

*Journal*  
*of*  
Near-Death Studies

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

**Guest Editorial: Near-Death Experiences: A Speculative Neural Model** • *Lawrence C. Wile, M.D.*

**Near-Death Experiences and Kundalini Awakening: Exploring the Link** • *Yvonne Kason, M.D., C.C.F.P., M.Ed., F.C.F.P.*

**Kundalini and the Near-Death Experience** • *Gene Kieffer*

**Near-Death and Transcendental Experiences: Neurophysiological Correlates of Mystical Traditions** • *Jean-Pierre Jourdan, M.D.*

**Volume 12, Number 3, Spring 1994**



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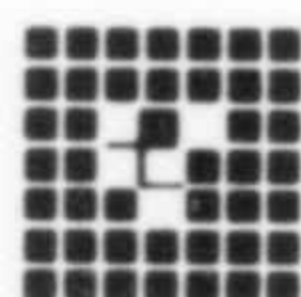
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**JOURNAL OF NEAR-DEATH STUDIES** (formerly ANABIOSIS) is sponsored by the International Association for Near-Death Studies (IANDS). The Journal publishes articles on near-death experiences and on the empirical effects and theoretical implications 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, 638 Prospect Avenue, Hartford, CT 06105-4298.

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## Editor's Foreword

In Eastern spiritual traditions, the biological mechanism of both individual enlightenment and evolution of the species toward higher consciousness is called kundalini, a potential force that can be activated under certain conditions to strengthen or purify an individual's life energy, producing a variety of mental, emotional, physical, and spiritual effects. Despite kundalini's apparent incomprehensibility in terms of Western scientific and medical paradigms, the concept has captured the interest of a significant minority of Western clinicians and researchers since Carl Jung organized a conference on the topic in 1932.

Almost a decade ago, kundalini was proposed as the mechanism of near-death experiences (NDEs) in books by two prominent psychologists working independently: Kenneth Ring (1984) in the United States and Margot Grey (1985) in the United Kingdom. Over the ensuing years, the concept has received passing reference in the near-death literature—for example, in books by NDErs P. M. H. Atwater (1988) and Barbara Harris (Harris and Bascom, 1990)—but little focused attention. Only now are articles on kundalini and NDEs starting to appear in the journals of medicine and psychology (Greyson, 1993a, 1993b).

We devote this entire issue of the *Journal* to an exploration of the relationship between kundalini and NDEs from four different perspectives. In the Guest Editorial, psychiatrist Lawrence Wile describes how his personal struggles to understand his own mystical experiences led him to the study of kundalini and to an intriguing neuroanatomical hypothesis for this mechanism. Next, Canadian family practitioner and psychotherapist Yvonne Kason, President of the Kundalini Research Network, elaborates a view of the awakening of kundalini by an NDE, based on her own personal experience and subsequent research.

Gene Kieffer, President of the Kundalini Research Foundation and the person most responsible for making Gopi Krishna's works available to the Western world, describes Krishna's perspective on kundalini and how it might bring about near-death phenomena, and issues

a warning about common misunderstandings of the phenomenon. Finally, French general practitioner and founding member of IANDS-France's Research Committee Jean-Pierre Jourdan presents a comprehensive neurochemical theory of kundalini and its relation to near-death and other mystical experiences. While much of this material is still speculative, it is our hope that these speculations will stimulate further debate and research into the connection between kundalini and the NDE.

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Bruce Greyson, M. D.

*Guest Editorial*

## **Near-Death Experiences: A Speculative Neural Model**

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**ABSTRACT:** A personal mystical experience led me to the belief that a little known structure in the center of the spinal cord, Reissner's fiber, is identical with the anatomical entity described by kundalini yoga. My struggles to understand the meaning of that experience have led me to believe that an understanding of the deeper realities underlying quantum phenomena can be integrated with an understanding of the mysterious realities of near-death and other mystical experiences, and that Reissner's fiber can serve as an empirical basis for a scientific investigation of these phenomena.

In the beginning the serpent, the most subtle of all the wild beasts, said to Eve, "Did God really say you were not to eat from any of the trees in the garden?"

Eve replied, "We may eat the fruit of the trees in the garden. But of the fruit in the middle of the garden God said, 'You must not eat it, or touch it, under pain of death.'"

Then the serpent said to Eve, "No! You will not die! God knows in fact that on the day you eat it your eyes will be opened and you will be like gods, knowing good and evil."

So Eve ate of the fruit of the Tree of Knowledge and gave some to Adam, and he ate it.

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When God saw what Adam and Eve had done he cursed them and proclaimed, "For dust you are and to dust you shall return."

God expelled Adam and Eve from the Garden of Eden. He posted the cherubs and the flame of a flashing sword so that they would not stretch out their hands and eat from the Tree of Life and live forever.

Though exiled to the world of suffering and death, we continue to have visions of eternal life. In olden times, Moses, Buddha, Jesus, and Mohammed gave human voices to the Eternal One and awakened faith in enlightenment and redemption. In modern times, medical technology has brought back survivors from the brink of death, who have told tales of the other side.

Near-death experiences (NDEs), characterized by visions of eternal life and out-of-body experiences with objectively verified observations (Sabom, 1982), challenge the prevailing materialistic paradigm of neuroscience. Disembodied beings hovering above emergency room resuscitation teams are anomalies in search of a paradigm, harbingers of a new relationship with the mystical—or else are seductive illusions composed by neural sparks in our temporal lobes.

Two disciplines that have attracted modern researchers are ancient mystical traditions and quantum theory. Ancient mystical traditions, most notably kundalini yoga, describe an anatomical connection with the mystical that closely corresponds to a little known structure in the central nervous system called Reissner's fiber. NDEs and their after-effects are similar to the experiences described as kundalini (Ring, 1984). Quantum theory's concepts transcend ordinary classical phenomena and are fertile ground for speculations about the relationships among mind, matter, and spirit. It is a basic tenet of quantum theory, however, that all observational evidence is necessarily expressed in classical terms. Or, as starkly stated by the acknowledged master of quantum theory, Neils Bohr, "There is no quantum world. There is only an abstract quantum description" (Pais, 1991, p. 426).

I propose that near-death and other mystical experiences result from direct awareness of the quantum mechanical activity of Reissner's fiber. By developing methods of stimulating the activity of Reissner's fiber and measuring that activity with neuroimaging devices, we can explore worlds that currently lie at the threshold of death and in the esoteric depths of mysticism.

According to kundalini yoga, there exists a dormant psychospiritual energy called kundalini that resides in a triangular-shaped dilation at the base of the spine, the muladhara chakra. Using a variety of consciousness disciplines, including meditation, postures (asanas), and breathing exercises (pranayama), yogis can awaken the kundalini so

that it ascends through a hollow tube that runs through the center of the spinal cord, the sushumna nadi. Inside the sushumna nadi, proceeding inward, lie the vajra nadi, chitrini nadi, and Brahma nadi. The radiance of consciousness (chit) is associated with the chitrini nadi, while the Brahma nadi is linked to the Infinite (Brahma).

The ultimate destination of the awakened kundalini is the Cave of Brahma and the ajna and sahasrara chakras located in the brain. When the kundalini reaches the ajna and sahasrara chakras, paranormal abilities, including out-of-body experiences, and entry into spiritual realms are said to occur (Feuerstein, 1989).

My pursuit of the possible neuroanatomical basis of kundalini was encapsulated by a seven-year encounter with the mystical. It began as I was driving to see my girlfriend Peggy, when suddenly the primal drumbeat of Buddy Holly's "Peggy Sue" ignited the potent brew of my peaking hormones, fantasies, and anima. My ego melted into the cosmic oneness of pulsating music. I thought this must be love.

A series of uncanny coincidences between my psychic and physical realities, which I later learned were described by Carl Jung and Wolfgang Pauli's theory of synchronicity, involving Buddy Holly's "Peggy Sue" and "Peggy Sue Got Married," directed the passion of my unrequited love to the reawakening of yoga in the collective consciousness of the 1960s. My scientific mind struggled to reconcile new, nonordinary realities with the foundations of my beliefs. This struggle led to my investigation of the possible correspondence between neuroanatomy and kundalini as a first-year medical student at the University of Connecticut under the supervision of the Chairman of Neuroscience, Charles Loeser.

Loeser's laboratory was lined with black velvet to absorb stray photons that might interfere with the activity of a sophisticated electro-optical instrument capable of measuring nanosecond events taking place in fluorescently labeled biological structures. From the moment I wondrously watched the surreal flickering of its orange and purple lights, I knew that I had found my mentor.

Loeser was doing research on the quantum mechanical events associated with the interactions between lysergic acid diethylamide (LSD) and neural membranes, and between cancer cells and the immune system. His assistant was a physicist with an interest in yoga. The laboratory's interest in LSD and yoga, together with Loeser's struggle with a malignant melanoma, combined to open doors for my pursuit of the mystical that might ordinarily have been closed.

Loeser's initial bemused curiosity gradually evolved into supportive interest as we worked toward developing a research project that would

study the possible functional connection between the terminal ventricle at the base of the central canal of the spinal cord and the pineal gland, as the analogs of the muladhara chakra and the ajna chakra. His leap to unrestrained enthusiasm coincided with the culmination of my encounter with the mystical.

Seven years after it all began, I started to feel the stirrings of a synchronistic premonition when "Peggy Sue" started to play as I turned on my car radio. Within a few minutes after entering the main entrance of the University of Connecticut Health Center I was greeted by Peggy. Although I had not seen Peggy for several years, the mere coincidence of this chance encounter with the playing of "Peggy Sue" failed to live up to my half-conscious expectation of a meaningful synchronicity. Just before the banality of my conversation with Peggy began to fade into disappointment, I saw Loeser walking down the hallway.

"This is it," he said, as he handed me a reprint from a medical journal about Reissner's fiber. The article described a glycoprotein fiber, originating from a structure just below the pineal gland called the subcommissural organ, that travels down the central canal of the spinal cord and ends at the terminal ventricle. Here was the central core of the sushumna nadi. Although Loeser was a distinguished neuroanatomist, he had previously been unaware of this empirical crystallization of my seven-year quest for a nebulous and irresistible goal.

Shortly thereafter Loeser arranged for me to depart from the standard medical school curriculum and start my research on Reissner's fiber at the National Marine Laboratories at Woods Hole, Massachusetts. As I was reading a 1905 article by Porter Sargent about experiments involving behavioral observations of sharks following the severing of Reissner's fiber, I experienced the last of the synchronicities that helped to harden my interest in discovering the function of this little known but strategically located structure. Glancing at the last pages of the article, I noticed that Sargent thanked the National Marine Laboratories at Woods Hole for the use of workbenches and the circular stone tanks where the sharks for my experiments were now swimming.

This was not the only thing that I shared with Sargent. We also shared the curse of Reissner's fiber. The curse repels scientific investigation so that the fiber can live secretly in the innermost recesses of our brains. The origin of the curse stems from the coincidental beginnings of research about Reissner's fiber and the establishment of the neural doctrine. While Sargent was hypothesizing high-speed transmission through a nonneural structure, Santiago Ramon y Cajal was

laying the foundations of a neuroscientific paradigm based on neurons that use ionic action potentials and chemical synaptic transmission. The language and methods of the emerging dominant paradigm excluded Sargent's hypothesis. He became a scientist without a voice.

Sargent spent ten years peering through a microscope to complete his study of the neuroanatomy of Reissner's fiber. He observed (1905, p. 131) that

It is remarkable that so peculiar and conspicuous a structure as Reissner's fiber, which is of so great importance as to persist throughout the vertebrate series, should have remained for forty years after its discovery so little known[.]

and concluded his paper by writing:

The optic reflex apparatus, then, not only plays an important part in the life of the individual, but its functioning has probably been a determining factor in the evolution of vertebrates. The conclusion and discussion of the results are reserved for the second part of this paper dealing with the higher vertebrates. This is already well advanced and it is hoped will appear in about a year. (p. 256)

That paper never did appear. He abandoned his research to become a world traveler studying and interpreting peoples, their arts and religions.

In the 1950s Mahashi Enami tried to lift the veil from Reissner's fiber. He discovered a branch of the fiber that traveled along the floor of the third ventricle between the preoptic area of the hypothalamus to the subcommissural organ (Enami, 1954). Later, he investigated the function of the terminal ventricle, concluding that it plays a role in buoyancy regulation in fish. He envisioned Reissner's fiber and its connection with the hypothalamus, pineal-subcommissural complex, and terminal ventricle as a unified system. Shortly before he was to present a paper at a conference in San Francisco, Enami committed suicide.

My encounter with the curse of Reissner's fiber came shortly after my experiments at Woods Hole began. My anima no longer illuminated the transcendently meaningful synchronicities between the microcosm of my psyche and the macrocosm of external events. I was on my own in the real world.

Loeser's cancer went out of remission and he died that summer. The dean of the medical school told me I should return to school and submit a paper about the results of my work. My paper explained my goal of exposing Reissner's fiber through the roof of the fourth ventricle so that I could study the fiber's activity with optical recordings using

fluorescent dyes. I also wrote about the possible correspondence between the anatomy of kundalini and Reissner's fiber, and how quantum-relativistic models of the fiber, by virtue of its being the focus of a converging sensory system, could provide a biological basis for Jung and Pauli's theory of synchronicity and mystical experiences.

I was told that my paper was unsatisfactory and that I should see Robert Cancro, the Chairman of Psychiatry. He welcomed me and spoke about his research on abnormal eye-tracking in schizophrenics. I told him of my interest in neuroscientific research and my experiences with Loeser. Then his demeanor subtly changed and unaccountably my heart started to pound as the new bearer of the curse of Reissner's fiber began to speak:

"Your ideas are outside consensual reality, Lawrence. Your speculations about yoga, mysticism, and quantum theory are not what we are looking for. Just write about what you did and what you saw, and you will receive credit for your student research project."

The curse worked once again. I was detoured from my greatest passion, the pursuit of the truth about Reissner's fiber, for twenty years.

Now, with NDEs providing unique opportunities for exploring questions about life and death, God, and our place in the cosmos, and with neuroimaging technologies capable of measuring the activity of Reissner's fiber appearing on the horizon, it is time to dare the curse of Reissner's fiber once again. Now is the time to lift the shroud of obscurity from this glistening crown jewel around which the most wondrous structure in the universe is organized.

Reissner's fiber's exalted role in the central nervous system can be seen most clearly from an embryological perspective. The embryonic nervous system begins as a groove running through the center of an oblong sheet of cells. This neural groove invaginates to form the neural tube that runs through the center of the central nervous system. Some of the invaginating cells migrate outward to form the external sensory surfaces of the body, including the retina and the skin. An interesting analogy suggested by this embryological perspective is that internal reality is to the inner surface of the brain as external reality is to the outer surface of the brain. Occupying the strategic center of internal reality, converged upon by our internally directed sensory system, is Reissner's fiber.

The function of Reissner's fiber is unknown. Experiments have shown that Reissner's fiber influences the regeneration of severed tadpole tails (Hauser, 1969) and grows at a rate influenced by pineal-gland-mediated responses to light (Diederer, 1973). Experiments that

showed Reissner's fiber binds neurotransmitters (Ermisch, Sterba, and Hess, 1970) led one investigator to make the unflattering hypothesis that Reissner's fiber detoxifies the cerebrospinal fluid (Woollam, 1982).

One system that is likely to interact with Reissner's fiber is the network of cerebrospinal-fluid-contacting serotonergic neurons that originate from the dorsal raphe nucleus (Agajanian, 1975). The dorsal raphe nucleus, which has been proposed as playing a key role in the neurophysiological basis of NDEs (Morse, Venecia, and Milstein, 1989), is the site of action of LSD. Interestingly, the psychoactive properties of LSD are not explainable by the conventional model of blocking synaptic transmission, but are correlated with the energy of the outermost electron shell, a quantum mechanical property (Snyder, 1968).

It is also likely that Reissner's fiber interacts with the brain's endogenous opioids. Fibrils from Reissner's fiber contact the ventricular surface of the central gray area that contains the brain's highest density of endogenous opioids. This system has also been proposed as playing a role in NDEs (Saavedra-Aguilar and Gómez-Jeria, 1989).

Our mortal array of macromolecular membranes, ion flows, and neurotransmitters is hard to reconcile with out-of-body experiences and eternal life, and is inadequate for explaining the microscopic activity of Reissner's fiber. Quantum theory, which is our best theory of the microscopic activity of Reissner's fiber, is, on the one hand, compatible with a variety of mystical realities. On the other hand, this compatibility is currently based on a shared sense of mystery and ineffability of what is now unknown.

The ineffable mysteriousness of the quantum world derives from the fact that, in the words of Bohr,

*however far the phenomena transcend the scope of classical physical explanation, the account of all evidence must be expressed in classical terms.* (French and Kennedy, 1985, p. 122; italics Bohr's)

Quantum theory forces us to revise radically our ideas about causality and reality but leaves us speechless as to what the reality of the quantum world is.

The best illustrations of why quantum theory forces us to abandon our common sense notion about reality are the recent experiments (Aspect, 1983) based on a paper by Albert Einstein in collaboration with Boris Podolsky and Nathan Rosen (1935). It turns out that the data gathered by measuring the polarizations of pairs of quantum particles traveling in opposite directions after being emitted from a common source are inconsistent with two of our most fundamental

assumptions about reality. The first assumption, realism, is that objects have definite properties independent of their being observed. The second assumption, locality, is that if objects are separated they cannot influence each other with information that travels faster than light.

If quantum objects have definite properties before they are measured, then we are left with the implausible notion of signals traveling faster than the speed of light. If we abandon realism, then we are left with a mysterious nonlocal reality. Contemplation of the quantum world can evoke mystical feelings, but as scientists we are left with correlations between random distributions of classically expressed measurements.

A key to understanding the mysteries of quantum theory is the transition between the abstract microscopic quantum world and the macroscopic classical world, the collapse of the wave function. According to one interpretation, the collapse of the wave function is produced by the observer's consciousness. According to another interpretation, all the possibilities contained in the wave function are real, and during a measurement the universe splits into multiple copies of itself. The nature of the transition from the quantum to the classical world remains mysterious. For physicists, this transition is a one-way, irreversible process.

There is an even more mysterious transition when we combine quantum theory with gravity. Here the laboratory is creation itself. According to string theory, which is now the most promising candidate for a theory of quantum gravity, the universe existed as a ten-dimensional world that pre-existed space-time, energy, and matter. As a result of broken symmetries, analogous to the broken symmetries of a forming crystal, the four dimensions of our universe expanded, leaving the remaining six dimensions compacted into a region  $10^{-33}$  centimeters in diameter. The transition between the compacted ten-dimensional world and our own four-dimensional universe lies at the intersection of man and God.

Most physicists would agree with Werner Heisenberg, who wrote that

The use of classical concepts is finally a consequence of the general human way of thinking . . . There is no use in discussing what could be done if we were other beings than we are. (Herbert, 1985, p. 248)

This limiting of our potential may be premature. There are two ways that Reissner's fiber could make us into beings other than what we are now, and thereby bring us into a new relationship with the quantum world. First, awareness of Reissner's fiber would result not from the triggerings of our external sensory neurons. Rather our awareness of

the fiber could result from stimulation of our internal sensory neurons. Or, perhaps, we could become aware of Reissner's fiber directly—as in being aware of awareness—without mediation of our internal sensory neurons. Here the knower and the known would literally be one, fulfilling the mystic's goal of uniting with reality.

Second, Reissner's fiber could organize into a coherent macroscopic quantum system by boson condensation, thereby reversing the microscopic/macroscopic distinction that characterizes the usual relationship between the quantum and classical worlds. Also, because Reissner's fiber is hollow, a boson condensation of its constituents could form the boundaries of a thread running through its center. This could extend the compacted, quantum gravitational dimensions into a one-dimensional neural thread, thereby creating a deeper relationship between our consciousness and the ultimate frontiers of physics. Spectroscopic evidence of biological boson condensation has been found in neural membranes (Fröhlich, 1983).

Since our first bite from the fruit of the Tree of Knowledge, we have tried to know the mind of God and reach out to the Tree of Life. We have committed what Einstein called the "metaphysical original sin" of separating ideas and sense images. We have stepped outside our instinctual, biological roots and plotted a new path based on reason and imagination. This was the beginning of the ascendancy of the prefrontal cortex and the degeneration of the Reissner's fiber apparatus.

The Tree of Life is guarded not only by the flame of a flashing sword but the verbal dust of fallen Babel as well. By replacing the problematic relationships among ideas, language, and experience by a unified neurophysiological system based on Reissner's fiber, we can create a new relationship with reality, uniting inner (eternal?) and outer realities. We can begin the restoration of the Reissner's fiber apparatus by using the fully developed powers of the frontal cortex.

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## Near-Death Experiences and Kundalini Awakening: Exploring the Link

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**ABSTRACT:** This article explores the historical and research evidence that the awakening of latent spiritual energy is the biopsychospiritual basis of near-death experiences (NDEs). This spiritual energy is known in various sacred traditions as Holy Spirit, Vital Winds, chi, dumo fire, mana, and, in the yogic tradition, kundalini. I outline the modern kundalini hypothesis, as first proposed by Gopi Krishna; how this hypothesis can account for the physical symptoms and psychospiritual transformation associated with NDEs; and preliminary evidence from my own NDE and from research underway through the Kundalini Research Network.

On March 27, 1979, I had a most extraordinary experience, which prompted me to research spiritual and paranormal states of consciousness and which has, over the years, led me to the conclusion that kundalini awakening is the mechanism responsible for the phenomena currently known as near-death experiences (NDEs). On that day, I was a young medical doctor, a medical resident, completing my specialty training in family medicine at the University of Toronto. I was assigned that month to work at a remote northern Canadian community, Sioux Lookout, and that day I had been designated by the supervising staff physicians to accompany a critically ill Native Indian woman on a

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medical evacuation from our small hospital to a larger hospital in Winnipeg. This medical evacuation took place by small aircraft.

The plane took off in sub-zero weather, and flew into a bad snowstorm. About one hour underway, our plane developed mechanical problems when the air filters of the twin-engine aircraft froze over. Our plane crash-landed onto the surface of a semi-frozen lake, and sank through the ice into about 200 feet of water. I managed to escape from the sinking aircraft, along with the pilot and the nurse. I swam about 100 yards, in icy water with a strong current, to the nearest land, an island.

Once on the shore, I had to wait, soaking wet, in sub-zero weather—technically a blizzard—until I was rescued. I was a near-drowning victim, with lake water in my lungs, and profoundly hypothermic, nearly frozen, with a body temperature below the bottom reading on the local hospital's thermometer. Fortunately I was rescued and rushed to a local hospital by two selfless heroes. In fact, the story of this crash and rescue was written up in *Reader's Digest* magazine as a "Drama in Real Life" (Waller, 1981).

This accident had another facet, however, not recorded in *Reader's Digest*, which had the most profound impact on my life. I experienced a paranormal experience of consciousness that began as the plane was crashing, continued as my body became progressively more hypothermic as I swam to shore, and then continued as I waited on shore for our rescue, huddled against the icy wind, wet and gradually freezing to death. When I first realized that the plane was crashing, my initial reaction was to feel a wave of intense fear. "Oh God, I am going to die!" was my first thought. I was overwhelmed with panic and fear.

Suddenly, as if poured into my consciousness by another force, I started hearing verses from the Bible in my mind, verses that were reassuring and comforting, verses that I could not consciously quote verbatim. The fear and panic were displaced by an intense sense of peace and calm. I suddenly felt that God was there, and that everything would be all right. I was no longer afraid.

After the plane crash-landed onto the ice, I tried to pull the stretcher-bound patient out of the plane, but was unable to do so before the plane sank. As the plane and patient disappeared into the dark icy water, I heard a voice in my head clearly state, "Swim to shore." I looked to shore, and saw that it was quite far away.

Dark open water lay between me and the shore. Turning away from shore was ice on the surface of the water. My intellect argued with the inner voice. I remembered some of the life-guarding courses I had

taken as a teenager. "Do not attempt to swim to shore in the event of a boating accident," I had been taught. "Stay by the boat. Shore is farther than it seems; you will drown while swimming to shore."

So, I ignored my inner voice for a while, as I repeatedly strived to climb onto the very thin ice farther away from shore. Finally, as I become colder and colder, and progressively more exhausted from my futile attempts to climb on the ice, my inner voice again loudly repeated, "Swim to shore." Finally, I obeyed my higher directive.

As I was swimming the 100 yards or so to shore, I heard a wind-like noise, and I felt as if my consciousness suddenly lifted up out of my body. It seemed as if my point of perception was now 15 feet or so above my body, and that I was looking down, accurately perceiving what was happening to my body below. The feeling of peace and calm that had begun earlier in the crash was still with me.

I detachedly watched my body struggling to swim to shore through the icy water and strong current. I saw it go under twice, exhausted. I knew it was my body, and I somehow intuitively knew that I was dying. However, I felt totally unafraid. Somehow the peaceful state of mind that had taken me over also gave me the intuitive knowledge that there is nothing to fear in death. I felt the most ecstatic, blissful, wonderful emotion I have ever experienced. I felt enveloped, protected, embraced by a loving force. I was surrounded by light. I sensed that I was in the presence of and being lovingly embraced by the loving intelligent power behind the universe—what I call God.

I watched the event happening to my physical body below with detachment and complete trust and surrender to the divine. I knew that the outcome was somehow already predetermined by the loving intelligence that was embracing me and uplifting my spirit. I was totally unafraid to die. I knew there was nothing to fear in death. I watched in anticipation to see the outcome of the worldly events below.

After I was rescued, my near-frozen body was taken to Kenora Hospital. My consciousness seemed to be floating above my body, and at times piercing through to speak through my body. At one point, I could feel my consciousness starting to drift farther away from my body. The hospital staff were inexperienced in treating hypothermia, and they did not seem to realize the critical condition I was in.

Suddenly my body spoke the words, "Boy, could I use a hot bath." The nurses responded by saying to each other, "Maybe that would help them; let's take them down to the physiotherapy department and put them in the hot whirlpool baths." It turns out that submerging us in

hot water was the best medical thing for them to do at that time to treat the hypothermia. However, at the time that I spoke those words, I did not consciously know that fact!

When my body was placed into the hot whirlpool bath, I suddenly felt my consciousness re-enter my body. It felt as if I was forcefully sucked down from a higher, more expanded space, through the top of my head, into my body. I felt myself actively sucked back into my body, in a way I imagine a genie feels when being forcibly sucked into the confines of its bottle. When my consciousness re-entered my body, I abruptly felt my spirit and point of perception were back in my body. I then knew that I was meant to live, and that I had survived the ordeal of the plane crash.

At that time, in 1979, I had no idea how to interpret this experience. Being a traditionally trained Canadian medical doctor, I had never heard of such an experience. I had been exposed to the writing of Elisabeth Kübler-Ross, and had heard vaguely of near-death experiences, but since I had never been dead at any time during this accident, I thought this experience must be something else. In fact, my experience began while I was fully conscious and alert, continued while I was actively swimming to shore, and then continued on as I began to approach death, as my body became progressively more hypothermic. Initially, the only way I could conceptualize this experience was to call it a mystical experience. I therefore began to research mystical experiences of all types, including those labelled as NDEs.

The psychological impact of this mystical experience was very strong. First, it absolutely convinced me of the reality of the loving intelligence behind the universe, which I call God. Second, the experience made me totally lose my fear of death. I became absolutely certain that the spirit lives on after death.

Third, the experience has etched itself into my memory. I can still clearly recall the experience. Even though 15 years have passed, I still feel a strong personal sense of connection with the intelligent power behind the universe. Finally, the experience convinced me that all humans, regardless of race, creed, and religious denomination, have the same personal connection to the power behind the universe. I became convinced that we are all essentially spiritual beings, children of the same one all-loving God.

The mystical experience also seemed to have a transformative effect upon my consciousness. About one month after the plane crash, I had my first clairvoyant experience. Since that time I have had many psychic experiences, a predilection that I did not have prior to the experience.

Also, I seemed spontaneously to unblock traumatic childhood memories and rapidly heal the associated unresolved psychological conflicts. In my case, after many years of a dysfunctional relationship with my father, after unblocking a particularly traumatic memory from around age five years, I was then able rapidly to work through feelings of anger left over from this childhood incident. I seemed to have new clarity of perception, and was able to see the complexity and truth of the childhood situation more clearly. I also discovered an increased desire and increased ability within myself to forgive my father.

This experience also propelled me professionally, inciting my scientific curiosity to begin to research what is known about various types of mystical and paranormal consciousness experiences. Over the last 14 years, as well as doing an extensive literary review of the topic, I listened to the stories and counseled well over 200 persons in Canada and the United States who have had various types of mystical and paranormal experiences, experiences I now cluster together under the umbrella term of "spiritually transformative experiences." Further, as part of my ongoing research, I have read detailed personal accounts of at least another 200 persons. In response to the need expressed by these persons to have a supportive physician and counselor to talk to after such an experience, I founded and now direct the Spiritual Emergence Research and Referral Clinic in Toronto, Canada.

My research and clinical experience has led me to the conclusion that what is presently termed as near-death experiences is one sub-type of experience within a spectrum of spiritually transformative experiences (STEs). The full range of STEs includes mystical experiences of all types, near-death experiences, psychic awakenings, inspired creativity experiences, spiritual energy experiences, and in some cases transient psychosis with mystical features.

Mystical experiences may take many forms, including: mystical visions of deities, saints, gurus, or spiritual archetypes; bliss episodes, ecstatic experiences of all-encompassing love, joy, or devotion; unitive experiences, a feeling of union with God or the universal intelligence, or sensing the one-ness of all things; expansive episodes, a sense of a dramatically expanded point of perception; spiritual rebirth, a sudden profound spiritual awakening or spiritual conversion; and illumination, a profound insight into the nature of the universe.

Spiritual energy experiences are marked by sensations of energy coursing up through the body and/or spine, inner light sensations, and inner sounds such as ringing, buzzing, or roaring like the wind, and are associated with a paranormal or mystical experience. Spiritual energy experiences are known by various terms in different spiritual

traditions, including kundalini awakening, shakti, Holy Spirit, Holy Wind, Circulation of Light, dumo fire, Vital Winds, and chi kung.

My own research has led me to the conclusion that the broad range of spiritually transformative experiences may all, in fact, be due to the activation of a latent biological/psychological/spiritual energy mechanism in the body. This mechanism is known and well described in the yogic tradition as kundalini. Kenneth Ring in his book *Heading Toward Omega* (1984) speculated on kundalini awakening as being the cause of NDEs. Research underway, coordinated through the Kundalini Research Network, an international research collaborative, suggests that persons having all types of spiritually transformative experiences, including NDEs, have symptoms suggestive of kundalini activity.

Gopi Krishna, a contemporary Indian scholar and kundalini researcher, presented a very detailed modern perspective on kundalini and its possible causative role in NDEs and other spiritual experiences. He provided a concise update of the ancient yogic kundalini knowledge in his many books on the modern kundalini hypothesis (Krishna, 1971, 1972a, 1972b, 1974, 1975, 1978a, 1978b, 1978c, 1988). Near-death experiences are caused by a transient kundalini awakening, in his opinion.

Krishna described an ancient yogic practice, perhaps 5000 years old, called kercheri mudra, in which a spiritual aspirant would attempt to induce a mystical state by deliberate partial asphyxiation, an intentional NDE. The aspirant would make fine progressive cuts in the frenulum under the tongue, to enable the tongue to flex farther and farther backwards. In time, the aspirant would eventually be able voluntarily to obstruct the airway with the tongue. In the yogic esoteric tradition, it was believed that at the time when the airway was blocked in this manner, the kundalini energy would sometimes awaken from its dormant center at the base of the spine, and carry a potent stream of life energy or prana to the brain, to protect the brain from hypoxic injury. At the point when the kundalini mechanism drives the potent prana to the brain, the aspirants would experience their goal, a mystical state of consciousness, today called a near-death experience. The kundalini would not always arise with this practice, for reasons unclear then and still unclear now.

### **The Modern Kundalini Hypothesis**

The modern kundalini hypothesis, as first put forward by Gopi Krishna, provides a "missing link," a plausible theory to account for the biopsychospiritual basis for all types of paranormal and spiritual experiences, including near-death experiences. It is a modified and

modernized version of the kundalini theories put forward in the ancient yogic texts, the tantras, and the shakti-shastras.

The basic premise underlying the modern kundalini hypothesis is that there exists a yet unidentified life energy present in all living creatures, called prana in the yogic tradition, chi energy in the Orient, and bioenergy, bioplasma, or the life energy in the West. This subtle, intelligent life energy vivifies each human cell, and circulates through the nervous system to the brain, providing psychic fuel and the substance of consciousness for our minds. Under certain conditions, a normally dormant potential mechanism in the body is activated, causing two distinct changes.

First, the body is stimulated to send a stronger, more potent stream of prana and a psychic nutrient, ojas, to the brain via the central nervous system. Second, a previously dormant region in the brain, the brahma randhra, becomes stimulated into activity, leading to the development of an expanded range of conscious perceptions, which are presently considered paranormal or mystical experiences. This two-pronged potential mechanism is called kundalini, and its activation is called kundalini awakening.

In the modern kundalini hypothesis, Krishna proposed that with the awakening of the kundalini mechanism, a more potent form of prana or bioenergy streams to the brain via the spinal cord. The human nervous system has this yet unrecognized activity in addition to its normal functions. Certain cells of the body produce prana, perhaps in the mitochondria. Air and food also contain prana. The peripheral nervous system extracts prana from the cells of the body, from the air we breathe, and from the food we have eaten, and transports the prana to the brain via the central nervous system. This prana is used by the brain as psychic fuel.

The sexual organs and the nerves are the two major storehouses or reservoirs for prana in the body. Upon the activation of the kundalini mechanism, the nervous system is stimulated into a higher degree of activity, to extract greater amounts of prana from all the cells of the body, and especially from the reservoirs in the sexual organs and in the nerves.

The sexual organs are said to also be capable of sending subtle essences, or ojas, extracted from and transmuted out of the sexual secretions, upward, via the spinal cord. This ojas is said to act as a tonic and regenerative elixir, nutritive for the evolving brain center. It is postulated that these fine essences normally vivify the seed, if emitted downwards during the sexual act. If the sexual secretion essences are instead transmuted and released upwards as ojas, they provide a concentrated form of psychic fuel with regenerative capabilities for the

newly activated, transforming brain center. This sublimation of the sexual secretions and their transmutation into psychic fuel is known in the yogic tradition as *urdhva-retas*, literally translated as upward flow of semen.

Further, it is proposed that upon the awakening of the kundalini mechanism, a previously dormant region of the brain, known in the yogic tradition as the *brahma randhra*, is "awakened," or stimulated to activity. The exact anatomic location of the *brahma randhra* is not presently known, but it is said to be centrally located in the brain, just above the rear of the palate. It is thought *not* to be the pituitary, and probably *not* the pineal gland.

When properly fueled with the increased amounts of potent prana extracted by the now more highly active nervous system, and nourished with the nutritive *ojas*, the newly activated *brahma randhra* region of the brain begins to function, usually in a limited way initially. In time, as the *brahma randhra* is continuously stimulated, it transforms and develops, resulting in the brain developing new mental faculties, new channels of perception. This change in consciousness is described in various mystical and esoteric traditions as the opening of the third eye/inner eye, the development of the sixth sense, or shedding of the veils of *maya*.

As this brain center first activates, only transient flashes or brief episodes of new expanded mental perceptions may occur. Often, the paranormal perceptions may initially occur only during meditation, prayer, or during times of deep absorption and concentration. With time, if the kundalini remains active, and the *brahma randhra* continues to be stimulated and fed with increased amounts of healthy potent prana, the brain becomes gradually capable of more frequently perceiving subtle energies and dimensions normally beyond perception by the human mind. A condition is often reached, in time, in which a person with an awakened kundalini regularly has mystical visions and paranormal experiences during meditation. This episodic and variable pattern of experiences of expanded states of consciousness may continue for the rest of the person's life.

In extremely rare cases, after many years of stimulation by the kundalini mechanism, the *brahma randhra* region of the brain may become completely activated and transformed to a level of stabilized, ongoing, full functioning, while the person is able, at the same time, to maintain concentration on external realities also. Such a person would exist in a perennial state of mystical ecstasy, with the third eye always functioning. They would live in higher consciousness, in constant mental contact with the subtle energies behind the universe,

not just during meditation, but also while participating in external worldly activities.

This state is called the sahaja-samadhi, the sahaja state, or the turiya state in the yogic tradition; Buddha consciousness, Christ consciousness, or perennial enlightenment in other traditions. The term sahaja means "co-emergent," describing the coexistence of two states of consciousness, mystical ecstasy and normal worldly mental functioning. Richard Maurice Bucke (1901), the Canadian psychiatrist, called this "perennial cosmic consciousness." Ring (1984) called this "omega," after Pierre Teilhard de Chardin. Bucke, Ring, and Krishna all hypothesized perennial cosmic consciousness to be the next evolutionary step for the entire human race.

Upon the activation of the kundalini mechanism, the entire body and all the bodily organs must adjust to a higher level of activity to meet the higher energy demands of the transforming brain. As the cells become more active and increase their production of prana, and the nervous system becomes more active in its transport of prana to the brain, energy sensations may be perceived. Persons describe feelings of their body tingling with energy, or feelings of energy flowing up their arms or legs, and frequent sensations of energy streaming up their spinal column to the brain. Unusual sensations may be felt at what are called chakra points in the yogic tradition.

Chakra points are said to be energy centers, associated with the body's major nerve plexuses as well as with the subtle/etheric energy body, perhaps acting as communication points between the nerves and the etheric body. The exact number and locations of the chakras are disputed among various traditions. In the yogic tradition there are said to be seven chakras. Five chakras are said to lie along the spine, the lowest at the base of the spine, the second a few inches higher, the third at the solar plexus, the fourth at the heart region, and the fifth at the throat. The sixth is at the third eye region, by the forehead between the eyebrows, and the seventh is just below the crown or top of the head.

After a kundalini awakening, various energy sensations may intermittently be felt at these chakra points. Energy vortices may be perceived at the chakra points, as if the pranic and bodily energies swirl and communicate at these centers. Persons may also perceive pranic energy flows throughout their body. They may perceive luminescent prana circulating about their body organs and flowing upwards through their nervous system, or colors and subtle glistening energies surrounding the body in an aura.

Following a kundalini awakening unusual sensations may frequently be felt in several of the bodily organs. Most marked sensations

may be felt in the sexual organs, as prana is extracted from these potent prana reservoirs, and as ojas is ejected upwards. An upward sucking sensation from the genital area may be perceived, as well as unusual fluctuations in sexual energy and sexual desire. Spontaneous orgasms may occur, as well as orgasms without outward release of ejaculate. The increased activity of the other bodily organs may be noticed especially in the digestive system, with an increase in appetite and an increase in the frequency of bowel movements, and in the heart's activity, with an increase in pulse rate.

### **The Kundalini Hypothesis and Near-Death Experiences**

Most near-death experiences follow certain patterns. This has been well documented by the research of Raymond Moody (1975; Moody and Perry, 1988), Ring (1984), Melvin Morse (Morse and Perry, 1990), and Tom Harpur (1991), as well as by my own clinical experience and research. There are definite similarities and patterns in the experiences persons have described when "coming back" from a near-death experience.

Commonly reported features of an NDE, listed in the order that they generally tend to occur, include hearing what was said around the body, strong feelings of peace, unusual inner noises, floating out of the body and clearly seeing the body and surroundings below, a dark tunnel, meeting spirits, white light experiences, a life review, a life border, and abrupt return to the body. Common after-effects include conviction of the reality of the experience; transformational impact, including new spiritual insights, stronger spiritual convictions, and an increased occurrence of psychic phenomena; new views of death, including loss of fear of death; independent corroboration of events witnessed while out of the body; and ineffability of the experience.

According to Moody's near-death research, persons rarely have all of these experiences but commonly persons will have around eight of the 15 features. The order in which these experiences occur, however, seems fairly constant.

The progression of typical symptoms in a near-death experience can be understood in light of the chakras and kundalini activation. It is held by several Eastern esoteric traditions that at the time of death, the kundalini energy awakens, rises to the crown chakra, and enables the spirit to leave the body via the crown of the head. Some esoteric writers even speculated that the silver cord, which is said to attach the spirit to the body, is really a manifestation of the kundalini.

Considering this perspective, the progression of symptoms common during a near-death experience can be explained related to the progression of the chakras as the kundalini is raising. Typically, one of the first sensations during an NDE is a feeling of great peace and calm, that there is nothing to fear, that all is right with the universe. These emotions and feelings are typical of those experienced when the kundalini raises to the heart chakra, a so-called heart opening. According to the kundalini hypothesis of NDEs, these symptoms appear first, because after the kundalini awakens, it first rises to the heart chakra, a so-called partial kundalini awakening.

As the NDE continues, the kundalini rises farther up the body. When the kundalini reaches the third eye or sixth chakra, a psychic awakening occurs, and an out-of-body experience results. This out-of-body experience, floating above the physical body and accurately viewing what is happening below, almost invariably occurs *after* the feeling of peace begins in an NDE.

If the NDE continues, the kundalini continues to rise even higher, and reaches the crown chakra. It is upon reaching the crown chakra that the individual experiences a mystical experience, and experience of the light. The classical symptoms of the kundalini reaching the crown chakra are light, expansion of consciousness, and a mystical experience with or without a mystical vision. This is typical of the experiences NDErs go on to have, such as the dark tunnel with light at the end; feeling merged into the light; having mystical visions of saints, gurus, and deities; visions of departed loved ones; and receiving spiritual life messages. Classically, kundalini awakening is also associated with the experience of an inner sound, another symptom frequently described by NDErs.

According to the kundalini hypothesis, once the kundalini mechanism is initially activated or awakened, especially if raised to the crown or seventh chakra, it rarely turns off completely. The kundalini returns to the root chakra after the NDE, but the mechanism would then continue to be active, but to a small degree. This is in keeping with Morse's research observations described in his book *Transformed by the Light* (Morse and Perry, 1992). He documented that those NDErs who saw the light were the ones who were spiritually transformed afterwards, with a loss of the fear of death, an increase in spiritual focus, and an increase in psychic experiences after the NDE. Those NDErs who never experienced the white light did not experience such a spiritual transformation.

According to the modern kundalini hypothesis, those NDErs whose kundalini rose to the crown chakra are those who saw the light. These

experiencers therefore never had their kundalini mechanism completely shut off afterward. The NDE would result from a sudden blast of high kundalini stimulation of the brain, with the years afterwards having a more subtle, gentle kundalini activity continuing on, making their minds more open to mystical and psychic experiences.

Further, the low level of kundalini activity after the NDE may increase over time, eventually becoming perceptible to the NDEr as ongoing or recurrent low level kundalini symptoms, such as ongoing inner sounds, intermittent light perceptions, or intermittent rushes of energy up the body and/or spine. This ongoing kundalini activity may also be noticed by its effect of gradual stimulation of the brahma randhra brain center. This stimulation would be perceived as the gradual development and increase in frequency of psychic experiences, recurrent mystical experiences, or more rarely as an increase or development of inspired creative gifts.

According to the modern kundalini hypothesis, most NDErs who experienced the light should notice some degree of gradually increasing, ongoing kundalini transformation following their NDE. Those NDErs who further stimulate their kundalini through yoga, meditation, intense prayer, intense concentration, or other spiritual practices are the most likely to notice a perceptible increase in kundalini symptoms over time, with the development of recurrent psychic and/or mystical experiences.

### NDE-Like Experiences

NDEs appear to be a very broad spectrum of experiences related in time to being close to death. I use the term "NDE-like experiences" to describe the mystical and out-of-body experiences reported by persons who have *not* been physically dead or unconsciousness and then resuscitated. Persons who have come *close* to becoming unconscious or who had a very brief brush with death will sometimes report an experience that includes only two or three of the early NDE features listed above, typically being overwhelmed with a feeling of peace, and then an out-of-body experience without an experience of light. This experience ends abruptly when the person is rescued or resuscitated.

NDE-like experiences have also been repeatedly reported by persons who *thought* they were going to die, but who never actually became unconscious or clinically dead. These persons, however, *psychologically* faced death. This has been well documented on the battlefields of war, with many soldiers in the line of fire, believing themselves about to be

killed, reporting out-of-body experiences, seeing their life flash before their eyes, feeling the presence of loving spirits protecting them, and experiencing many of the other classic features of NDEs.

Close-call automobile accidents are another frequent psychological trigger of NDE-like experiences. Many people anecdotally will describe seeing their life flash before their eyes, or transiently flipping out of their body in very frightening or life-threatening situations. I view these experiences as being somewhere in the spectrum of NDE-like experiences of consciousness, less dramatic than a full blown NDE, but clearly related. They may be due to a psychological triggering of a partial kundalini awakening.

The final group of NDE-like experiences is the mystical experiences had by persons *shortly before* they actually die. These are called "death-bed visions" by some researchers. As a medical doctor, I often work with elderly patients, hospitalized with illnesses that will ultimately cause their death. Repeatedly I have heard elderly persons tell me that they had a mystical "vision" or a "dream." Sometimes they report seeing a dark tunnel, with a brilliant white light at the other end. Often they will describe seeing the spirits of deceased loved ones coming to greet them. They may say they saw beautiful luminous spirits of their departed spouse, parents, siblings, or even close friends. Sometimes they will report seeing visions of one of their religious prophets welcoming them, such as Christ, or Mary.

These persons close to death often know inwardly that they will be dying shortly, and they interpret their NDE-like experience as being a sign of their impending death. After the NDE-like experience, the terminal person is usually changed, they become much calmer, much more at peace. They will often try to use their remaining time to tell their family members that they love them, and not to grieve for them. They may reassure their remaining relatives that death is welcome to them, and that they are not afraid to die. Persons who have had this type of prior-to-death NDE usually die a very peaceful and serene death. I think that death-bed visions may also be related to kundalini activation in *preparation* for death.

### Conclusions

Current scientific understanding can not explain the phenomena of near-death experiences, or any of the other types of spiritually transformative experiences. Research is needed to test the modern kundalini hypothesis, and to examine the relationship between near-death experiences and the development of symptoms of kundalini activity.

This research has begun: I am presently chairing such a project, coordinated through the Kundalini Research Network, an international, nonsectarian research collaborative. In a multi-center study, detailed case histories are being collected from persons around the world who are having various types of STEs, including NDEs.

Although this research is presently underway, some preliminary data, available after the completion of the pilot study in 1991, support the relationship between kundalini and NDEs and other STEs. All the NDErs in the pilot study reported the development of recurrent or ongoing symptoms of kundalini activity. Further, all the NDErs reported the development over time of ongoing or recurrent psychic experiences, as well as recurrent mystical experiences. The sample size in this pilot study was very small, so no conclusions can be reached. However, this preliminary evidence strongly suggests that further research should be done to examine this hypothesis.

My research and personal and clinical experiences have brought me to the conclusion that the entire spectrum of NDEs and NDE-like experiences may all be related to the triggering of the kundalini mechanism, at a time when the body physically or psychologically faces death. Since the kundalini mechanism may also be activated at other times, spontaneously or especially during meditation or intense prayer, this can explain why people also report NDE-like experiences in completely non-life-threatening situations.

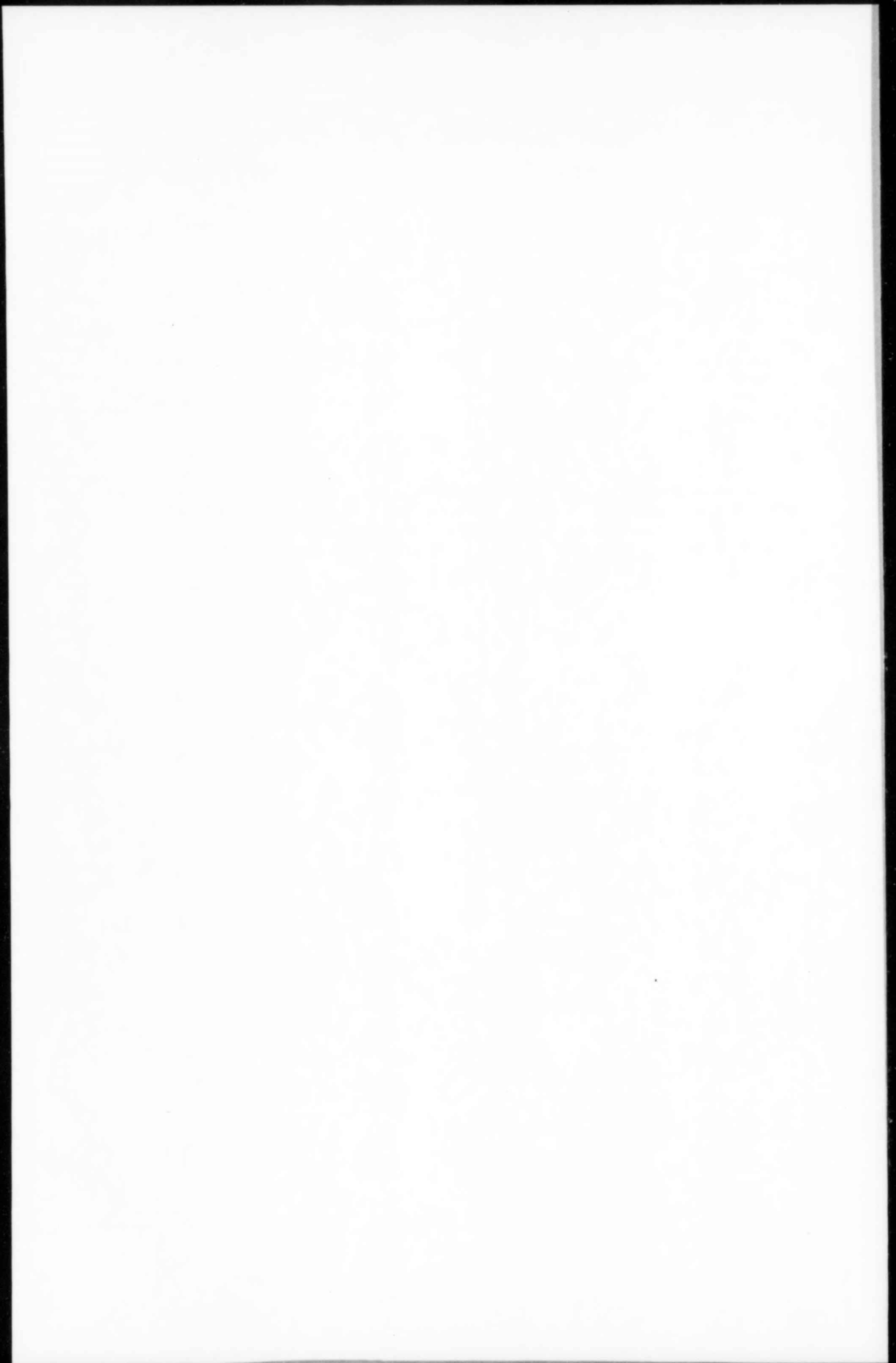
In the case of my own out-of-body and mystical experience in the plane crash, I now call it an NDE with confidence. My NDE began as I psychologically faced death, and continued on until I physically faced death, ending when my body was rescued and out of physical danger. The modern kundalini hypothesis provides a plausible explanation for my symptoms and experiences, both during the NDE and for the 14 years afterwards.

In conclusion, I think that NDEs form one subtype of experience within the spectrum of spiritually transformative experiences occurring to persons in the world today. The modern kundalini hypothesis provides a plausible scientific theory, a missing link, providing a model to understand the biological basis of NDEs and all mystical experiences. As such, the modern kundalini hypothesis warrants extensive research.

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# Kundalini and the Near-Death Experience

Gene Kieffer

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**ABSTRACT:** While many now believe that the near-death experience can, in some cases, activate the kundalini, there is still little understanding of what is meant by the arousal of this power. The awakening of kundalini actually means the reversal of the activity of the reproductive system and the activation of another chamber in the brain, which, if all goes well, can lead to enlightenment or illumination, the next stage of human evolution. One objective proof of this phenomenon is urdhava-retas, the upward flow of the sexual energy. Unless this reversal occurs and persists, there can be no meaningful awakening.

In 1977, the very first issue of *Spiritual India and Kundalini*, a magazine published by the Kundalini Research and Publication Trust in Srinigar, Kashmir, carried a dramatic article by Joseph Dippong, a Canadian businessman. Briefly, the story it told went like this: In 1970, Dippong participated in what might be described as an "encounter group" consisting of 17 businessmen. In a mood of hostility and in the midst of a heated discussion, one of the more aggressive men stared at Dippong and shouted, "Let's kill him; let's kill him." His article described what followed:

And down on the floor I went, with about a dozen or more people on top of me. At first it appeared to be a joke, and I know in everyone's mind, indeed, it was meant to be one—you might say sort of kidding around to prove a point. . . . I was now being deprived of oxygen, without any possible way of communicating this fact with my hands, voice, or anything. . . . The joke had gone too far! Those who were putting me to this test had lost control of the situation.

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... According to the 17 witnesses, my heart had stopped beating and I had no apparent pulse. My lungs stopped functioning, and my body, which had turned almost black was lying motionless on the floor. I was declared clinically dead. There was chaos in the room. Those who had pushed this little joke into a catastrophe were full of terror and fear. . . .

The last thing I remembered was that I prayed to God. The next consciousness—which could have happened in seconds, minutes, years, or even an eternity—slowly began to unfold. At first I was aware of beautiful colours, all the colours of the rainbow, magnified in crystallized light, beaming with brilliance in every direction. It was almost as if I were in a beautiful pasture, with flowers, and the most beautiful, soothing, music ringing in my ears. Music which was close, so soothing, so loving, and the like of which I had never heard before. All this was very familiar to me while in this state of consciousness, like another life, a life after death, the hereafter. I don't know to this day where I was. I was no longer aware of my physical existence on earth, of my friends, my family, or my relatives. It was only consciousness at the time, but what a glorious consciousness it was! Yes, I was consciousness with awareness.

... I could see all and everything at the same time. I was aware of a tunnel, and I was in the middle of this tunnel coming closer and closer to its end. In the far distance I noticed two distinct circles—at least this is how I must describe them in the limited language available to me now. . . .

In the middle of one circle there was a most beautiful figure of a being. It was neither a man nor a woman, but it was both. I have yet to lay my eyes on anything as beautiful as this was. The love which poured out of this being's eyes was immense. The face was shining with an ever-radiant, golden hue—glorious colours and the ever-present, beautiful white light. . . . It was my father—but it wasn't him. It was like going home. It was something way above me, yet it was still a part of me. . . .

The impression I felt at the time was one of omnipotence, of unending, glorious love; love that I had never experienced ever before. It was almost as though I had met my Maker. Indeed, this stupendous, unbelievable, powerful light, which seemed thousands and thousands of times stronger than our sunlight, did not bother my eyes, and I just wanted to have more and more of it.

... The awareness that came upon me—it still persists—was that life is eternal, that indeed we never die. We take on other forms of life and the physical body is nothing else but a sort of container. I had the feeling that life indeed is omnipotent and omniscient. (Dippong, 1977, pp. 33-36)

For years afterwards, Dippong searched for an explanation, talking to many people who had "death" experiences under different conditions and circumstances. Then he began to explore the occult and experi-

ment with various kinds of meditation. He said he met with gurus, lamas, priests, and rabbis, yet no one was able to give him a satisfactory answer to his question.

Finally, in 1975, he visited Gopi Krishna at his home in Srinagar, Kashmir. Dippong wrote that this meeting

turned out to be three hours of the warmest, kindest and most informative conversation I have ever had. . . . For the first time in more than 100 attempts, it was the Pandit who not only explained what the vision was and what my experience meant, but also described and explained to me the enchanting colours and feelings behind the experience. (Dippong, 1977, pp. 36-37)

According to Dippong's article, the pandit also shared with him some unusual, often bizarre, practices that some yogis have undertaken, and still do on occasion, in order to reach the higher, blissful states of consciousness. One of these practices, called kercheri mudra, involves cutting part of the ligament at the base of the tongue. It takes several months to complete the operation, because each new incision is made only after the previous one has healed.

When the ligament is finally cut back sufficiently, the yogi attempts to swallow the tongue in an effort to induce suffocation, hoping that under such extreme conditions the kundalini will awaken momentarily, sending prana or nerve energy up the spine to the brain. This practice sometimes proves fatal. This phenomenon may explain why, each year, a considerable number of adolescent boys accidentally hang themselves.

Over the years, I often discussed near-death experiences (NDEs) and other mystical experiences with Krishna, and I have read most of his writings, including those not yet published. Among the more important points he made was that kundalini is not the energy itself but rather is a *mechanism*. He insisted that in the not-too-distant future science will discover that kundalini is the biological mechanism responsible for human evolution. This mechanism, he said, involves every cell in the body, including the brain and nervous system, even the genes, and therefore has an effect on the progeny of those whom it transforms.

The key to understanding the kundalini process is prana, which has two aspects, cosmic and individual. By individual prana, Krishna meant the subtle biochemical substance that it creates as a link between itself and the atoms of matter. In the final analysis, atoms

vanish into energy. Kundalini is the mechanism, or power center, through which both the cosmic and individual prana are intermingled and regulated. Although it is actually immaterial, prana, in its individual aspect, is life-energy, and it is fully conversant not only with the laws of matter but also with the complicated organic forms it has to create.

Like the atom and its ingredients, electrons and protons, prana is in a perpetual state of activity. The difference is that prana is conscious, with super-intelligence transcending time and space. It can shape and mold matter, according to given laws, to create individual prana and organic formations.

Both aspects of prana spring from the same source, the cosmic shakti or energy. Subsequently it takes two forms, the organic and the inorganic, to create the universe. All bodily functions are conducted by universal prana, or, in other words, by cosmic life. It is like electromagnetic waves that come to the television or the radio. We all have pranic bodies, and universal prana pervades the whole body, but the body makes use of only a small portion of it.

When a failing organ in the body has to be replaced in an operation, it is not the surgeon who performs the healing process; nor is it the mother who directs the development of the embryo in the womb. Both are conducted by prana. All mental activity is also due to prana. It is the prana that supplies energy to the brain for thinking, feeling, and every act of will.

In a near-death experience, this same conscious life-energy endeavors to make a last-ditch effort to save the brain by rallying all available organic resources into action. The mechanism that powers and regulates this life-saving operation is kundalini. Then a more powerful prana, acting as the agent of kundalini, flows directly into the brain, causing the visions and other mental phenomena so frequently described by those who survive the crisis.

The difference between normal prana, which operates in everyone, and the more powerful prana that springs into activity at the onset of an NDE or sudden kundalini awakening, is that the latter is lustrous. In normal consciousness, there is no ingredient of luminosity. But when this higher prana pervades the head, a bright effulgence fills the brain and eventually becomes an inseparable part of the transformed consciousness, if all goes well.

Immediately after the awakening, which can sometimes be precipitated by a near-death experience, the rhythm of the body changes. The pulse becomes quicker and the blood courses more rapidly through the

body. There is increased activity in the digestive and eliminatory organs, too, because the whole body undergoes a process of rejuvenation in order to adjust itself to the new life-energy sent up by kundalini.

Krishna (1972) described the entire process in detail. From the very beginning, he wrote, the whole head is filled with a lustrous glow, and a stream of energy pours into it through the spinal canal. Every part of the brain is flooded with an indescribable light. Concentrated vital energy from all parts of the body, even from the toes and fingers, is felt flowing through all the nerves, coming together in the spinal cord, then rising as a stream of blissful nectar into the highest center of the brain. This nectar is also known as ambrosia and soma, which are repeatedly mentioned in the *Rig Veda* (Ingalls, 1957).

At the start, the energy is directed into the brain from the base of the spinal canal. But later on, when the entire network of nerves in the body is stimulated to activity, the energy pours into the spinal canal through *all its length* and is then carried into the brain.

A not altogether inappropriate way of thinking about the evolutionary process is to imagine a city the size of New York having its entire communication system overhauled and upgraded in just a single month. Once the decision is made to undertake the Herculean project, millions of highly skilled technicians are put to work day and night, replacing the old copper wires and switches with fiber-optic cables and the latest technology in computers and other electronic devices.

Although each technician works both independently and as part of a team, all are under the central control of the master engineer, or in computer terms, the central processing unit (CPU). What would ordinarily have taken two or three generations to complete is now accomplished almost overnight.

The same thing happens when kundalini is awakened fully. That it rarely succeeds in raising a person to a higher state of consciousness, by completely rebuilding the nervous system and brain, simply means that not all conditions have been met. In most cases, after the first experience, the process dwindles to an extent that a permanent transformation of the body and the brain is precluded.

Regeneration reaches its fullest expression in only a few cases, mainly because heredity plays an essential role in the process. Few people have the right combination of genes to permit such an evolutionary leap in a single lifetime. Because the kundalini process affects even the most subtle levels of the molecular and genetic structure, the expanded consciousness achieved by the fully awakened individual is,

to a large extent, passed on to his or her progeny, thus advancing the evolution of the race. That, too, is why celibacy after the transformation is completely unwarranted.

The NDE, then, is just another of nature's ways of hinting every now and then at what lies ahead for each one of us. It is like a tug upward, reminding us to try to make the ascent. If it really signifies the awakening of kundalini—and sometimes it really does—then the evolutionary process begins and, at the very least, it should result in a permanent change in personality.

In that case it is essential that the individual be given reliable information, and this can seldom be found in occult or speculative books or through hearsay. Like a woman who has just conceived, the individual must carefully regulate his or her life to maintain optimum health for the new, rapidly developing personality. The correct foods, including those high in protein, should be consumed in abundance; adequate sleep and rest are very important; and in every way possible, those individuals in whom the power is newly activated should try to remove themselves from stressful conditions and inharmonious environments.

Since this is rarely possible in modern society, due to economic factors beyond the individual's control, the chances of a successful conclusion are so slim, even when all other factors are right, as to be almost negligible. It is not nature's fault if the seed of a rose falls on barren soil, nor is it her fault if the awakened person must earn a living and support a family in an inhospitable atmosphere. That is why society must change.

Kundalini was called Vach, the Goddess of Speech, because one of the first symptoms of a healthy awakening is vaikhari, the spontaneous flow of words, full of wisdom and worth. The transformed subject must become something even more than a genius, an illumined seer. Krishna was convinced that in the future, when the secrets of kundalini are better understood, many enlightened sages and polymaths will arrive on the scene to help guide the race to higher states of consciousness. *Panchastavi*, a hymn in five cantos written by an anonymous illumined Kashmiri poet about a thousand years ago, said: "Thou [kundalini] bring them to fullness, and they thus become world-teachers" (1976, p. 73).

Just as the normal period of human gestation is 280 days, so kundalini also has its normal term. According to Krishna, that is usually 18 months. This does not mean the process is completed in that period. If all conditions are right, it will continue through one's entire lifetime.

But the first 12 to 18 months are by far the most critical, just as the time spent in the womb is the most critical for a new life.

During this period, one should remain celibate. The reason for this is that the semen in men or erotic fluid in women is being transformed into the pranic radiation that supplies nourishment to the brain and nervous system, as well as fuel for the expanding flame of consciousness. If there is one thought that should be inculcated into everyone interested in the evolution of consciousness, it is contained in *urdhava-retas*, a Sanskrit word that means, literally, reversal (*urdhava*) of the seed (*retas*), that is, the upward flow of the seminal essence. In common usage in India centuries ago, it was synonymous with the word "illuminated" or "enlightened."

Although it may take thousands of years before *Homo sapiens* fully understands how evolution works in the human body, we already know enough to cooperate in many ways. We should not fear that adults in whom kundalini awakens will employ their newly acquired powers for selfish goals. Nature has provided built-in safeguards that turn the energy against anyone who employs it to gain an advantage over others.

We should, however, develop of healthy fear of those in whom kundalini is already active *at birth*, should they choose to pursue evil ends. It is our responsibility to make this knowledge widely known, so that such individuals can be easily recognized, and their ambitions thwarted before they exceed manageable bounds. In this age of the electronic media, when charismatic men and women can manipulate the masses should they so wish, the knowledge of kundalini is essential for humanity's survival.

### The "New Aquarian Conspiracy"

From the dawn of the Age of Aquarius, New Age writers have avoided the issue of evolution. The scholars who have focused their attention on kundalini have not furnished a clue as to the magnitude of the subject they are addressing, as though they are as much in the dark about its implications as their students and readers.

What is going to save the race from nuclear annihilation and lead us into the Promised Land, if not accelerated evolution? The publicity attending the publication of Michael Murphy's *The Evolution of the Body* (1992) is only a murmur compared to the uproar that will deafen our ears once kundalini is properly presented to the media; it is but the tip of an iceberg of controversy that will rip through the American

psyche when the public begins to understand what is really at stake. And when the stakes *are* known, only those who have an in-depth knowledge of kundalini will be able to calm the waters and rescue the drowning multitudes. In such troubled waters, writers like Murphy who have ignored kundalini will be of no help whatsoever.

Those who write about evolution in general and the mechanism of evolution in particular should be acutely aware that no other subject, with the possible exception of nuclear disarmament, is as important to global survival. In failing to take into account kundalini and its implications, the authors risk the stern rebuke of future scholars who will take up the same quest in the decades and centuries to come.

The doctrine of kundalini signifies the discovery of one of the greatest secrets of nature known to humankind. The only way of crossing the ocean of illusion that now befuddles science is to attain the next higher dimension of being, where the sensual world ceases to dominate the mind and reveals itself to be nothing but a projection of an Almighty Consciousness.

When the truth of this doctrine is empirically established, it will cause a revolution. Most of the seemingly insurmountable problems facing us today, including drugs, uncontrollable population growth, environmental pollution, and religious fanaticism, are but symptoms of obstructed evolution and will dissolve once science comes to grips with kundalini.

To get a better perspective of this future battle of the minds, it might be helpful to review a few incidents of the recent past, because a whole new generation has grown up since kundalini was first brought to our attention. I met Krishna for the first time in 1970 in Zurich, two years after his autobiography, *Kundalini: The Evolutionary Energy in Man* (1971b/1968) was published in England, and just before it was brought out in the United States. He had already completed *The Secret of Yoga* (1972), and in a letter I had received some months earlier, he had asked me to find a publisher for it. That same year I incorporated the Kundalini Research Foundation in New York as a nonprofit, tax-exempt organization.

Although *The Secret of Yoga* (Krishna, 1972) was a scholarly work with numerous references to ancient and obscure treatises difficult to find, its chief value lay in its descriptions of the transcendent state, as far as was possible to do so linguistically in our present state of knowledge. Like many of the books Krishna wrote subsequently, it was also of considerable value in suggesting the means to achieve this state, and in making the world aware of the dangers inherent in continued violation of the biological laws of evolution.

By 1970 more than 30 years had already passed since Krishna awakened the kundalini in himself, and during those intervening years he had gathered a large amount of documentary evidence to bolster the remarkable knowledge he had obtained through intuition. In a letter to me he wrote (personal communication, 1970):

My first book is free of any scholarly references. But I could not continue to write in the same vein forever. I have absolutely no desire to introduce supernatural romance, adventure, or phantasy in the realm of the super-conscious. The descriptions I am providing must be found valid even after a thousand years. Just as the descriptions contained in the Upanishads stand true even today, after a lapse of more than 2,500 years, in the same way the accounts contained in our books should stand true 2,000 years from this date. In order to adhere to this principle, meticulous care is necessary in the choice of words. What I am asserting must be verified by posterity word for word.

Ruth Nanda Anshen, protege of Alfred North Whitehead and a personal friend of Pope Pius XII, Albert Einstein, Jonas Salk, and other intellectual and spiritual luminaries, published *The Secret of Yoga* (Krishna, 1972) in her prestigious Religious Perspectives Series at Harper and Row. She also published a shorter, introductory treatise, entitled *The Biological Basis of Religion and Genius* (Krishna, 1971a), which included a 46-page introduction by Carl Friedrich von Weizsäcker, Director of the Max Planck Institute for Life Sciences.

Von Weizsäcker had been the protege of Werner Heisenberg, with whom Krishna had discussed kundalini in depth at a meeting in Munich in 1968. Heisenberg told Krishna that he agreed fully but could not express his view publicly because of the damage it would do to his reputation as a physicist. When Adolph Hitler asked Heisenberg and von Weizsäcker to work on the atom bomb, Weizsäcker refused; after World War II he was honored by the German government for this, and for his scientific achievements, by giving him his own Max Planck Institute. For a scientist of such worldwide repute to write a lengthy introduction to a small book by an obscure, uneducated clerk from a remote region of the Indian subcontinent was unprecedented; Anshen, however, was well aware of its historic significance.

Taken together, these three books comprised a wealth of detailed information on kundalini, and yet, so surprising was the "secret" of yoga that hardly anyone took notice. What few reviews were written omitted any mention of the secret; this despite the fact that the secret was explained on the dust jacket in boldface caps:

[The book] is an exploration of the complex terrain of Yoga and its source of energy, *Kundalini*, in the light of modern knowledge. Gopi

Krishna distinguishes *Kundalini* from the miraculous and supernatural to bring it within the orbit of a demonstrable natural law governing the evolution of the human race. He surveys the aim of Yoga and how it can be achieved, describes its disciplines and physiology, discriminates between the true understanding of Yoga from the false, outlines the biology of *Kundalini*, its fact and fiction, and presents *Kundalini* as the key to enlightenment and Cosmic Consciousness.

And the person who achieves a metamorphosis in consciousness, says Krishna, reaps a harvest of transcendent, genius, and psychic powers. Although many modern authors acknowledge the psychic gifts, ecstasies, visions, and enlarged consciousness that these individuals enjoy, these same writers maintain a silence with regard to the intellectual stature accorded to these special few. This omission, argues the author—the remarkable increase in intellectual power—is THE SECRET OF YOGA. (Krishna, 1972, dust jacket)

From the very beginning in 1970, my job, as a former newspaper editor and public relations man, was to do my best to make this information available. To this end, I mailed out more than a thousand copies of *The Biological Basis of Religion and Genius* (Krishna, 1971a) to scholars and scientists, and more than 300 copies of *The Secret of Yoga* (Krishna, 1972) to professional journals, magazines, and newspapers.

Years later, Kenneth Ring and I discussed the subject several times. This was all the more reason for my disappointment when I received a complimentary copy of his book *Heading Toward Omega* (1984) shortly after its publication. Several of Krishna's books were listed in the bibliography, which pleased me very much, but his descriptions of kundalini were wholly inadequate. Moreover, there was no emphasis at all of its inestimable value to mankind. While it is true that Ring's primary aim was to explore the links between kundalini and the near-death experience, he had included just enough information to give readers the impression that they now knew the basic facts about the former. Unfortunately, however, this was not the case.

Kundalini is the reversal of the reproductive system. There would be no kundalini without the reversal of the sex energy. To describe the kundalini process and not emphasize and elaborate on the all-important sexual connection was the same, in my opinion, as not describing it at all. Furthermore, Ring, like nearly all the other writers on the subject, showed little or no appreciation of the fact that for thousands of years knowledge of kundalini was a jealously guarded secret. In his chapter on "The Biological Basis of NDEs," he wrote, "Although the literature on kundalini is now extensive, the term is still unfamiliar to many people" (Ring, 1984, p. 229). This is a misleading statement.

The word "kundalini" has still to appear in any dictionary, nor can anything about it be found in any general encyclopedia. When Richard Milner included references to kundalini in *The Encyclopedia of Evolution* (1990), he was chided by specialists in evolution at the Museum of Natural History, where he is an editor of *Natural History* magazine. By no stretch of the imagination can the literature on kundalini be considered "extensive." The knowledge of kundalini is still a secret, despite the numerous "kundalini masters" who claim otherwise in the advertising pages of New Age magazines.

Ring quoted Stanley Dean rather extensively, citing the Miami psychiatrist as an authority on what Dean called "ultraconsciousness" (Dean, 1975). Dean described ten characteristics of a person who has experienced such a state, but omitted mention of the one essential characteristic, namely the upward flow of the seminal essence or radiation. Though his views on the "ultraconscious" state added nothing new to the literature, he clearly understood the historical significance of *anything* on mysticism in today's materialistic world enough to have his short paper on psychiatry and mysticism read into the Congressional Record.

Some months after John White borrowed from me more than a dozen books on kundalini, his *Kundalini, Evolution and Enlightenment* (1979) was published, and those same few books had formed the basis of the anthology, the very one that had given Ring the erroneous impression that literature on the subject was so extensive. White introduced me to Edgar Mitchell about the time that Mitchell was considering the possibility of founding the Institute of Noetic Sciences. He wished to have Krishna's opinion on the idea, and asked me to forward a letter to him in Kashmir. The pandit's response was a 40-page letter in iambic pentameter. Here is a sample stanza taken from page 25 of the letter in verse:

What hope can you see for a world distraught  
By hundreds of conflicting streams of thought?  
The growing vagrancy, indiscipline,  
Promiscuity and disaffection in  
The youth stem from the fact that they are not  
Harmoniously united in their thought.

The object of the evolutionary drive  
Is that the embodied soul should learn to dive  
Into the Deep, of which he is a drop,  
To reap a more and more abundant crop  
Of knowledge, for man has but made a start  
Towards a peak, if he plays well his part

Where such a feast is spread before his eyes,  
That nothing on the earth nor of the skies  
Compares to it, where, brighter than the sun,  
The cosmos fuses with the Eternal One.

Julian Huxley, the eminent British biologist, also exchanged views with Krishna and received a similar response in verse that ran to 57 pages. Afterwards, Huxley, whose faith in agnosticism seemed to have been slightly shaken by it, replied to the effect that perhaps the pandit's views were not so far off the mark after all. He wrote, in part (J. Huxley, personal communication, April 5, 1972):

I suppose I could be described as an atheist, but I prefer the term agnostic, coined by my famous grandfather, T.H. Huxley. Frankly we just don't know anything about a God or Gods, about Divine guidance or control of planetary and human affairs.

However, I still maintain that biological evolution can be "explained" (or understood) in terms of a modernized version of Darwin's Natural Selection; and that this applies also in part of Man's evolution, though here additional elements come into play—conscious thought and will, and social organization and tradition. . . .

Character derives from one's own action and knowledge—or through "transcendental" life-enhancing experiences. Please give my best regards to Mr. Krishna and say that I think we are brothers in the great adventure, even if we don't agree over details and methods.

By the time the idea for *Heading Toward Omega* had jelled in Ring's mind, more than ten of Krishna's books had already been published, were stocked by the Kundalini Research Foundation, and were available to anyone requesting them, in most instances without delay and without charge. It is expected that scholars should thoroughly review the literature before embarking on any new writing project, as they stand on the shoulders of those who went before them.

Many professional scientists have experienced the frustration of being set upon, at one time or another, by amateurs who believe they have discovered the secret of the universe. As a rule, such persons are dismissed as crackpots, simply because they do not have the credentials, the discipline, and the tools, intellectual or otherwise, to make their "discovery" meaningful to science.

The exception to this rule is the genuine mystic, whose intuitive powers are generally appreciated by the learned. But even here, there is a big risk, because science has no way of identifying the charlatan. Anybody with a little imagination can write glowingly of "the liquid light flowing up my spine and cascading down my face, as my consciousness merges with the Infinite," etc. As Krishna wrote in "The Way to Self-Knowledge" (verses 275–276):

Not e'en a shadow of the thought  
Of Victory should cross your mind,  
When with the inner changes wrought  
The coiled up power starts to unwind.

This is the sign which they must show  
Who have attained the ecstatic state,  
The Picture from their lips must flow  
In language hard to imitate.

There are two ways to go about demonstrating the somatic basis of kundalini. Although they have been relegated to the back seat by writers on mysticism thus far, both are scientifically doable. The first is, of course, to show evidence of genius where there was none before. While anyone can describe the "mystical flights of the soul," no one can fake real genius, nor real talent. The second way is to verify that the operation of the reproductive system has been reversed.

This too can be observed and measured, for it is impossible that an activity of this nature can occur without leaving unmistakable traces. The constant absorption of the generative fluids and hormones into the visceral organs and their ascent into the brain as an ultra-subtle life-essence cannot leave the blood and the cerebrospinal fluid unaffected. There must be definite signs of it present in both (Krishna, 1975).

This now brings us to the work of the late Itzhak Bentov, to whom I did my best to describe every detail connected with the awakening of kundalini of which I was aware. I particularly emphasized that the whole process revolved around the reversal of the reproductive system, that in fact one could actually observe the sucking, pumping action in the region of the perineum immediately following a forceful arousal. It didn't require any electronic measuring devices, but only one's own eyes and a movie camera, provided the awakening were a powerful one.

I told Bentov that in the case of a spontaneous, full awakening, the reproductive organs begin producing copious amounts of semen (or erotic fluid in women), up to 10 to 12 times the amount that could be produced by the same person before the awakening. Bentov, who had been practicing Transcendental Meditation, replied that it all sounded too utterly fantastic to him to be believed.

I knew that practices such as Transcendental Meditation, which often lead to passive, somnolent, or quiescent states, indicated by an alpha rhythm, could sometimes bring visionary experiences or creative flashes, as in dreams. But I also knew they were not designed to awaken kundalini, and that was all the more reason for me to redouble my efforts to make the distinction between the two methods perfectly

clear to him. When his book, *Stalking the Wild Pendulum* (1977), was published, there was no sign that our meetings had produced the desired results. Bentov's publisher had earlier published Krishna's *The Awakening of Kundalini* (1975), which included a chapter on positive and negative views of meditation:

Passive states of mind [such as brought on by Transcendental Meditation] provide rest from tension and can, no doubt, have a curative and calming effect in a tense environment caused by today's complex life. But then, like sleep and hypnosis, they should be plainly labeled as such and not acclaimed as substitutes for Yoga or other active spiritual disciplines which are designed to lead to extended states of consciousness. . . . The alpha and theta states are the very antithesis of the attentive or concentrated states of mind essential for the evolution of the brain. (Krishna, 1975, p. 54)

In other words, if meditation is to be effective in arousing kundalini it has to be *active* in nature, and the mind has to be kept fully alert, focused only on one thought or image. This state of one-pointed attention and absorption is a prominent characteristic of the highly intelligent and talented mind.

The problem with Bentov's theory is that it really has little or nothing to do with kundalini. It may bear on certain symptoms arising from the practice of different kinds of meditation, but that is another subject altogether. Kundalini is the reversal of the reproductive system, brought about through various disciplines, although most generally through the practice of pranayama and the development of powerful concentration of the mind.

Scientists under Keith Wallace at Maharishi International University have been investigating their particular form of meditation, Transcendental Meditation, for almost two decades now, and other scientists, such as Herbert Benson at Harvard, have been doing the same thing. They have shown that many different physiological changes can be detected by ultrasensitive instruments during the course of meditation, or, for that matter, during almost any other activity, including sleep. But what they have not shown is that these particular changes have something to do with higher consciousness.

On the other hand, there are clear references in the words of the well-known Indian philosophers Abhinava Gupta and Shankaracharya to *urdhava retas*, the capacity gained by accomplished yogis to carry the reproductive essences into the *brahma randhra* in the brain, as stated above.

If the apparatus and method devised by Bentov to measure "kundalini activity" were capable of differentiating between a genius and

an ordinary person, then there would be some basis for the claims made for it. But that has not been shown. Nor is it clear to me whether any other scientist has ever replicated Bentov's experiments or whether any of his subjects had in fact actually activated kundalini. The claims of those who believe they have awakened kundalini are only subjective impressions and should not be accepted as proof that something significant has actually occurred.

Many of the symptoms associated with the Bentov physio-kundalini model are similar or identical to the kriyas reported by those who have experienced shaktipat. But as has become abundantly clear over the past two decades, very few, if any, of the individuals who have received shaktipat ever awakened kundalini or have anything tangible to show for it. The question of what shaktipat has to do with evolution has yet to be answered.

Twitches, shakes, spontaneous body movements, strange posturing, and other symptoms may or may not be associated with a genuine kundalini awakening. And since they are of such a minor nature, of such insignificance when compared with the real goal of the kundalini process—genius, transcendence, and illumination—they ought not be given any real importance.

Even as far back as 1973, as conservative a newspaper as *The New York Times* published an op-ed page article headlined "Beyond the Higher States of Consciousness," in which the following information appeared (Krishna, 1973, p. 23):

The all-inclusive nature of sex energy has not yet been correctly understood by psychologists. In fact, the very term reproductive, or sex, energy is a misnomer. Reproduction is but one of the aspects of the life energy, of which the other theater of activity is the brain. The cephalic activity is so slow and subtle as to be almost imperceptible. But this activity is the cause of genius, uncanny psychic powers, and also insanity.

Once this fact is empirically demonstrated, we come to a turning point in our present concepts about mind and consciousness—even about matter and the universe as a whole.

The first harvest of this change will be the beginning of a new science dealing with subtle intelligent energies in the cosmos. When this happens, the gigantic physical world—now dominating the whole mental horizon of science—will be relegated to its proper position. It is but the visible peak of an infinite creation, of which the unbounded major part is sunk below the surface of the space-time ocean, forever hidden from the sight of man.

It is only in higher states of consciousness that a fragment of the submerged portion comes into view, causing a state of wonder and exhilaration that is beyond description. It is only when the evolving

human organism and the cosmos are viewed in right perspective that the appropriate ways of life and conduct, favorable for this transformation, can be devised by science.

We stand today at a crossroads, a cosmic drama unfolding before our very eyes. For the first time in history, we are coming in direct contact with the hidden intelligent forces of nature, not all of which may be our moral superiors. Just as we have malignant forces in the physical world, so too can we be certain that they exist in the spiritual world. It is extremely important, however, that we do not yield to superstition. Carl Jung was right that the gods do dwell within, and that is one more reason why it is imperative that we obtain the right interpretation of the ancient esoteric texts and religious scriptures. For when it comes to the gods within, it is easy to be misled.

The cerebrospinal system is still in a state of evolutionary transition. Surrounding and permeating the gross tissues of the body is a living electricity, acting *intelligently and purposefully, controlling the activity of every molecule of living matter*. It carries the life principle from one place to the other, energizes, renovates, and purifies the neurons and maintains the life-giving subtle area of the body in the same way as the blood maintains the grosser part.

Even holy sages, O Mother, who have completely purged their mind of worldly attachment, with their intellects over-awed (by Thy Splendor) are never able to gain the smallest bit of knowledge concerning Thee. (*Panchastavi*, 1976, Canto v. 24)

Our myths, from the heavenly war in Revelation to the war between science and religious fundamentalism, have revolved around the issue of human evolution. What, after all, was the reason for the break between the Archangel Michael and Lucifer if not their opposing views on evolution? Lucifer wanted humanity to know the secret; Michael did not. For if he had, we would surely have discovered it before now. And so, according to John, "there was war in heaven," and that Old Serpent, the devil, was cast out.

But the Serpent surfaced again in the Garden of Eden, urging our primal parents to partake of the Forbidden Fruit:

And the woman said to the serpent, "We may eat of the fruit of the trees of the garden; but God said, 'You shall not eat of the fruit of the tree which is in the midst of the garden, neither shall you touch it, lest ye die.'" But the serpent said to the woman, "You will not die. For God knows that when you eat of it your eyes will be opened, and you will be like God, knowing good and evil." (Genesis 3:2-5)

The next great battle will be fought over the minds of people, and whoever takes control of the media will have already won the war. Seventy years ago high school biology teacher John Thomas Scopes was ordered not to teach the theory of evolution. The resulting "Scopes Monkey Trial" soon became front-page news around the world, ample testimony that people *are* interested in evolution. The old "Aquarian Conspirators" have failed to carry the torch into the New Age. Now it is time for new voices to be heard.

With the stakes so astronomically high, those who know about kundalini must speak out. Some editors may say there is no pressing interest because evolution operates on such a vast time scale. That is nonsense: if kundalini were nothing more, it surely is the great compressor of time. It can do in one lifetime what ordinarily would take eons to accomplish.

Sociobiologists Charles Lumsden and Edward O. Wilson have sounded the battle cry:

How the last step of megaevolution was attained is a mystery of surpassing importance. Its mere contemplation brings together some of the central questions of biology and philosophy. Armed with scientific insight we can ask again with rising hopes: what is humankind, what created us, and what is our purpose in the world? The search for the origin of mind is more than just another exercise in philosophy. It goes to the heart of all of our assumptions about ethics, polity, and social purpose. (1983, p. 7)

The doctrine of kundalini answers to the Promethean fire. The benefits of knowing even a little bit about the Serpent Power are incalculable. One need not strive to become an illuminated genius in order to reap great rewards. According to Krishna, when the laws about kundalini are known, the life span of humans will increase to as much as 150 years, out of which the greater part will be for our enjoyment and the exercise of all our faculties; just *knowing* about kundalini is enough to increase the flow of prana into the brain.

Nettlesome social problems like abortion will be resolved when the doctrine of kundalini is established. Theologians, philosophers, and thinkers of every description have struggled for centuries to determine what is morally right and what is morally wrong. In the future, the question will be framed more productively: i.e., what accelerates the healthy, harmonious process of kundalini, and what retards it? In other words, thoughts and acts harmful to the kundalini process will be considered "sinful," and vice versa.

In the not-too-distant future, our political, spiritual, and educational leaders will come to know the evolutionary target set for humanity,

and they will also know the best means to approach it. Our job in the interim is to join the battle against inertia, apathy, and ignorance. While there are still many kundalini secrets to be discovered, enough is known to give us the fighting edge in any debate with those manning the reactionary ramparts of the status quo.

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# Near-Death and Transcendental Experiences: Neurophysiological Correlates of Mystical Traditions

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**ABSTRACT:** The first stages of transcendental experiences might be induced by blocking or saturating sensory input to the brain at the level of the hippocampus. This could be accomplished during near-death experiences by blockade of hippocampal NMDA receptors by endopsychosins and during meditation by alteration of the hippocampal theta rhythm. Mystical practices described in ancient yogic or taoist texts may also alter hippocampal theta by breath exercises or labyrinthine stimulation. Many accounts of kundalini awakenings are consistent with this theory, as is an extended version of Itzhak Bentov's physio-kundalini model.

Taking place at the approach of death, near-death experiences (NDEs) might be regarded as a good starting point for those who seek an answer to the question of survival. However, the same kind of NDE occurs in a physiological crisis—the classical NDE—as under psychological stress—the so-called “fear-death” experience (Stevenson, Cook, and McClean-Rice, 1989–90); and the same NDE can occur spontaneously or induced by various psychophysiological techniques in a mystical context. In fact, many aspects of the NDE and its long-term effects have been described both since time immemorial and in contemporary accounts, in most cases with no relationship to imminent death.

NDEs that occur in a true physiological crisis and those that occur under psychological stress can be compared in terms of the manner in

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which they unfold, and in terms of their long-term effects. According to witnesses' reports, these long-term effects do occur, and can be disturbing; no serious near-death study can neglect them.

The question then arises: do we solve this problem of NDEs occurring without imminent death by deciding arbitrarily that all those who experience such phenomena, including important spiritual and religious figures, have suffered pathological hallucinations, or do we admit that those accounts are sufficiently similar and consistent to merit further study?

### **The Phenomenology and Aftereffects of Near-Death Experiences**

As the unfolding of the NDE is by now quite well known, I will present here only some excerpts from French NDErs' accounts concerning essentially their impressions and aftereffects, showing how their concept of life, their sense of values, and their behavior are deeply modified after such experiences. A few examples may be more explicit than a long explanation.

One NDEr talked of "that divine part of man"; she had the impression that "in this life we only half live, and reality is after death," which she defined as a rebirth or awakening. Another said "in each human being exists a divine spark," and for her

earthly reality is an illusion because here on earth we cannot grasp the real sense of life. . . . I had the impression that my body was an integral part of the soil, the water, the sky, stars, and stones. I was both myself and everything at once; it's difficult to explain. . . . I can't say that it was either joy or happiness; it was a sort of well-being that couldn't compare with beatitude, which I have never known. . . . I saw nobody at the end of the tunnel; it was the infinite.

Concerning human beings, she said "they are tiny but all-encompassing; it is for each individual to work towards the essence, but can words express this?"

Another spoke of the descent into infinite love, peace, and the feeling of infinite love reaching the absolute and the extraordinary and warming light in which she bathed.

These experiences are difficult to explain to those who have never known anything similar, due to our limited concepts and words, which seem pale and insufficient, somewhat like trying to translate a sym-

phony into words and describe one's emotions listening to it. One experimenter, for example, admitted:

For a long time, I spoke to nobody of my experience for different reasons. First of all, I didn't want to use words to describe it because I felt they would diminish the splendor, because it was impossible to describe verbally. There was no point in talking about it, because anyway it would have been misunderstood. . . . It's very, very painful to keep it to myself.

During the NDE, there seems to be an opening into a different state of consciousness in which a vaster reality, transcending time, space, and matter encompasses ordinary reality. Apparently this opening does not disappear completely after the experience. It appears, as Kenneth Ring (1984) so aptly wrote, that a seed has been planted, free to germinate or not with time. A few quotations will illustrate this concept:

My sensitivity increased; sometimes I had premonitory dreams and often telepathic powers. I decide to call my mother or my daughter or else I think they will call me, and within five minutes I get a phone call. After this experience I left my body several times.

A more acute sensitivity, telepathic powers, and ability to leave one's body, as well as healing powers and the ability to help others.

Sensitivity is greater, I learn quicker, I can concentrate better, I have a better memory and psychic gifts, but most important, I strive to incarnate myself by trying to decrease out-of-body experiences. It is in and through the body that the experience of life is centered, and nowhere else.

By loosening the ties between consciousness and body, NDEs sometimes lead to many out-of-body experiences. In one instance, a man who became bedridden after a serious accident, in which he had a core NDE, experienced out-of-body experiences nearly every night. During these experiences, he had the sensation of complete identification with anything he fixed his attention on: by observing a tree, he became the tree, its leaves, its roots; he could feel the bird's nest in his branches. Another left his body at night during conscious sleep, an experience that enabled him to help dying people leave their bodies without fear.

These abilities are sometimes a burden, as it appears that precognitive phenomena often involve highly emotionally charged events. The future is not always bright, and even if, for NDErs, death is only the

discarding of a worn-out body, some would willingly do without foreseeing the death of close friends and family:

I quickly discovered in the month that followed my experience that I knew how long people had left to live. . . . Believe me, it's a very uncomfortable realization.

There is another, brighter, more common aspect: many discovered they had the power to help and heal others; altruism and compassion are leitmotifs in these testimonies. One NDEr said: "I develop more and more my capacity as a healing channel; divine energy uses me as its channel." The techniques used are varied, including laying on of hands, a sensation of acting upon the subtle body, shamanic techniques, nontraditional psychotherapy, and accompanying the dying.

Many NDErs describe synchronicities after their experience. Students of mystical tradition, either Oriental or Western, will recognize many characteristics of transcendental experiences and their after-effects. Similar features are described in all mystical traditions, and occur spontaneously even outside those traditions: 25 percent of university students report having had at least one out-of-body experience (Palmer, 1979a), some of which are very similar to NDEs.

### **Kundalini as a Model for Mystical Experience**

I will now focus on one tradition that has described particularly well this awakening to a higher consciousness and the techniques employed to reach it. Hindu tradition describes a "force" or "evolutionary power" called kundalini, symbolized by a snake coiled around the base of the spine. Its awakening and ascension up the spine open up six or seven "centers," called "chakras," along the body's axis. When kundalini reaches the last and highest chakra at the top of the skull, it awakens consciousness to a superior reality. Carl Jung was a forerunner in bringing this concept to Western scientists, having organized a seminar on kundalini in 1932. According to Lillian Silburn (1988, p. xiii):

Kundalini, the upright axis at the innermost center of a person and of the universe, is the very source of man's might, drawing and unfolding all his energies. However, rather than dwelling on the extraordinary powers acquired through her medium, the followers of the Trika, Krama, and Kaula systems lay stress on the peace and the living harmony she bestows.

Still, this mysterious energy aroused by Kundalini yoga manifests with a violence beyond belief and cannot be manipulated without incurring certain risks.

Tara Michael wrote that

when kundalini sleeps in the Muladhara (the first and lowest chakra center), man awakes to the world. But when it awakes and unites with Shiva, man falls asleep to the world and becomes one with the infinite consciousness beyond matter. (1979, p. 34)

It is easy to compare this peace described by Silburn and the infinite consciousness described by Michael with sensations frequently reported in NDEs. Long-term changes that affect NDErs are precisely the changes found in yoga, and the Siddhis or powers that this awakening is supposed to confer—and in opposition to which exist many warnings—are precisely what many NDErs experience spontaneously: transcendence of time, in precognition; transcendence of space in telepathy, clairvoyance, and out-of-body experiences; and transcendence of matter in healing powers. Some experiences are physically and psychically disturbing.

The comparison between NDEs and the kundalini awakening concept has already been described by Ring (1984). One of the characteristics of kundalini is that it is accompanied by various physical, psychological, and sensory symptoms, which have been studied by Itzhak Bentov (1977), who advanced an explanation, Lee Sannella (1987), and Hiroshi Motoyama (Motoyama and Brown, 1978). Yoga has codified these characteristics, but it is worth noting that the same effects have been linked to a number of transcendental experiences around the world. It appears to be a universal phenomenon, at the origin of a set of experiences that humanity has always sought in order to transcend our condition. In order to provide a clearer idea of this kind of experience, I will briefly describe two of the better known examples, those of Gopi Krishna and Motoyama.

Krishna, a Hindu Brahman who had received a Western education, was in no way a mystic. His only tie with Hinduism was regular meditation. One morning, while meditating on a bright lotus on his head, he perceived a strange but pleasant sensation at the base of his spine, which fluctuated according to the intensity of his attention. When he concentrated again with determination, the sensation was renewed and it moved upwards:

Suddenly, with a roar like that of a waterfall, I felt a stream of liquid light entering my brain through the spinal cord. . . .

The illumination grew brighter and brighter, the roaring louder, I experienced a rocking sensation and then felt myself slipping out of my body, entirely enveloped in a halo of light. . . . I was now all consciousness, immersed in a sea of light simultaneously conscious and aware of every point . . . bathed in light and in a state of exaltation and happiness impossible to describe. (Krishna, 1971, pp. 12-13)

That was only the beginning of an experience that was to last years, with moments of exaltation alternating with periods of doubt and depression.

Motoyama, a Japanese scientist, related what he experienced over a period of several months after practicing the breathing techniques of pranayama yoga:

During continued practice, I began to notice some new sensations. I had an itchy feeling at the coccyx, a tingling feeling on the forehead and at the top of the head, and a feverish sensation in the lower abdomen. I could hear a sound something like the buzzing of bees around the coccyx. In ordinary daily life my sense of smell became so sensitive that I could not endure offensive odors.

These conditions continued for two or three months. One day, when I was meditating before the altar as usual, I felt particularly feverish in the lower abdomen and saw there a round blackish-red light like a ball of fire about to explode in the midst of a white vapor. Suddenly, an incredible power rushed through my spine to the top of the head and, though it lasted only a second or two, my body levitated off the floor a few centimeters. I was terrified. My whole body was burning, and a severe headache prevented me from doing anything all day. (Motoyama and Brown, 1978, pp. 240-241)

A few months later he started to have premonitory dreams and frequent telepathic experiences. His wishes seemed to be fulfilled spontaneously. Clairvoyance phenomena developed with the progressive awakening of the different chakras. Sometime after,

I saw a kind of heat energy rising from my coccyx to my heart through the spine. . . . As the kundalini rose from my heart to the top of my head, it became shining white. It left my body through the top of my head and I rose with it into a much higher dimension. (Motoyama and Brown, 1978, p. 247)

He then acquired a healing power. At the same time profound psychic changes took place, and he lost attachment to material things. The awakening of another chakra (the Vissudha chakra, situated at the

throat level) gave him the ability to see the past, the present, and the future in the same dimension.

Similar concepts can be found in other traditions, implying the existence of a universal phenomenon. The *Egyptian Book of the Dead* (Budge, 1967) describes

a symbol of the vital fluid, of the fire snake in the spine. That fluid is the breath of life that the priest passes on by laying his hands on the deceased's nape of the neck to warm and cover him with Isis' heat.

For the Chinese Taoists (Brelet-Rueff, 1975),

Energy does not only flow in meridians; it also concentrates in certain areas linked by forces: the three "Fields of Cinnabar." The upper Cinnabar Field originates from the strange point Inn Trang (between the eyebrows). . . . The middle Cinnabar Field, or "Vermillion Palace," is situated on the chest with the heart as a center. . . . It circulates energies. The lower Cinnabar Field—the third energy center . . . is two inches above the navel. The control of one's breath may allow the transmutation of mental energy into a golden elixir dripping the median canal to mix into ancestral energy and Ki. In a burst of sparks, the substance created by the fusion of the Ki, ancestral energy, and mental energy, flowing up through the central canal to the upper crucible, bursts the universal orbit of Tao into a gold, silver, sun and moon blossoming.

Anthropologist Richard Katz (1982) has studied the Kung, a tribe living in the Kalahari Desert. This tribe has a rite that seems to have a lot of common points with kundalini yoga: its aim is to awaken and set ablaze a force called num, in order to reach a state called kia, in which extraordinary possibilities appear, such as healing powers, remote viewing, and walking on fire. The num is said to lie in the pit of the stomach and the base of the spine. Once started, it flows up from the base of the spine to the skull, allowing people who reach the state of kia. One Kung healer described the action and ascent of num:

In your backbone you feel a pointed something, and it works its way up. The base of your spine is tingling, tingling, tingling, tingling. Then num makes your thoughts nothing in your head. (Katz, 1982, p. 42)

How is this phenomenon produced? Another Kung healer described the experience:

You dance, dance, dance, dance. Then num lifts you up in your belly and lifts you in your back, and you start to shiver. Num makes you tremble; it's hot. Your eyes are open, but you don't look around; you hold your eyes still and look straight ahead. But when you get into

kia, you're looking around because you see everything, because you see what's troubling everybody. Rapid shallow breathing draws num up. . . . Then num enters every part of your body, right to the tip of your feet and even your hair. (Katz, 1982, p. 42)

Sannella, a psychiatrist, is well known as a specialist in these phenomena. He has collected a number of similar contemporary testimonies in a book (1987). People who have gone through an NDE describe similar symptoms followed by similar consequences; an example is Barbara Harris's experience (Harris and Bascom, 1990; Ring, 1984).

Bentov (1977) and Sannella (1987) have collected the physiological symptoms occurring during kundalini awakening under the name of physio-kundalini. These symptoms can be grouped into three categories:

- (a) sensory symptoms, including ticklings, vibrations or feelings of energy in a particular spot, flowing up the spine and then going down to the chest and abdomen, orgasmic sensations, pain starting and stopping suddenly, sensations of cold or heat in different parts of the body, various sounds, internal light sometimes illuminating the body;
- (b) motor symptoms, including spontaneous movements of hands and body, involuntary contractions of the anus, abdomen, or throat, changes in breathing rhythm, sudden locking or paralysis of certain parts of the body; and
- (c) psychological symptoms, including sudden joy or ecstasy, anxiety or depression, acceleration of thought, and expansion of consciousness beyond the body.

## Neurobiological Mechanisms

### *The Role of Breathing*

One clue to what may happen in kundalini awakening is that most of the techniques used seem to aim at disconnecting consciousness of external stimuli from feelings, either by concentrating on a point, as in meditation on an object, a concept, a sound, or a posture; or by reciting a mantra or a prayer, or deep relaxation or contemplation. But one commonality that can be found nearly everywhere is the use of breathing, with, from the very start, the explicit notion of the equation:

$$\text{mind} = \text{breath}$$

Let me present a few examples. The first is a Taoist text, *The Secret of the Golden Flower* (Lao-tsu, 1991). To understand it, one must know two things: (a) that the same Chinese ideogram signifies both "heart"

and "mind," and (b) that this ideogram is itself incorporated into the one that signifies "breathing."

Breathing comes from mind/heart. What comes out of that mind/heart is breathing. . . . Since mind and breathing are interdependent, the revolution of light must be united to a rhythm given to breathing. . . . The great saints, who were aware of how mind/heart and breathing energy influenced each other, made up a simplified method to help later generations. (p. 76)

In the *Hatayoga Pradipika* (II,2), "when breath is set into action, so is the spirit; when breathing stops, so does the mind" (Eliade, 1989b, p. 249). The goal of Tibetan yoga is to weaken this connection (Evans-Wentz, 1967, p. 139):

In consequence, that thing called mind—so difficult to control because of its normal incapacity to function outside the process of breathing which is the cause of the continuous impulses from one thought to another—takes control and gets free from that dependence on breathing. . . .

The length of a thought is equal to that of a respiration. . . . These exercises aim at training the mind to work independently from breathing and therefore being no longer influenced by the process of thinking. Concepts grow up in the mind because of stimuli. Those stimuli must be neutralized and the process of thought disappears; then the mind reaches a natural state.

A similar process is described in the *Vijnanabhairavatantra*, "when one keeps in check the entire flow [of the sense activities] by means of the breath energy of breath which gradually rises" (Silburn, 1988, p. 66).

A praying technique, the Hesychasm, used by the monks of Mount Athos (Eliade, 1989b), consisted of controlling their breathing while repeating the words "Kyrie Eleison." And again, in the Kung tradition, "Rapid shallow breathing draws num up" (Katz, 1982, p. 42).

Numerous shamanistic techniques are based on breathing (Eliade, 1989a), as are the techniques used by famous mediums to facilitate their feats. Eileen Garrett, for instance, wrote:

In order to be clairvoyant it is possible for me by breath, and by breath alone, to lift myself above the normal everyday being. The moment I make contact with those who seek my help, I really, with animal understanding, "sniff" their atmosphere. Therefore, I think much of my clairvoyance could be a "leftover" primitive race faculty. I do exactly as the dog does when he catches the scent of a rabbit. I seize it

and hold onto it until I know a good many needed facts about the personality of the inquirer. (1961, p. 61).

In each of these techniques, one must set a rhythm to one's breathing, either slowing it down, sometimes to the point of apnea, or speeding it up. The states reached by these techniques range from a more or less complete trance to a complete loss of contact with reality, producing a state that, according to tradition, might in its turn lead to a transcendent experience.

In order to sort out the main characteristics, I propose to start with, to put together all those phenomenologically similar experiences, without regard to the circumstances in which they take place. I call "non-ordinary experience" any experience involving continued consciousness and memory and a feeling of reality, along with at least one of the following features:

1. a feeling of beatitude;
2. a feeling of leaving one's body;
3. transcendence of time and/or space;
4. perception by unusual channels, different from ordinary senses;
5. perception in an unusual *form*, such as panoramic vision, melting into or identification with an observed object or phenomenon, or nonverbal perception and comprehension;
6. corroborated access to information impossible to get by ordinary means;
7. perception of or participation in a transcendental event of a spiritual or mystical nature; or
8. long-term effects, such as restructuring, therapeutic, or evolutionary changes, or attainment of paranormal or healing abilities.

### *Organization of Perceptions*

Visual, auditory, and tactile information detected by sensory organs is relayed through the thalamus before it reaches the cortex; that thalamic relay is responsible for orientation and focusing of attention on the sensory field corresponding to what is "new" in the environment. This information, focused by the thalamic relay, is then sent to the cortical area specific for each sensory organ, where it is analyzed and connected with corresponding information from the other hemi-

sphere of the cortex. Once processed, that information is sent to the sensory association areas, where it is integrated and interpreted. Once there, these perceptions are modulated on the affective and emotional level by projections to the limbic cortex.

Olfactory information, by contrast, is processed differently from other sensory input, in that it is sent directly to the olfactory cortex without passing through the thalamus. Belonging anatomically to the limbic system, which appeared phylogenetically before the neocortex, the olfactory cortex has been driven to the center of the brain during evolution. The primary olfactory area is the pre-piriform cortex; the parahippocampal gyrus, or entorhinal cortex, is considered to be the secondary olfactory area.

At that point, we have a series of global but instantaneous representations of the external world. The instantaneous perceptions must still be linked together in time to be understood in a temporal context, allowing purely spatial perception to become spatiotemporal perception. The input from the associative areas is then sent, by way of the entorhinal cortex, to the hippocampus, where a memory bank accesses previous information and links it to the newest input. The information is linked temporally, allowing passage from the instantaneous to the present, and then sent back to the neocortex. This circuit with retroactive loops permanently reprocesses all sensory input. The processed information is then sent back to the neocortex, where semantic and cognitive integrations are made.

### *Long-Term Potentiation, Hippocampal Theta, and Survival Behavior*

In order to explain learning and development in the brain, Donald Hebb (1949) propounded that neuronal activity should modify synaptic connections. That is, when one neuron stimulates another one often enough, metabolic or structural modifications of one or both cells should strengthen their connections. This hypothesis was unverifiable at that time, but in 1966, Terje Lomo discovered "long-term potentiation," a long-lasting enhancement of synaptic efficacy by which a neuron, by repeated neural input, is durably and sometimes permanently modified.

This phenomenon appears primarily in the hippocampus, at least in mammals, where memorization and learning seem to occur through long-term potentiation. A particular electrical activity called theta rhythm is at least one of the factors in this phenomenon, since theta

seems to activate the N-methyl-D aspartate (NMDA) receptors that initiate long-term potentiation. That was proved by the fact that short trains of high frequency pulses, applied to certain parts of the hippocampus, induced long-term potentiation only if they were applied at the peak of theta rhythm, while they decreased synaptic efficacy if they were applied at the trough of theta activity.

Electrical recordings from the brains of rats in the waking state, in slow-wave sleep, and in rapid eye movement (REM) sleep have demonstrated that neuronal transmission in the hippocampus depends on behavior (Winson and Abzug, 1977). The hippocampal theta rhythm is linked to learned activity that is essential for survival, but not to genetically programmed behavior such as mating or feeding. For example, hippocampal theta appears in the cat as it hunts, in the rabbit when it senses a predator nearby, and in the rat as it explores its environment. In fact, the peaks of theta activity are synchronized with specific behaviors, such as sniffing the air and moving the whiskers or vibrissae.

This hippocampal theta rhythm seems to play a role in synchronizing the processing of sensory information; for instance, as the rat explores its environment, olfactory messages and tactile input from the vibrissae, together with the other sensory information, converge simultaneously on the hippocampus, where they are processed in 200-millisecond bunches marked off by the theta rhythm. As Jonathan Winson wrote:

One may speculate that in animals such as the rat which make great use of the sense of smell it is important that all sensory information, touch sensations from the vibrissae, vision and hearing are coordinated with the cyclic inhalations of odors. In this way the entorhinal cortex, hippocampus and the rest of the limbic system can process all sensory input along with smell—an event is linked to its odor. (1985, p. 190)

I believe that this hippocampal theta rhythm may also function as an alarm signal for olfaction, the way the thalamic orientation reaction does for auditory, visual, and tactile perceptions. In those mammals in which olfactory messages provide information critical for survival, the theta rhythm would be a priority signal, indicating that information arriving at the time of peak theta activity should be considered vital and processed accordingly.

The hippocampal theta rhythm can also be evoked by rapid rotating motion, which stimulates the labyrinths of the inner ear (Costin, Bergmann, and Chaimovitz, 1967, p. 185):

In the awake, non-stimulated animal, angular acceleration evoked a hippocampal theta-rhythm, expressing itself in synchronization and in an increase in amplitude.

The theta rhythm appears not only during survival-related behavior and as a result of labyrinthine stimulation, but also during REM sleep, even though no movement or information-seeking is occurring. Winson (1990) suggested that in REM sleep, the neocortex-hippocampus circuit, again alerted by the theta rhythm, could permanently reshape memories. Although theta activity during REM sleep is difficult to show in humans, he proposed that this phenomenon may be responsible at least in part for our dreams.

Long-term potentiation is produced by the activation of NMDA receptors in the granule cells of the hippocampus and in various areas in the neocortex. The neurotransmitter of these granule cells is the excitatory amino acid glutamate. While glutamate permits a quick transmission and processing of sensory influx, it can also lead to what is called excitotoxicity: if too much glutamate is produced, as can occur for example in anoxia, it becomes toxic and brings about the death of the neuron where it has been released.

### **Biologically Produced Near-Death-Like Experiences**

Various experiences phenomenologically similar to NDEs can be produced by pharmaceutical agents or by physiological disturbances. Ketamine, a dissociative anesthetic, reduces the activity in the neocortex and subcortical structures, while it increases the activity in the limbic lobe and the reticular activating system. Its particular effect is to block NMDA receptors in the neocortex, thalamus, and hypothalamus. This disconnects the patient from sensory input, including pain, but does not really put him or her to sleep. Depending on the dose and the route of administration, it may leave consciousness and memory intact while progressively disconnecting sensory perceptions.

These effects seem to offer a reasonable experimental model for NDEs. In a study comparing the effects of anesthetics on consciousness, Barbara Collier (1972) gave 11 subjects 40 to 60 milligrams of ketamine intravenously, and had 11 other subjects inhale a mixture of 50 percent nitrous oxide and 50 percent oxygen. Of the 11 ketamine subjects, 10 reported a sensation of floating in space, nine felt the "spirit" or mind leave the body, four saw colored or white patterns with their eyes closed, three described "looking down" on their bodies on the gurney and noted the exact time their "spirit" re-entered it (which happened a few moments after the return of responsiveness to a light

pinprick), two experienced the "mind" moving very rapidly through a vacuum with no sense of time or light, and one subject "became" one of a pile of boxes.

By contrast, of the 11 subjects who received the nitrous oxide, 10 experienced distorted body awareness, five experienced a sensation of floating upwards, four noted changes in auditory perception, two suffered from a sense of claustrophobia, and two became dizzy. Collier likened the descriptions given by the patients under the influence of ketamine to those given by subjects undergoing sensory deprivation.

Ketamine, at doses less than those used for anesthesia (generally between 0.4 and 0.6 milligrams per kilogram of body weight), has been used by psychiatrists to foster an emotional reliving of repressed stressful memories, leading to a therapeutic discharge of dammed-up emotions (Khorramzadeh and Lotfy, 1973). Six months after reviving memories with ketamine, 91 percent of patients with a variety of psychiatric disorders were considered cured.

Patients in that study reported experiences reminiscent of NDEs: "I was in a different world and with flash backs I was seeing vividly events which led to my illness," "I was talking to the Holy Family," "I was walking on an infinite piece of land and my life was marching in front of my eyes," "I was flying and chasing my own life," and "Heavy burden of sin is gone now" (Khorramzadeh and Lotfy, 1973, p. 345).

Another psychiatrist, Ladislav J. von Meduna (1950), tried treating various neuropsychiatric disorders with a mixture of 70 percent oxygen and 30 percent carbon dioxide. This mixture induced experiences that included certain elements of an NDE, such as a feeling of getting out of one's body, a vision of a bright light, and ineffability. However, the experience was accompanied by severe neurological disturbances and unpleasant hallucinations.

Experimental stimulation of the temporal lobes also seems to produce comparable phenomena. Wilder Penfield (1955, 1975) described the results of experiments in electrical stimulation of various zones of the temporal lobes during surgery for temporal lobe epilepsy. The patients, who had not been put to sleep, could describe their perceptions, and when Penfield stimulated various regions of the temporal lobes, they reported such phenomena as motor responses, sensory or somatic illusions, feelings of vertigo, and of leaving one's body, as well as more complex phenomena such as sensations of *deja vu*, hearing pieces of music, remembering whole blocks of memories, and a sense of reliving certain memories.

For example, Penfield reported the following patient's responses to electrical stimulation of a particular point:

Stimulation at a depth of 2 cm. along the superior surface of the temporal lobe, within the fissure of Sylvius, caused the patient to say suddenly, "That bitter-sweet taste on my tongue." He seemed confused and made tasting and swallowing movements.

The stimulating current was shut off and the electro-corticogram showed that a slow wave 4 per second generalized rhythm had been set up as an after-discharge. While this was continuing the patient exclaimed: "Oh God! I am leaving my body." Dr. Karagulla, who was observing him, said he looked terrified at the time of the exclamation and made gestures as though he sought help. When the electrocorticogram had returned to normal the patient seemed to be himself again. (Penfield, 1955, p. 458)

Penfield hypothesized on the basis of such observations that superficial stimulation of the temporal lobe can in fact act on a deeper zone with which it is directly linked and which is, among other things, in charge of storing memories. He speculated that the hippocampus might be that deeper zone, and since then strong monosynaptic connections have been discovered between the temporal cortex and the limbic structures, particularly with the hippocampus.

Karl Jansen (1990) proposed a hypothesis based on the fact that ketamine acts by blocking NMDA receptors, especially in the hippocampus, preventing long-term potentiation. That blockade would amount to closing the access channel to sensory information, whereupon, Jansen proposed, internal memories would take the place of the missing sensory input.

The discovery of endogenous ligands for those very receptors supported Jansen's hypothesis: those ligands, called endopsychosins, could be released in anoxia in order to block access of glutamate to the NMDA receptors and thus prevent the death of the target neuron by excitotoxicity (Contreras, Monahan, Lanthorn, Pullan, DiMaggio, Handelmann, Gray, and O'Donohue, 1987). The result would then be similar to what occurs with ketamine and could explain the phenomenon of the life review or panoramic memory found in many NDEs.

### **Sensory Disconnection and Spiritual Experiences**

Before proceeding, let me clarify that this model attempts to address the spiritual, which is beyond words and beyond common experience. It is virtually impossible to compare, let alone try to explain, intimate experiences that are well beyond the human capacity for analysis and understanding. All we can do for the moment is to try to catch a

tangible thread common to these experiences, and then pull on it to see what will come next. This thread may reside in the various factors that are at the origin of the experience. If we could isolate a common neuropsychophysiological substrate, we might then be able to carry out objective research based upon more than just speculation and phenomenology.

As noted above, Winson (1990) proposed that REM sleep is linked to a reprocessing of the information received while awake and to a reshaping of memory by induction of a hippocampal theta rhythm. That rhythm, which under certain circumstances is closely yoked to the breathing pattern in frequency and phase, seems to be able to modulate information processing during wakefulness as well as during sleep. Similar effects can be produced by pharmacological agents such as ketamine, or by other means, such as in hypercapnia or electrical stimulation. That fact might explain the cathartic effect seen with ketamine as well as in the modified states of consciousness induced by using various breathing techniques or after an NDE.

Furthermore, if we assume that memory reorganization during REM sleep induces a theta rhythm in the neocortical-hippocampal circuit, then inducing an artificial theta rhythm by changing the breathing pattern or by body movements that stimulate the labyrinth of the inner ear could produce the same result. If these techniques also produce sensory and motor disconnection, another characteristic of REM sleep, then every condition that seems to be at the base of a number of nonordinary experiences is present.

The hippocampus is an archaic structure of the brain that used to play a critical role in the sense of smell. While its role in olfaction has since passed on to the entorhinal area, which also receives and processes interoceptive information, the circuits that modulate functioning of the hippocampus may still exist in humans. As we have already noted, the influx from the sensory cortex reaches the hippocampus through the entorhinal cortex, which, since it is still directly linked to the sense of smell, might be modulated by a particular breathing rhythm. If we assume that the theta rhythm could in fact be, for olfaction, the equivalent of the thalamic orientation reaction for the other senses, then changing one's breathing rhythm intentionally might deceive certain circuits and give priority to olfactory and interoceptive information, inhibiting the transmission of other sensory information (Motoyama and Brown, 1978).

But we are not a particularly gifted species when it comes to olfaction, and if there is furthermore no particular smell to perceive, then limiting our attention to olfactory input could in many cases focus our

consciousness on *nothing at all*, producing a sensory disconnection. Most of the techniques used in mystical traditions involve mastering the breathing pattern or, as in the shaman's dancing and the dervish's spinning, stimulating the labyrinth, which may produce bursts of hippocampal theta rhythm. In fact, it is likely that any voluntary change in the breathing rhythm will have some effect on the processing of information by the brain.

Apart from sensory deprivation experiments, in which there are virtually no environmental data to be processed, all the mechanisms mentioned above deal with data processing in the hippocampus and its related structures. A hypothesis can be deduced from all this that NDEs are part of a large number of experiences, which I call non-ordinary experiences, that all have as the same starting point a sensory disconnection. Since there is an emotional detachment, particularly in the NDE, there seems to be a disconnection of certain parts of the limbic system as well, which corroborates this hypothesis.

That disconnection, during the NDE, might be due to the release of neuroprotective substances blocking the NMDA receptors; Jansen (1990) proposed this mechanism as an explanation for the life review. Voluntary induction of similar experiences by breathing exercises could be mediated by a progressive blockade of hippocampal transmission, allowed by the persistence of archaic ways of modulating perceptions at that level.

That hippocampal blockade may also occur in the "fear-death experiences" (Stevenson, Cook, and McClean-Rice, 1989-90), which may be related to "stress-induced antinociception," in which disturbance of serotonergic systems reduce the response to pain stimuli under stress (Carr, 1982; Morse, Venecia, and Milstein, 1989; Snow, Tucker, and Dewey, 1982). Since afferent pathways of the hippocampus are serotonergic, one of the bases of Melvin Morse, David Venecia, and Jerrold Milstein's (1989) hypothesis on NDEs, the analgesia in stress-induced antinociception may be produced by a modulation in the hippocampus. That modulation could sometimes be enough to start a complete disconnection, thus creating the conditions allowing an NDE-equivalent to happen.

In the experiments on hypercapnia, the increase in carbon dioxide could be thought of as the beginning of anoxia, which would release neuroprotective substances. The high levels of carbon dioxide would be responsible for side effects producing distortion and the unpleasant aspect of the perceptions, perhaps through a hyperexcitability of the temporal lobe. In the experiments using ketamine, action roughly similar to that of the endopsychosins induces at the least a flux of

memories, and with a larger dose a more complete disconnection, precipitating an out-of-body experience.

In the case of the Penfield experiments quoted above, since the sensation induced by the stimulation of the temporal lobe was gustatory, the piriform lobe of the entorhinal cortex may have been indirectly stimulated. The out-of-body experience described happened after the stimulation had stopped, while a synchronized rhythm was in process; that synchronization might have disrupted the hippocampus by imitating a theta rhythm, or the recorded rhythm may have itself been a hippocampal afterdischarge having diffused to the temporal lobe.

As for the experiences reported during pure meditation, the link between hippocampal and cortical theta rhythm is not as clear. However, the EEG recordings of experienced yogis during meditation showed slow rhythms, first alpha and then theta becoming more prominent (Twemlow, Gabbard, and Jones, 1982). A study by John Palmer (1979b) showed that out of 20 subjects, the three who had the most lively out-of-body experiences had more than 30 percent theta waves in their EEG, implying at least a certain disconnection from their environment.

### **The Role of the Hippocampus in Kundalini**

It is therefore possible to describe a neurophysiological mechanism for the initiation of non-ordinary experiences, a mechanism concerning the hippocampus as the essential key formation. Can we go further? The hypothesis I propose, in which the functioning of the hippocampus is altered by external factors, seems if not to explain at least to allow an interpretation of some of the collateral phenomena described in mystical traditions and confirmed by contemporary experiences.

Every account of these non-ordinary experiences includes a host of various sensations described above as comprising the physio-kundalini syndrome. Although those phenomena occur in a mystical context, they do have a reality nevertheless for those who experience them. The question is then: What do they reflect? To answer this question, let us review a few premises.

The kundalini awakening is said to allow an evolution from or a transcendence above the ordinary human condition. Kundalini awakening must then be accompanied by actual changes, both physiological and psychological.

Our nervous system is malleable enough so that the way we function is not fixed rigidly by strict laws, but can be altered either unconsciously by adaptive mechanisms or more or less willingly through

certain techniques. Some techniques such as biofeedback are known to be capable of causing lasting modifications in vegetative functions that are normally not under voluntary control (Green and Green, 1977).

If the sporadically occurring physio-kundalini phenomena affect all the cerebral systems, then at the peak of these experiences there is what seems to be an actual explosion, a saturation of all transmitting channels into synesthesia. This is illustrated by Krishna's description of his kundalini awakening, cited above (1971, pp. 12-13):

Suddenly, with a roar like that of a waterfall [auditory], I felt [somaesthetic] a stream of liquid [tactile] light [visual] entering my brain through the spinal cord. . . . I felt a rocking sensation [equilibrium] and then felt myself slipping out of my body. . . . (Krishna, 1971, pp. 12-13)

This seems to be a general excitation, perhaps such an unusual phenomenon that each sense tries to express in its own way.

A superficial survey of these perceptions can of course lead to the impression that they are pathological brain disturbances. Some people presenting with those symptoms have rather quickly been labeled and treated as psychotics. Krishna (1971) and Sannella (1987) both estimated that about 30 percent of patients labeled as psychotic or schizophrenic are in fact victims of a pathological "awakening." Krishna gave as examples the characters called Avahoots in India and Mastanas in Persia, who combine extraordinary gifts of clairvoyance with schizophrenia and manic-depressive psychosis at different stages.

This is not the proper place to discuss the relationship between madness and transcendence. However, it is remarkable that psychosis is manifested particularly by identity problems and by the loss of reality testing, which are not found in kundalini experiences. And while some physio-kundalini symptoms resemble epilepsy in their location and progression, seizures are always associated with cerebral irritation, whether that is due to trauma, tumor, or vascular lesion. When the seizure is generalized, it is a short dramatic event leading to a loss of consciousness with subsequent amnesia; no such pathology is found in kundalini phenomena.

Every mystical tradition attempts to integrate the lower levels of the psyche by controlling the behaviors, instincts, feelings, and perceptions of the mind. This control may be functional as well as psychological; that is, the working of the nervous system may be altered, since the deepest and most archaic structures, the limbic system and reptilian brain, must be mastered and integrated by higher structures. This seems to be the case with the long-term aftereffects found in

NDErs and in transcendental experiencers generally: altruism and empathy, which are the most important aftereffects, first appear phylogenetically with the development of the prefrontal cortex (McLean, 1990).

The hippocampus is a central processing area at which meet the sensory and associative cortex, which are turned outwards; the limbic system, which is turned both inwards and outwards and helps perceptions acquire an emotional value; memory; and the prefrontal cortex, which makes us human. Any phenomenon dealing with hippocampal functioning is therefore liable to modify all those areas.

Many of the facts reviewed above point to changes in hippocampal functioning. First, the hippocampus is particularly rich in NMDA receptors, which can also be found in the thalamus and neocortex. Second, those receptors are now known to be one of the main factors in the synaptic regression that is at the heart of cerebral development and plasticity. Synaptic regression is not, as its name might seem to imply, a degenerative phenomenon; as in creating a sculpture, the more detail you want, the more substance you have to take away.

Third, NMDA receptors are also the site of long-term potentiation, which may alter, sometimes forever, neuronal status. Fourth, long-term potentiation can be influenced, again through NMDA receptors, by both endogenous and exogenous factors, and probably by voluntary changes in breathing rhythm. Finally, whereas most parts of the brain have only brief periods of plasticity, generally during their embryonic development, the hippocampus retains this capacity throughout life.

These facts allow a few speculations. In the yogic tradition, the techniques of meditation and visualization concern all the senses; one can meditate or concentrate on a sound, a posture, a symbol, a concept, on various parts of the body, particularly by visualizing the various chakras at their own level, or on the circulation of energy or prana, which is said to be the subtle component of breath. Meditation is used together with techniques controlling the breathing rhythm, which are of prime importance in every tradition.

As noted above, interoceptive and olfactory information go directly to the entorhinal cortex; I propose that the theta rhythm may serve as a priority signal for them as well under certain circumstances. If it is true that certain breathing techniques can modify the processing of sensory information in the hippocampus, then it is possible that exteroceptive information could be inhibited while interoceptive information, traveling through another channel, could be treated as a priority transmission.

An enhanced perception of normally unconscious inner phenomena is a necessary and sufficient condition to create a feedback loop that would in turn allow one to increase or decrease these inner sensations. Physio-kundalini could well be the consequence of an increased perception of both (a) normally unconscious interoceptive information and (b) the functioning of certain parts of the nervous system, which would be translated differently by each sensory system.

The various techniques for concentrating and visualizing could start a feedback loop, initiated and reinforced by breathing techniques, in turn creating durable modifications in the functioning of certain parts of the nervous system through the phenomena responsible for neuronal plasticity, long-term potentiation and synaptic regression.

Since the hippocampus has centrifugal connections with the hypothalamus and other structures dealing with somatovisceral, emotional, and endocrine functions, we can then understand the possibility of actual changes in all those functions, which, according to some reports, are not always positive nor well tolerated. Indeed, this mechanism may provide an elegant explanation for what is called mystic physiology, involving the chakras with their various functions and the "nadis," through which flow energy or prana. According to this hypothesis, this mystic physiology is more like a projection or corporal interpretation of neuronal functioning than any anatomic reality.

The fact that in some animal species the hippocampal theta rhythm is linked to breathing frequency is not of course evidence that the same is true in humans. However, given that most mystical traditions use rhythm and breathing changes to induce altered states of consciousness, the persistence of an archaic circuit allowing the modulation of perceptions and states of consciousness in humans cannot be ruled out.

The hippocampus is a crossroads between perceptions, memory, and consciousness. If all the phenomena described above are capable, in one way or another, of influencing hippocampal functioning, then they can also modify the relationship of consciousness with the outside world. That world is usually perceived through the sensory organs, which are filters as well as sensors, and they give us but a hazy image of the outside world. In fact the world we know is not an objective reality, but rather only a representation of one, albeit consensual.

The hypotheses I propose concern certain characteristics of brain function that could allow a non-ordinary experience and could possibly help us understand some of their long-term effects; but I do not claim that they explain the experience itself. Unusual perceptions, difficulty telling others about one's experience, and deep changes in one's con-

cept of space and time during non-ordinary experiences suggest that they are perceived without the usual cortical tools of perception and cognition. In numerous cases, the acquisition of information supposedly unobtainable rules out any hypothesis that these experiences are hallucinations or purely neurological phenomena.

Concerning NDEs, the same experience may occur either in an unharmed brain or in an anesthetized person undergoing cardiac arrest, subject to a combination of anoxia, hypercapnia, anesthetic chemicals, and metabolic intoxication. This leads to the question of how this experience can occur and be processed into memory in the same way under such different brain conditions.

The deeply spiritual aspect of these experiences eludes for the moment any objective research, but it exists nonetheless. I hope I have shown that it is possible to draw a bridge, however frail, between science and transcendence, and that spiritual matters can be studied without necessarily making the opposing mistakes of either a scientific reductionism or a blind mysticism, which may be but differing appearances of the same lack of curiosity.

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**THE JOURNAL OF NEAR-DEATH STUDIES** encourages submission of articles in the following categories: research reports; theoretical or conceptual statements; papers expressing a particular scientific, philosophic, religious, or historical perspective on the study of near-death experiences; cross cultural studies; individual case histories with instructive unusual features; and personal accounts of near-death experiences or related phenomena.

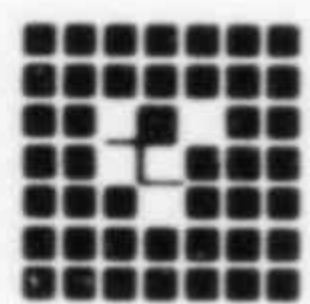
**GENERAL REQUIREMENTS:** Logical organization is essential. While headings help to structure the content, titles and headings within the manuscript should be as short as possible. Do not use the generic masculine pronoun or other sexist terminology.

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