the presence of Christ" in an NDE needs to be distinguished from "the image which the perceiving brain creates to fit it, which is simply drawn from the picture-bank of memory" (p. 63); the idea of death as a "journey" is a cultural belief (p. 109); the picture of a Paradise garden is a culturally-influenced myth (p. 78).

All this means that there will be differences between British and American NDEs (pp. 166–8). The "life review" is more common in America. American cases seem to have a "much more complex 'story-line'" and are more authoritarian about what the experiencer is required

to do on return to this earth. (Incidentally, in reference to the Fenwicks' discussion on pp. 167ff., Betty Eadie is a Mormon, not an evangelical Christian.) Even the difference between "hellish" and pleasant NDEs may depend (p. 168) more on the overall feeling-tone of the experience than on any specific details of what seems to be being perceived.

So far, few surprises; but it is when Fenwick applies his professional knowledge as a brain specialist to the NDE accounts that the reader begins to realize that not everything is plain sailing. Is the experience the result of drugs or medication? or of the random firing of neuronal circuits? or of cerebral anoxia? or hypercapnia? or the release of endorphins? Each of these explanations is initially promising, but each eventually runs up against insuperable difficulties, although there are times when it has to be acknowledged that further research is needed before we can be certain. So, how can we have memory during a period of unconsciousness? How can a disordered brain produce orderly images? How can random firing produce coherent imagery? There is something here that a mechanistic appeal to brain circuitry or chemistry can not encompass.

It might be easier to validate the NDE as evidence of something objective if, for instance, we were able to show that people having an out-of-body experience (OBE) actually saw what they were physically unable to see. Fenwick acknowledges (p. 258), with Susan Blackmore (1993), that there is as yet no firm evidence for this, although experiments with which he is associated are being set up to see whether it is the case. Claims that the NDE can lead to increased psychic sensitivity (pp. 141-150) also rest upon very slender data. Most post-NDE premonitions are very generalized and are little more than a conviction that there will be "work" to be done, or a destiny to be accomplished, on return to this earth.

A clue comes when we realize that the right temporal brain lobe is unusually active during these and similar experiences. The right hemisphere, we know, is more emotional and less verbal and logical than the left. So let us run the gamut of possible explanations. Once more, they fail to be completely satisfying to a neuropsychiatrist. NDEs are not hallucinations, or dreams, or dissociation, all of which have different manifestations.

In the end, the Fenwicks have to confess that the closest parallel to the NDE lies in mystical experience. Work such as that done by the Alister Hardy Religious Experience Research Unit at Oxford has shown that mystical or religious experience is far more common than we at first supposed and that the majority of the human race seems capable of

undergoing it. But, once more, that does not close the argument. If the NDE is a mystical experience, how is it that it happens to a disordered brain in a state of extreme trauma? Are we being led to suppose that mystical experience has an objective counterpart in what we might term "transcendental reality" (p. 24) and is not simply a mental state? Could it possibly be that the brain and the mind are separable and that the NDE "originates outside the human brain even if it is mediated through it" (p. 236), so that the brain can be thought of as something that transmits, rather than creates, experience? Are we, perhaps, being led to admit that the NDE is real evidence for that of which it is *prima facie* evidence—that is, the existence of the human soul and its survival of physical death? Or is it the case that "we should just accept and value these experiences for what they are, experiences which are enormously meaningful and powerful to those who have them" (p. 266), but which have no ultimate meaning?

There is mention of the relevance of parapsychological data to the question of survival, but it is very scrappily treated (and, please, it is "Ganzfeld," not "Gansfield" on page 255). Here, the book seems to tail off. "We do not like to believe that an experience which makes a powerful emotional impact might be essentially meaningless" (p. 266). True enough; and as we come to the end of this volume, we hope that its authors might give us some help towards discovering this meaning. But, just as the really important questions are being broached, we are left to answer them for ourselves rather than be told what Peter and Elizabeth Fenwick themselves think we ought to believe.

But perhaps that is exactly right. Fenwick has given unstintingly of his professional knowledge. He has shown us what questions he can ask, which ones he can answer, and which ones lie outside his professional expertise. If we want to go on from there and make up our own minds as to what the NDE "really" is, he has enabled us to do so without denying the data or their implications. And for that we are deeply grateful.

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BOOK REVIEW

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The Journey Home: What Near-Death Experiences and Mysticism Teach Us about the Gift of Life, by Phillip L. Berman. New York, NY: Pocket Books, 1996, 207pp + xiv, \$14.00 pb.

The Journey Home is a book born of Phillip Berman's personal experience surviving a near-fatal sailing accident and the loss of an infant daughter, as well as his research as an oral historian. A Harvard-educated theologian, he collected hundreds of stories from Americans concerning "mystical" experiences, some of them evidently near-death experiences (NDEs), which form the basis for this book. *The Journey Home* is a combination of both personal and professional insights designed for popular instruction and inspiration about how to celebrate life in view of the wisdom gleaned from NDEs. At this level, the book is successful. For near-death researchers or readers already familiar with the literature, it may be less so.

On the positive side, *The Journey Home* expands the NDE literature by offering new case material, although the text is thickly augmented by excerpts from familiar researchers and experiencers, such as Raymond Moody, Kenneth Ring, Melvin Morse (whose name was consistently misspelled throughout the book), Bruce Greyson, George Ritchie, and P. M. H. Atwater. In addition to illustrative examples of certain NDE phenomena from his research participants, Berman presents in-depth NDE narratives from four individuals, two apparently new and two well-known cases (George Rodonaia and Yvonne Kason). These are interesting accounts for those who never tire of NDE stories.

The book also features historical NDE stories less commonly encountered in the literature, most of them from Western sources. Less well developed than contemporary materials, the historical material is not

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merely reassuring for general readers, but evocative for professionals. Sources include St. Paul, Egyptian and European clergy of the first millennium A.D., medieval laity and nobility, and Black Elk. Berman also refers to thanatological myths supporting various aspects of the NDE from old Teutonic, Egyptian, Mediterranean, and North American sources and brings in other Jewish and Christian theologians on related spiritual topics. This intriguing and potentially rich area of his expertise is as much teasing as it is informative, for it is easy to see that the author is much more conversant with these interesting avenues than the constraints of a mass-market book permit.

For the general reader interested in death, dying, grief, and theodicy, or in search of inspirational material, this book is appealing. It seeks to address the spiritual yearnings of humanity with the messages NDEs provide. In contrast to the veridicality focus of most near-death researchers and writers, Berman treats the meaning of NDEs and the larger question of what they say about the meaning of life and how it is to be lived.

For professionals, or even educated readers, however, *The Journey Home* has little new to offer, and worse, suffers from inadequate editing that renders the text confused, contradictory, and misleading. In the first place, the research methodology is entirely missing. For instance, by providing unqualified long narratives from the four individuals mentioned above, Berman creates the impression that these are new accounts uncovered in the course of his research. Although he may indeed have personally interviewed Rodonaia and Kason, anyone familiar with the literature knows that their stories appear at length elsewhere—although no citations or references to those previous publications appear. Given Berman's standing, presumably the original study was well done, but considering the many serious technical lapses in the book, I was left with the distinct impression that the author was hurriedly cannibalizing previous research to create a bestseller exploiting the current interest in NDEs. This impression was furthered by the superficial and dated treatment of spiritual material, and the strong suggestion that well-accepted NDE research somehow originated from the author's own efforts. Waiving any scholarly pretensions, the text's aggrandizement of the author's efforts and lack of proper attention to other sources created such a sense of exploitation as to mitigate, at least for me, the heartfulness that might otherwise redeem the book as a popular effort.

The slipshod handling of citations is one of the most arrant editorial lapses. Other researchers' work is paraphrased and cases are

quoted verbatim without endnote numbers in the text, except inexplicably for Chapter 7, where they suddenly appear, for at least a few of the references—but not all. If only the citation numbers in the text were missing, but the endnotes appeared in order, readers might have a chance of attributing material to the proper sources, but the book is inconsistent in this regard. Chapter 3 contains direct quotes by Atwater, Albert Heim, Karlis Osis and Erlendur Haraldsson, Carl Jung, Russell Noyes and Roy Kletti, Ritchie, Moody, George Gallup, Teilhard de Chardin, and Dylan Thomas, yet only two endnotes appear for this entire chapter: Noyes and Moody, who are given a single note each, despite the fact that Noyes's material is scattered over several discontinuous pages in the chapter text. Similar problems exist for a number of chapters, making one wonder about the publisher's liability concerning attribution.

The book is divided into sections addressing spiritual needs. After a brief introduction covering his personal reasons for writing this book, Berman begins with the centrality of the fear of death to spiritual traditions. Here he presents the four narratives mentioned above, complete with the subjects' own interpretation of the spiritual significance of those events. These are followed by a rather idiosyncratic history of near-death research, ground so familiar to professionals as to be surprising only in terms of whose research is emphasized and whose goes unmentioned; fortunately some of the most glaring omissions do appear later in the book, notably Carol Zaleski, Ring, and Greyson, though without compensatory references for the quality of their contributions. This haphazard organization sets the tone for the difficulties with the rest of the book: Berman's popular spiritual agenda and the rather unremarkable quality of his own findings, given the maturity of the field, lead to unfortunate juxtapositions of material, erroneous statements concerning the novelty of his ideas, and misdirection.

For example, the second section, "Journeys of the Soul—Past and Present," interweaves historical sources, Berman's cases, and material from other researchers in fleshing out the all-too-familiar characteristics of a full-blown NDE, notably the out-of-body experience, the tunnel, and meeting deceased relatives or other guides. Here the author points to some of his findings as though they are new, or as though they treat information somehow overlooked by contemporary researchers. One of his subjects reports having her soul "jerked" from her body by God (p. 71), a finding Berman develops as if the only corroboration for such reports comes from his own historical research, rather than referencing contemporary sources, such as Osis and Haraldsson or Zaleski, whose

work he cites elsewhere. This pattern is repeated throughout the book, implying—when not outright stating—that Berman has somehow uncovered new findings or “corrected” persistent misrepresentations in the current literature. In another example occurring just a few pages later, he says that in the popular mind, NDEs are characterized by

a journey down a long, dark tunnel toward a brilliant, white light. Yet in my own studies of modern and ancient near-death stories, I have encountered very few accounts of “tunnel travel.” It appears the experience of traveling in a tunnel is actually quite rare. Gallup reports that of those who have had an NDE, only 10 percent actually describe such a journey. . . .

Despite a tremendous amount of digging, I have found very few pre-modern near-death accounts that actually describe a tunnel experience. (pp. 77–79)

The implication is that without Berman’s and Gallup’s rigor, the public would be misinformed. Yet in the first scientific study of NDEs, Ring’s *Life at Death* published in 1980, he qualified the tunnel nomenclature, pointing out that the tunnel phenomenon was not commonly mentioned by respondents and describing it rather as a transitional dynamic characterized by darkness, lack of dimension, etc. (pp. 53–56). Naive readers may be impressed by Berman’s tactics; nobody familiar with the near-death literature is likely to appreciate them.

In addressing spiritual concerns, Berman tends to use exaggerated language that promises more than it delivers, even making allowances for mass marketing. For example, a subsection called “Nature of the Soul” actually describes the spatial forms people believe they have when out of the body. He devotes an entire chapter to hellish NDEs, and it is here that the text reveals some of its most egregious editorial problems. First he states that “just one” person he interviewed reported a negative experience (p. 84). One paragraph later, he speaks of “the most dramatic hellish NDE I have encountered” (p. 84), implying by his use of the superlative that this was one of at least three cases. A few pages later, he writes, “The great majority of those near-death experiencers I spoke with were fortunate enough to bypass hell” (p. 98). Which is it: one, several, or a minority who have hellish NDEs?

The entire section on hellish NDEs is problematic; it seems to have been introduced primarily to address Western religious concerns at a very superficial level. Intriguing allusions to historical and contemporary traditions of judgment in the afterlife point to the universality of this theme in exoteric religion, though these interesting lines of development are not pursued. The research of Zaleski, Ring, and Greyson is

finally presented to introduce the concepts of culturally mediated NDEs, the universality of positive NDEs, and a more spiritual (esoteric) interpretation of traditional representations of the afterlife. Most of this is too late to be effective for the professional reader, and some of the most pertinent findings have been left out. For instance, Berman emphasizes the individual's responsibility for psychological projection in having a negative or positive experience, ignoring well-documented speculation that certain types of anesthesia may play a significant role in creating negative experiences.

The book next discusses the nature of the Light (God) from a perennialist point of view. Again the author suggests he is revealing novel information when he explicates the "gifts" of the Light—actually characteristics long associated with NDEs and their effects on experiencers: freedom from physical suffering; reassurance about the existence of God; faith that there is an afterlife; a sense of the unity of life; gratitude and joy; the chance for a life review; and spiritual transformation. Separate chapters offer interesting insights and qualifications about the life review and transformative power of NDEs, a few new and others so familiar as to be bromides. For the mass market, messages stressing the learning available to all from NDEs may be restated without losing their inspirational value: living in the present, self-confidence, unimportance of material things, spiritual rather than religious values, compassion, a sense of personal mission, and ecological concerns. Professionals will find little of interest here, certainly little that Berman can claim to have discovered.

In the last section, Berman seeks to identify common elements between NDEs and mystical experiences, though without reference to the burgeoning transpersonal literature. According to the author, NDEs convey the essential messages (and have many of the same qualities) as mystical experiences, notably, the interpenetration of divine love and "ordinary life," the total and unconditional quality of that love, and the interconnection of all sentient beings, the planet, and material reality. To substantiate his claim, Berman presents narratives from some of his subjects who have had "mystical" experiences (his use of the term "mystical" is unqualified; discerning readers would describe many of these as nonordinary, transcendent, or exceptional human experiences [EHEs], but Berman's primary references here are Abraham Maslow and William James rather than any of the more recent research). He introduces perennialism, suitably bolstered with inspiring quotes supporting the notion of universal love and connectedness in contrast to judgment and separation.

The final chapter is a guide to better living based on this knowledge. It advocates a reverence for life, compassionate service, gratitude, a sense of wonder, hospitality, community, and the delights of being a seeker—values well communicated by the warm voice of the speaker. While the repetition of such material in an easy-to-read format illustrated with ever-popular NDEs may be uplifting to average readers, professionals are likely to be less pleased with the apparent exploitation of the uncredited work of other scholars in the field.

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THE MOST

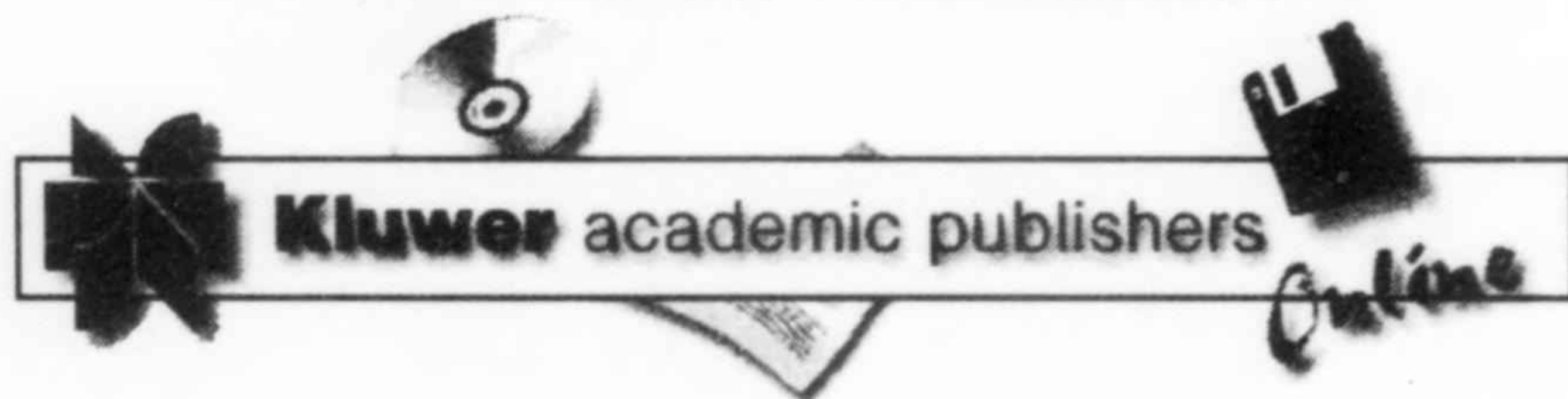
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