

# THE LIMBIC SYSTEM AND THE SOUL

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Evolution and the Neuroanatomy of Religious Experience1

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### ABSTRACT

Humans have been burying and preparing their dead for the "Great Beyond" for over 100,000 years. These behaviors and beliefs are related to activation of the amygdala, hippocampus, and temporal lobe, which are responsible for religious, spiritual, and mystical trance-like states, dreaming, astral projection, near death and out-of-body experience, and the "hallucination" of ghosts, demons, angels, and gods. Case studies and the evolutionary neurological foundations are presented and it is postulated that these structures evolved in order to make spiritual experience possible, and account for the sexual and violent aspects of religious behavior. Abraham, Moses, Mohammed, and Jesus Christ, and others who've communed with angels or "gods," display limbic system hyperactivity. Patients report religious "hallucinations" or out-of-body experiences when limbic structures are stimulated. As over 96% of human DNA is dormant, whereas 50% of activated DNA is devoted to the brain, these capacities may continue to evolve.

## THE LIMBIC SYSTEM AND THE SOUL

### Evolution and the Neuroanatomy of Religious Experience<sup>1</sup>

Can a lizard comprehend a man?

Can a man comprehend a God?

Who dares speak for God?

Perhaps...

Even the gods have gods.

A belief in the transmigration of the soul, of an afterlife, of a world beyond the grave, may well have been a human characteristic for at least 100,000 years (Belfer-Cohen and Hovers 1992; Butzer 1982; McCown 1937; Rightmire 1984; Schwarcz et al. 1988; Smirnov 1989; Trinkaus 1986). Despite their primitive cognitive capabilities, even "archaic" human beings who wandered the planet over 120,000 years ago carefully buried their dead (Butzer 1982; Rightmire 1984); and like modern *H. sapiens sapiens*, they prepared the recently departed for the journey to the Great Beyond: across the sea of dreams, to the land of the dead, the realm of the ancestors and the gods.

Throughout the Middle and Upper Paleolithic, it was not uncommon for tools and hunting implements to be placed beside the body, even 100,000 years ago (Belfer-Cohen and Hovers 1992; McCown 1937; Trinkaus 1986). A hunter in life he was to be a hunter in death, for the ethereal world of the Paleolithic was populated by spirits and souls of bear, wolf, deer, bison, and mammoth (e.g., Campbell 1988; Kuhn 1955). Moreover, food and water might be set near the head in case the spirit hungered or experienced thirst on its long sojourn to the Hereafter. And finally, flowers and red ocher might be sprinkled upon the bodies (Solecki 1971) along with the tears of those who loved them.

Given the relative paucity of cognitive and intellectual development among Middle Paleolithic Neanderthal and "archaic" (as compared to modern) humans, and the likelihood that they had not yet acquired modern human speech (Joseph, 1996), evidence of spiritual concerns among archaic and other Middle Paleolithic peoples (i.e., archaic, "early moderns," Neanderthals) may be somewhat surprising if not unbelievable (Gargett 1989). However, it appears, based on a gross photographic analysis of Neanderthal and Cro-Magnon endocasts (Joseph 1996) as well as the evidence reviewed below, that "archaic", "early modern" and Neanderthal men and

women possessed a well developed inferior temporal lobe and limbic system--brain areas directly implicated in the generation of religious experience.

As will be detailed below, the amygdala, hippocampus, and inferior temporal lobe appear to subservise and provide the foundations for mystical, spiritual, and religious experience, and the perception, or rather, the "hallucination" of ghosts, demons, spirits and sprites, and belief in demonic or angelic possession (Bear 1979; Daly 1958; d'Aquili and Newberg 1993; Gloor 1986, 1992; Horowitz et al. 1968; Jaynes 1976; Joseph 1996; MacLean 1990; Mesulam 1981; Penfield and Perot 1963; Schenk and Bear 1981; Slater and Beard 1963; Taylor 1972, 1975; Trimble 1991; Weingarten et al.1977; Williams 1956). When these nuclei are hyperactivated, "religious" experiences and related "hallucinations" although unusual, are not uncommon.

Because the limbic system is common to all peoples and appears to provide the foundations for religious feelings and related "hallucinations," this might explain why the belief in souls, spirits, the haunted house, and even angels or demons, or the capacity to have mystical experiences, including the sensation of being possessed by gods or devils and/or hearing their voices, is world wide (Budge 1994; Campbell 1988, Frazier 1950; Godwin 1990; Harris,1993; James 1958; Jaynes 1976; O'Keefe 1982; Malinowski 1948; Smart 1969; Wilson 1951).

Presumably because all humans possess a limbic system and a brain that is organized in a similar manner, they have similar religious and mystical experiences, what Jung (1964) referred to as "archetypes;" inborn tendencies to produce, create, dream of, and respond in a similar manner to specific images, symbols, and experience. This commonality in "religious" or archetypal" experience, includes the capacity to experience "God" or the "Great Spirit", as well as the many vestiges or incarnations of what has been referred to as "the personal soul" or "ghost."

Indeed, it could be argued that the essence of "God," and of our living soul, may be slumbering within the depths of the ancient limbic lobe which is buried within the belly of the brain. And not just the soul or the Great Spirit of the Lord God, for in the Upanishads and Tao it is said, and as Buddha, Lao Tzu, Chuang Tzu, Jesus (St. Luke 17: 21), the Sufis, and many Sumerian, Babylonian, Jewish, Arabic, Aryan, Egyptian, Greek, Roman, Indian, Muslim, and Gnostic mystics have proclaimed, "The kingdom of God is within you."

### The Antiquity of the Soul: Middle Paleolithic Spirituality

When humans first became aware of a "God" cannot be determined. Nevertheless, the antiquity of religious beliefs extends well over the course of the last 100,000 years. Indeed, it has been well established that Neanderthals and other H. Sapiens of the Middle Paleolithic (e.g. 150,000 to 35,000 B.P.) and Upper Paleolithic (35,000 B.P. to 10,000 B.P.) engaged in complex religious rituals. For example,

Neanderthals (a people who lived in Europe, Africa, and the Middle East from around 100,000 to 35,000 B.P.), have been buried in sleeping positions with the body flexed or lying on its side, surrounded by goat horns placed in a circle, with reindeer vertebrae, animal skins, stone tools, red ochre, and flowers, with large bovine bones above the head, with limestone blocks placed on top of the head and shoulders, or beneath the head like a pillow, and with heads severed coupled with evidence of ritual decapitation, facial bone removal, and cannibalism (Belfer-Cohen and Hovers 1992; Binford 1968; Harold 1980; Smirnov 1989; Solecki 1971). Moreover, Neanderthals presumably buried a bear at Regourdou, and at Drachenloch they buried stone "cysts" containing bear skulls (Kurten 1976); hence, "the clan of the cave bear."

Of course, the fact that these Neanderthals were buried does not necessarily imply that they held a belief in "God." It is apparent, however, that they had strong feelings for the deceased and had prepared them for a journey to the Hereafter or the land of dreams -hence the presence of stone tools, the sleeping position, and stone pillows. Throughout the ages, and as repeatedly stated in the Old Testament, dreams have been commonly thought to be the primary medium in which gods and human interact (Campbell 1988; Freud, 1900; Jung 1945, 1964). Insofar as the ancients (and many "moderns") were concerned, dreams served as a doorway, a portal of entry to the spirit world through which "God," His angels, or myriad demons could make their intentions known.

The possibility that ancient, Paleolithic humans believed the dead (or their souls) might return and cause harm is also suggested by the evidence of ritual decapitation, and placement of heavy stones upon the body; suggesting a belief in ghosts, souls, or spirits, and a continuation of "life" after death. Archaic H. sapiens, therefore took necessary precautions to prevent certain souls from being released from the body and returning to cause mischief among the living.

Similarly, the buried animal skulls and bones implies a degree of ritual symbolism, which when coupled with grave offering and positioning of the body, certainly implies that Neanderthals were capable of very intense emotions and feelings ranging from love to perhaps spiritual and superstitious awe. There thus seems to be good reason to assume that Neanderthals maintained spiritual and mystical belief systems involving perhaps the transmigration of the soul and the horrors, fears, and hopes that accompany such feelings and beliefs.

The Neanderthals, however, were not the only species of early humanity to practice mortuary rites. "Early modern", and other "archaic" H. sapiens also buried infants, children, and adults with tools, grave offerings, and animal bones. For example, archaic H. sapiens and "early moderns" were carefully buried in Qafzeh, near Nazareth and in the Mt. Carmel, Mugharettes-Skhul caves on the Israeli coast over 90,000 to 98,000 years ago (McCown 1937; Smirnov 1989; Trinkaus 1986). This includes a Qafzeh mother and child who were buried together, and an infant who

was buried holding the antlers of a fallow deer across his chest. In a nearby site equally as old (i.e. Skhul), yet another was buried with the mandible of a boar held in his hands, whereas an adult had stone tools placed by his side (Belfer-Cohen and Hovers 1992; McCown 1937). It is thus quite clear that humans have been burying and presumably weeping over their dead, and preparing them for a journey to the Hereafter, for over 100,000 years.

However, it is with the rise of the Upper Paleolithic and dominance of the Cro-Magnon and Asian "moderns" that the quality and quantity of grave goods undergoes a creative and symbolic explosion. Cro-Magnon dead were buried with jewelry, weapons, clothing, pendants, rings, necklaces, multifaceted tools, head bands, bracelets; all intricately fashioned with the care and talent equal to that of most modern artisans.

By 32,000 years ago the Cro-Magnon were painting, drawing, and etching bear and mammoth, deer and horse, and even pregnant females in the recesses of dark and dusky caverns (Bandi 1961; Chauvet et al., 1996; Leroi-Gurhan 1964, 1982; Prideaux 1973). The pregnant females include Venus statuettes, some of which may have been fertility and sex symbols or perhaps representations of various goddesses.

However, in order to view many of these Cro-Magnon paintings and "religious" objects, one had to enter and crawl a considerable distance, sometimes hundreds of yards, through a twisting, narrowing, pitch black tunnel before reaching these Upper Paleolithic underground Cathedrals. This is significant for in the Egyptian and Tibetan Books of the Dead, and has been reported among many of those who have undergone a "near death" or "life after death" experience, being enveloped in a dark tunnel is commonly experienced soon after death and immediately prior to entering the "light" of "Heaven" or paradise, at which point "the recently dead" may be greeted by relatives, friends, and/or radiant human or animal-like entities (Eadie, 1992; Rawling 1978; Ring 1980).

As is evident from their cave art and symbolic accomplishments, the nether world of the the Cro-Magnon and other peoples of the Upper Paleolithic, was also haunted by the spirits and souls of the living, the dead, and those yet to be born, both animal and human (Brandon 1967; Campbell 1988; Kuhn 1955; Prideaux 1973). However, Upper Paleolithic peoples apparently believed these souls and spirits could be charmed and controlled by hunting magic, and through the spells of sorcerers. Indeed, hundreds of feet beneath the earth, the likeness of one ancient shaman attired in animal skins and stag antlers, graces the upper wall directly above the entrance to the 20,000-25,000 year-old grand gallery at Les Trois-Freres in southern France (Prideaux 1973).

Gallopings, running, and swirling about this ancient sorcerer are bison, stag, horse, deer, and presumably their souls. Oddly, images of an almost identical "sorcerer"

appear again in ancient Sumerian and Babylonian inscriptions fashioned four to six thousand years ago.

### The Amygdala, Temporal Lobe and Religious Experience

Given that Middle Paleolithic peoples (archaic, "early moderns," Neanderthal) and those of the Upper Paleolithic (Asian, African "moderns" and Cro-Magnon) all buried their dead with grave offerings and with the body placed in sleeping positions, indicates these peoples were capable of experiencing love, fear, and mystical and religious awe. Like modern humans, Paleolithic peoples also shared a commonality in regard to that region of the brain (and in fact the only region of the brain) that has been implicated in the generation of fear, love, intense emotions, and religious and spiritual beliefs: the limbic system (e.g., amygdala and hippocampus) and inferior temporal lobe (Bear 1979; Daly 1958; d'Aquili and Newberg 1993; Gloor 1986, 1992; Halgren 1992; Horowitz et al. 1968; Jaynes 1976; Joseph 1992a, 1996, 1998, 1999; MacLean 1990; Mesulam 1981; Penfield and Perot 1963; Rolls 1992; Schenk and Bear 1981; Slater and Beard 1963; Subirana and Oller-Daurelia, 1953; Trimble 1991; Weingarten, et al. 1977; Williams 1956).

The amygdala and inferior temporal lobe appear to have been as developed in "archaics", Neanderthals, early moderns, as in Upper Paleolithic (Cro-Magnon and other "modern") *H. sapiens*. As will be detailed below, the evolution of these cerebral nuclei have made it possible not only to experience, but to attribute spiritual or religious significance to certain actions and geometric stimuli.

For example, in addition to burial and mortuary practices, one of the first signs of exceedingly ancient religious symbolism is the discovery of an engraved "cross" that is perhaps between 60,000 to 100,000 years old (Vertes 1964, cited by Mellars 1989). Likewise, the underground entrance to the Chauvet cathedral, in France, is also marked by a large red cross that was painted over 30,000 years ago (Chauvet et al., 1996). Regardless of time and culture, from the Aztecs, Mayans, American Indians, Romans, Greeks, Africans, Christians, Cro-Magnons, Egyptians (the key of life), and so on, the cross consistently appears in a mystical context, and/or is attributed tremendous cosmic or spiritual significance (Budge 1994; Campbell 1988; Jung 1964; Sitchin 1990). For example, like the Catholics, the Mayas and Aztecs adorned their temples with the sign of the cross.

Along the neocortical surface of the inferior temporal lobe (and within the amygdala) are dense neuronal fields that contain neurons that fire selectively in response to visual images of faces, hands, eyes, and complex geometric shapes, including crosses (Gross et al. 1972; Hasselmo, Rolls and Baylis 1989; Morris et al., 1996; Richmond, et al. 1983, 1987; Rolls 1984, 1992). These neurons are sometimes referred to as "feature detectors." The ability to recognize faces, geometric shapes, and social emotional nuances are dependent on these specialized temporal lobe and amygdala feature-detecting neurons and neural networks that respond selectively to

these stimuli (Gross, et al. 1972; Hasselmo et al. 1989; Morris et al., 1996; Richmond, et al. 1983, 1987; Rolls 1984).

However, since neurons in the amygdala and inferior temporal are also multimodally responsive and subserve almost all aspects of emotion, including religious feeling, it is possible for faces and geometric symbols to become infused with (or to stimulate) mystical and religious feeling.

For example, abnormal activation of the amygdala-temporal lobe is associated with the experience of frightening hallucinations--due to the activation of these feature-detecting neurons coupled with associated limbic emotions; fear being the most common reaction associated with amygdala activation. Moreover, as these nuclei respond selectively to stimuli such as crosses, heightened emotional activity within these limbic nuclei could result in feelings of fear, foreboding, or religious awe which is attributed to objects such as "crosses," which may also be hallucinated if the related feature-detecting neuron is also activated. Similar explanations could be offered in regard to the spiritual significance attributed to triangles (i.e. pyramids), and circles. In fact, crosses, triangles and circles were etched on Cro-Magnon cave walls over 30,000 years ago (Chauvet et al., 1996; Leroi-Gurhan 1964).

Hence, it can be assumed that "cross" neurons as well as "mystical/religious" feeling neurons (or neural networks) had probably evolved by 30,000 and perhaps 100,000 years ago--possibly in reaction to the experience of "cross-like" stimuli in nature coupled with feelings of fear or religious awe. One need only rise their arms horizontally or walk in the forest to spy dead trees that take the form of a "cross," or look upward to view birds with extended cross-like wings soaring through the skies. The sign of the cross is not uncommon and when staring at a cross the temporal lobes are activated.

#### The Twilight of the Gods: Cro-Magnon and Upper Paleolithic Spiritual Evolution

As the Cro-Magnon and other peoples of the Upper Paleolithic evolved their spiritual belief systems soon outstripped those of their predecessors in complexity, originality, and artistic and symbolic accomplishments -due in large part to the tremendous advances that had occurred in frontal and inferior parietal lobe evolutionary development (Joseph 1996). As the brain and man and woman evolved, so too did their spiritual beliefs. Hence, the Cro-Magnon conception of, and ability to symbolically express the spirit world, became much more complex as well (Bandi 1961; Kuhn 1955; Leroi-Gurhan 1964, 1982; Prideaux 1973).

Throughout the Upper Paleolithic and the Neolithic and continuing into modern times, some have believed that the Netherworld is populated with the souls of trees, plants, animals, humans, and demons and all manner of gods (Armstrong 1994; Brandon 1967; Budge 1994; Campbell 1988; Frazier 1950; Harris, 1993; Kuhn 1955; Smart 1969; Wilson 1951). There were forest gods, gods of the river, of the sky, the

clouds, the seasons, of the day and of the night. Planetary gods, moon gods, sun gods, personal gods, and Lord Gods who created the Heavens and the earth. Gods who created man and woman in the image of the gods. And finally a single "God" who gave of his own soul and spirit, thus awaking man and woman to their own spirituality through the breath of life... so claimed the ancients.

However, although the Heavens were thought to be the domain of the gods, some came to believe that the abode of "God," like the spirit and the soul, was within each individual woman and man. Indeed, this Kingdom, this transmitter to God, may be located within the limbic system.

## The Limbic System & the Soul

### The Hypothalamus, Sex & Emotion

The nuclei of the ancient limbic system include the hypothalamus, amygdala, cingulate gyrus, septal nuclei, and hippocampus (e.g. Gloor 1992; Halgren 1992; Joseph 1982, 1992a, 1996; MacLean 1969; 1990; Rolls 1992). It is these limbic system nuclei which are primary in regard to memory, the production of visual imagery, sexuality, and the expression and perception of most aspects of emotion, including love, sadness, grief, depression, fear, aggression, rage, pleasure, happiness, elation, and even sexual and religious ecstasy.

However, different limbic system nuclei, such as the hypothalamus, are more ancient and more primitive in emotional expression as compared to structures such as the more recently evolved amygdala (e.g. Halgren 1992; Joseph 1982, 1992a, 1996; MacLean 1969; 1990; Rolls 1992). For example, the hypothalamus mediates the expression of very intense, rudimentary and transient emotional states that are common to most creatures, including reptiles, amphibians, fish and even sharks (Joseph 1996; MacLean 1969, 1990). The hypothalamus monitors internal homeostasis, and mediates and controls the desire to eat, drink, attack, or have sex; i.e. the four F's: Feeding, fighting, fleeing, and fornicating. Indeed, sexuality and pleasure are of the utmost concern to the hypothalamus, and it is capable of generating orgasmic sensations of great intensity (Joseph, 1992a; Olds and Forbes 1981; MacLean 1969, 1990) via the release of naturally occurring opiates (Atweh and Kuhar 1977ab; Uhl, Kuhar and Snyder 1978)

### The Amygdala and Emotion

The amygdala (which is intimately interconnected with the hypothalamus) enables us to hear "sweet sounds," recall "bitter memories," or determine if something is spiritually significant, sexually enticing, or good to eat (Gloor 1986, 1992; Halgren 1992; Joseph 1992a, 1996; Kling, Lloyd, and Perryman 1987; O'Keefe and Bouma 1969; Rolls 1992; Ursin and Kaada 1960). The amygdala makes it possible to experience the spiritually sublime, is concerned with the most basic animal



emotions, and allows us to store affective experiences in memory or even to reexperience them when awake or during the course of a dream in the form of visual, auditory, or religious or spiritual imagery (Bear 1979; d'Aquili and Newberg 1993; Gloor 1986, 1992; Halgren, 1992; Joseph 1996). The amygdala also enables an individual to experience emotions such as love and religious rapture, as well as the ecstasy associated with orgasm and the dread and terror associated with the unknown.

In fact, the amygdala (in conjunction with the hippocampus) contributes in large part to the production of very sexual as well as bizarre, unusual and fearful mental phenomenon including dissociative states, feelings of depersonalization, and hallucinogenic and dream-like recollections involving threatening men, naked women, sexual intercourse, religion, the experience of god, as well as demons and ghosts and pigs walking upright dressed as people (Bear 1979; Daly 1958; d'Aquili and Newberg 1993; Gloor 1986, 1992; Halgren 1992; Horowitz et al. 1968; Jaynes 1976; Joseph 1982, 1992ab, 1993, 1996; MacLean 1990; Mesulam 1981; Penfield and Perot 1963; Rolls 1992; Schenk, and Bear 1981; Slater and Beard 1963; Subirana and Oller-Daurelia 1953; Taylor 1972, 1975; Trimble 1991; Weingarten, et al. 1977; Williams 1956). Moreover, some individuals report communing with spirits or receiving profound knowledge from the Hereafter, following amygdala stimulation or abnormal activation (Penfield and Perot 1963; Subirana and Oller-Daurelia, 1953; Williams 1956).

Indeed, as the medial amygdala is contiguous with and fans out to form the anterior-medial temporal lobe, and as the primary auditory receiving areas and Wernicke's receptive speech area not only evolved from the amygdala, but are buttressed by the (amygdaloid) claustrum, not surprisingly activation of the multi-modally responsive amygdala is also associated with auditory hallucinations--presumably, including the perception of the voice of "God."

### The Amygdala, Temporal Lobe, and the Soul

According to d'Aquili and Newberg (1993) mystical states may be voluntarily or involuntarily induced and are dependent upon the differential stimulation and deafferentation of limbic system nuclei, including the hypothalamus, hippocampus, and amygdala, as well as the right frontal and right temporal lobe. However, it appears that these brain areas differentially contribute to religious and emotional experience.

For example, whereas the hypothalamus is concerned with all rudimentary aspects of emotion and controls the hormonal and related aspects of sexual activity, the amygdala, in conjunction with the temporal lobe and hippocampus enables a human to have religious, spiritual and mystical experiences (Bear 1979; Daly 1958; d'Aquili and Newberg 1993; Horowitz et al. 1968; Mesulam 1981; Penfield and Perot 1963; Schenk, and Bear 1981; Slater and Beard 1963; Subirana and Oller-Daurelia 1953;

Trimble 1991; Weingarten, et al. 1977; Williams 1956), including the capacity to experience an orgasmic feeling of rapture, or the "nirvana" of a heroin "high." However, it is the hippocampus which appears to be responsible for "hallucinations" such as the sensation of floating above the body (Joseph 1996).

The amygdala, hippocampus, and temporal lobe are richly interconnected and appear to act in concert in regard to mystical experience, including the generation and experience of dream states and complex auditory and visual hallucinations, such as may be induced by LSD (Broughton 1982; Goldstein et al. 1972; Gloor 1986 1992; Hodoba 1986; Horowitz, et al. 1968; Joseph 1990ae, 1992a; Meyer et al. 1987; Penfield and Perot 1963; Weingarten, et al. 1977; Williams 1956). Intense activation of the temporal lobe, hippocampus, and amygdala has been reported to give rise to a host of sexual, religious and spiritual experiences; and chronic hyperstimulation can induce an individual to become hyper-religious or visualize and experience ghosts, demons, angels, and even "God," as well as claim demonic and angelic possession or the sensation of having left their body (Bear 1979; Gloor 1986, 1992; Horowitz et al. 1968; MacLean 1990; Mesulam 1981; Penfield and Perot 1963; Schenk, and Bear 1981; Weingarten, et al. 1977; Williams 1956).

The amygdala and inferior temporal lobes are also highly involved in the generation of feelings of intense sexual arousal, fear or, conversely, rapture and euphoria --the later being a consequence of the large quantities of enkephalins being released and the high concentrations of opiate receptors located throughout the amygdala (Atweh and Kuhar 1977ab; Uhl, Kuhar and Snyder 1978). In response to pain, stress, shock, fear, or terror, the amygdala and other limbic nuclei begin to secrete high levels of opiates which can eventually induce a state of calmness as well as analgesia and euphoria.

As noted, if these neurons are hyperactivated, such as occurs during dream states, seizures, physical pain, terror, food deprivation, social and sensory isolation, and under LSD (which disinhibits the amygdala by blocking serotonin) an individual might infuse their perceptions with tremendous religious and emotional feeling. Hence, under these conditions the individual may hallucinate, and ordinary perceptions, objects or people may be perceived as spiritual in nature or endowed with special or religious significance. Hence, the individual may come to believe he or she is hearing, seeing, and interacting with gods, angels and demons when in fact they are hallucinating and excessively emotionally/religiously aroused and/or experiencing an "enkephalin" high thereby giving rise to feelings of rapture or "nirvana."

This does not mean to say, however, that "gods", "angels", and "demons", do not exist, for conceivable this could be the case. Indeed, why would the brain have evolved neurons that enable the human race to hallucinate and/or believe in that which does not exist? Moreover, why would humans "evolve" neurons and neural

networks that continue to fire even after death thereby causing them to think they have left their body and are euphorically basking in the light of Heaven?

### Out-of-Body and Near Death Experience

Some children and adults who have been declared "clinically" dead but who subsequently return to life, have reported that after "dying" they left their body and floated above the scene (Eadie 1992; Joseph, 1996; Rawling 1978; Ring 1980). Typically they become increasingly euphoric as they float above their body, after which they may float away, become enveloped in a dark tunnel and then enter a soothing radiant light. And later, when they come back to life, they may even claim conscious knowledge of what occurred around their body while they were dead and floating nearby. Similar experiences are detailed in the Egyptian funerary texts and "book of the dead," written almost 6000 years ago (Budge 1994) as well as by otherwise completely "modern" and sophisticated humans.

"Lisa" for example, was a 22 year old college coed with no religious background or spiritual beliefs, who was badly injured in an auto accident when the windshield collapsed and all but completely severed her arm. According to Lisa, when she got out of the car her was blood spraying everywhere and she only walked a few feet before collapsing. Apparently an ambulance arrived in just a few minutes. However, the next thing she noticed was that part of the time she was looking up from the ground, and part of the time she was up in the air looking down and could see the ambulance crew working, picking up her body, placing it on a gurney and into the ambulance.

According to Lisa, during the entire ride to the hospital it was like she was half in and half out of the ambulance, as if she were running along outside or just extending out of the vehicle watching the cars and tress go by. When they got to the hospital she was no longer attached to her body but was floating up and down the halls, watching the doctors and nurses and attendants. One doctor in particular drew her attention because he had a big belt buckle with his name written on it. She could even read it and it said "Mike."

According to Lisa, she was "tripping out, bobbing up and down the halls, just checking everything out" when she noticed a girl lying on a gurney with several doctors and nurses working frantically. When she floated over and peered over the shoulder of one of the doctors to take a look she suddenly realized the girl was her and that her hair and face were very bloody and needed to be washed. At that point she realized she was floating well above her body and the doctors and that she looked to be "dead." However, according to Lisa she did not feel afraid or upset, although the fact that her hair was dirty bothered her.

As detailed by Lisa, she soon floated up and outside the Emergency room and was enveloped in a total blackness, "like I was passing through a tunnel at the end of

which was a vague light which became brighter and more brilliant, radiating outward." The light soon enveloped her body which made her feel exceedingly happy and very warm. A few moments later she heard the voice of her grandmother who had died when Lisa was a young girl. Although Lisa had no memory of this grandmother, she nevertheless recognized her and felt exceedingly happy. However, as Lisa approached, her grandmother very sorrowfully told her it was "too soon", she would have to "go back." Lisa didn't want to go back, but had no choice. She was drawn away from the light and felt herself falling only to land with a painful thump in her own body. At this point she moved her hand which alerted one of the emergency room staff that Lisa was no longer dead.

It is noteworthy that Lisa had never heard of "near death experiences" (she was injured in 1982) and that after returning to life she only reluctantly explained what had happened when she was questioned by one of her doctors. Lisa also claimed that while she was dead and floating about the emergency room that she saw, heard and is able to recall everything that occurred up to the point when she was enveloped in darkness. She was able to accurately describe "Mike" as well as some of the staff who first attended her, the conversations that occurred around her as well as some of the other patients. Indeed, similar "after death" claims of leaving and floating above the body, and seeing everything occurring below, are common (Eadie 1992; Moody 1977; Rawling 1978; Ring 1980; Sabom 1982; Wilson 1987), and, as noted, are even reported in the 6,000 year old Egyptian Book of the Dead (Budge 1994), as well as the Tibetan Book of the Dead (the Bardo Thodol) which was composed over 1,300 years ago (Evans-Wentz 1960). Approximately 37% of patients who are resuscitated report similar "out of body" experiences (Ring 1980).

Consider for example, the case of Army Specialist J. C. Bayne of the 196th Light Infantry Brigade. Bayne was "killed" in Chu Lai, Vietnam, in 1966. He was simultaneously machine gunned and struck by a mortar. According to Bayne, when he opened his eyes he was floating in the air, looking down on his crumpled, burnt, and bloody body, and he could see a number of Vietcong who were searching and stripping his him: "I could see me... it was like looking at a manikin laying there... I was burnt up and there was blood all over the place... I could see the Vietcong. I could see the guy pull my boots off. I could see the rest of them picking up various things... I was like a spectator... It was about four or five in the afternoon when our own troops came. I could hear and see them approaching... I could see me... It was obvious I was burnt up. I looked dead... they put me in a bag... transferred me to a truck and then to the morgue. And from that point, it was the embalming process. I was on that table and a guy was telling a couple of jokes about those USO girls... all I had on was bloody undershorts... he placed my leg out and made a slight incision and stopped... he checked my pulse and heartbeat again and I could see that too...It was about that point I just lost track of what was taking place.... [until much later] when the chaplain was in there saying everything was going to be all right.... I was no longer outside. I was part of it at this point" (reported in Wilson, 1987, pp 113-114; and Sabom, 1982, pp 81-82).

It is noteworthy that some surgery patients, although ostensibly "unconscious" due to anesthesia, are also able to later describe conversations and related events that occurred during the operation (Furlong, 1990; Kilhstrom, et al. 1990; Polster, 1993). Hence, the notion that those who are "clinically dead" or near death may also recall various events that occurred while they were ostensibly "dead" should not be dismissed out of hand. Moreover, some surgery patients also claim to "leave their bodies" while they were "unconscious" and claim to recall seeing not just the events occurring below, but in one case, dirt on top of a light fixture (Ring 1980). "It was filthy. And I remember thinking, 'Got to tell the nurses about that.'"

Did the above surgical patient or Lisa or Army Specialist Bayne really float above and observe their bodies and the events taking place below? Or did they merely transpose what they heard (e.g. conversations, noises, etc.) and then visualize, imagine, or hallucinate an accompanying and plausible scenario? This seems likely, even in regard to the "filthy" light fixture. On the other hand, not all those who have an "out of body" hear conversations, voices, or even sounds. Rather, they may be enveloped in silence.

"I was struck from behind...That's the last thing I remember until I was above the whole scene viewing the accident. I was very detached. This was the amazing thing about it to me... I could see my shoe which was crushed under the car and I thought: Oh no. My new dress is ruined... I don't remember hearing anything. I don't remember anybody saying anything. I was just viewing things...like I floated up there..." (Sabom, 1982; p. 90). Moreover, even individuals born blind experience these "near death" hallucinations.

### Fear and Out-of-Body Experiences

The prospect of being terribly injured or killed in an auto accident or fire fight between opposing troops, or even dying during the course of surgery, are often accompanied by feelings of extreme fear. It is also not uncommon for individuals who experience terror to report perceptual and hallucinogenic experiences, including dissociation, depersonalization and the splitting off of ego functions such that they feel as if they have separated from their bodies and floated away, or were on the ceiling looking down (Campbell 1988; Courtois 1995; Grinker and Spiegel 1945; James 1958; Neihardt and Black Elk 1932/1989; Noyes and Kletti 1977; Parson 1988; Southard 1919; Terr 1990). Consider the following:

"The next thing I knew I wasn't in the truck anymore; I was looking down from 50 to 100 feet in the air." "I had a clear image of myself... as though watching it on a television screen." "I had a sensation of floating. It was almost like stepping out of reality. I seemed to step out of this world" (Noyes and Kletti 1977).

Or as a close friend described his experience: "I was shooting down the freeway doing about 100 or more in my Mustang when a Firebird suddenly cut me off. As I

switched lanes to avoid him, he also switched lanes at which point I hit the breaks and began to lose control. The Mustang began to slide and spin... I felt real terror.... I was probably going to be killed... I was trying to control the Mustang and avoid turning over, or hitting any of the surrounding cars or the guard rail.... time seemed to slow down and then I suddenly realized that part of my mind was a few feet outside the car looking all around; zooming above it and then beside it and behind it and in front of it, looking at and analyzing the respective positions of my spinning Mustang and the cars surrounding me. Simultaneously I inside trying to steer and control it in accordance with the multiple perspectives I was suddenly given by that part of my mind that was outside. It was like my mind split and one consciousness was inside the car, while the other was zooming all around outside and giving me visual feedback that enabled me to avoid hitting anyone or destroying my Mustang."

### Hippocampal Hyperactivation and Astral Projection

Feelings of fear and terror are mediated by the amygdala, whereas the capacity to cognitively map, or visualize one's position and the position of other objects and individuals in visual-space is dependent on the hippocampus (Nadel, 1991; Joseph, 1996; O'Keefe, 1976; Wilson and McNaughton, 1993). The hippocampus contains "place" neurons which are able to encode one's position and movement in space.

The hippocampus, therefore, can create a cognitive map of an individual's environment and their movements within it. Presumably it is via the hippocampus that an individual can visualize themselves as if looking at their body from afar, and can remember and thus see themselves engaged in certain actions, as if one were an outside witness (Joseph, 1996). However, under conditions of hyperactivation (such as in response to extreme fear) it appears that the hippocampus may create a visual hallucination of that "cognitive map" such that the individual may "experience" themselves as outside their body, observing all that is occurring.

In fact, it has been repeatedly demonstrated that hyperactivation or electrical stimulation of the amygdala-hippocampus-temporal lobe, can cause some individuals to report they have left their bodies and are hovering upon the ceiling staring down (Daly 1958; Jackson and Stewart 1899; Joseph, 1996; Penfield 1952; Penfield and Perot 1963; Williams 1956). That is, their ego and sense of personal identity appears to split off from their body, such that they may feel as if they are two different people, one watching, the other being observed. As described by Penfield (1952), "it was as though the patient were attending a familiar play and was both the actor and audience."

### Limbic System Hyperactivation, Hallucination & Near Death

Presumably abnormal activation due to extreme fear or direct electrical stimulation induces an individual to think they are seeing themselves from afar because the

hippocampus is transposing and "hallucinating" one's image; similar to what occurs during normal remembering.

As noted, however, many patients who are diagnosed as "clinically dead" and then return to "life" report that after leaving their body they enter a dark tunnel and are then enveloped in a soothing radiant light. The same is reported in the Egyptian and Tibetan Books of the Dead.

Presumably, in that the hippocampus, amygdala, and inferior temporal lobe receive direct and indirect visual input and contain neurons sensitive to the fovea and upper visual fields, hyperactivation of this region also induces the sensation of seeing a radiant light. These brain regions would also account for the hallucinations of seeing dead relatives, and so on that are commonly reported by those who have "died," as well as the life review, in which one's past life flashes before their eyes. Similarly, the massive release of opiates (due to physical trauma leading to "death") would account for the immediate loss of fear and the experience of tranquility and joy.

Thus the hyperactivation of these limbic nuclei would explain why those who have near death experiences report feelings of peace, rapture and joy as they were "bathed by the light" and stood in the all knowing presence of "God" or other divine beings including friends and relatives who had previously passed away. Indeed, these exact same feelings and related hallucinations can be induced by electrically stimulating the inferior temporal lobe and amygdala-hippocampal complex.

#### Out-of-Body, Heavenly and Otherworldly Limbic Experiences

Penfield and Perot (1963) describe several patients who during a temporal lobe seizure claimed they could see themselves in different situations. One woman stated that "it was though I were two persons, one watching, and the other having this happen to me," and that it was she who was doing the watching as if she was completely separated from her body.

One patient had a sensation of being outside her body and watching and observing her body from the outside. Another neurosurgery patient alleged that while outside her body she was also overcome by feelings of euphoria and eternal harmony.

Other patients claim to have quite pleasant auras and describe feelings such as elation, security, eternal harmony, immense joy, paradisiacal happiness, euphoria, completeness. Between .5 and 20% of such patients report these feelings (Daly 1958; Williams 1956). A patient of Williams (1956) claimed that his attacks began with a "sudden feeling of extreme well being involving all my senses. I see a curtain of beautiful colors before my eyes and experience a pleasant but indescribable taste in my mouth. Objects feel pleasurable warm, the room assumes vast proportions, and I feel as if in another world."

A patient described by Daly (1958) claimed his temporal lobe seizure felt like "a sunny day when your friends are all around you." He then felt dissociated from his body, as if he were looking down upon himself and watching his actions.

Williams (1956) describes a patient who during an aura reported that she experienced a feeling of being lifted up out of her body, coupled with a very pleasant sensation of elation and the feeling that she was "just about to find out knowledge no one else shares, something to do with the link between life and death."

Subirana and Oller-Daurelia (1953) described two patients who experienced ecstatic feelings of either "extraordinary beatitude" or of paradise as if they had gone to heaven. Their fantastic feelings also lasted for hours.

Other patients suffering from temporal lobe seizures have noted that feelings and things suddenly become "crystal clear" or that they had a feeling of clairvoyance, or of having the truth revealed to them, or of having achieved a sense of greater awareness and of a new awareness such that sounds, smells and visual objects seemed to have a greater meaning and sensibility. Similar claims are made by those who have "died" and returned to tell the tale.

#### Embraced by the Light: Temporal Lobe Seizures, Death, and Astral Projection

Some individuals (and their followers) claim to be able to voluntarily leave their body (Monroe, 1994), this includes any number of "mystics," and New Age spiritualists, as well as some priests, prophets and shaman. Indeed, Monroe (1994) founded an Institute to study this phenomenon, and claims that others can learn this technique. Monroe, however, notes that when he had his first out-of-body experience he had felt extremely frightened.

As noted, a few individuals suffering from (or at least demonstrating signs suggestive of) temporal lobe epilepsy also report "out of body experiences." One woman I evaluated claimed she not only would float on the ceiling, but could float outside and could see everything that was going on, including on one occasion, a friend who was coming up the walkway. She also reported that by having a certain thought, she could propel herself to other locals including the homes of her neighbors.

Some of those who have "after death" experiences (as well as those who claim to voluntarily leave their bodies, e.g. Monroe, 1994) have made similar claims. For example, Betty J. Eadie reports in her 1992 book, "embraced by the light" that after dying and then communing with three "ancient" men who appeared at her side and who "glowed", she suddenly thought of her husband and children who she wanted to visit. "I began to look for an exit" and discovered that "my spiritual body could move through anything...My trip home was a blur. I began moving at tremendous speed... and I was aware of trees rushing below me. I just thought of home and knew



I was going there... I saw my husband sitting in his favorite armchair reading the newspaper. I saw my children running up and down the stairs... I was drawn back to the hospital, but I don't remember the trip; it seemed to happen instantaneously" (pp. 33-35).

Compare Eadie's description with that of Black Elk (Neihardt and Black Elk, 1932/1989), a Lakota Sioux Medicine Man and spiritual leader (born in 1863). During a visit to England (he was part of Buffalo Bills Wild West Show) he suddenly fell out of his chair as if dead, and then experienced himself being lifted up. In fact, his companions thought he had died.

According to Black Elk: "Far down below I could see houses and towns and green land and streams... I was very happy now. I kept on going very fast...Then I was right over Pine Ridge. I looked down (and) saw my father's and mother's teepee. They went outside, and she was cooking... My mother looked up, and I felt sure she saw me... then I started back, going very fast...Then I was lying on my back in bed and the girl and her father and a doctor were looking at me in a queer way...I had been dead three days (they told him)...and they were getting ready to buy my coffin" (pp. 226-228).

This was not Black Elk's first out of body experience, however. Black Elk demonstrated numerous behaviors and symptoms suggestive of temporal lobe epilepsy. Beginning even in childhood Black Elk repeatedly experienced "queer feelings" and heard voices, had visions, and suffered numerous instances of sudden and terrible fear and depression accompanied by weeping, as well as trance states in which he would fall to the ground as if dead.

Black Elk also had other visions similar to those reporting "life-after-death" experiences, including the following incident that occurred during one of his trance and out-of-body states: "Twelve men were coming towards me, and they said, 'Our father, the two-legged chief, you shall see...'. There was a man standing. He was not Wasichu (white) and he was not an Indian. While I was staring at him his body began to change and became very beautiful with all colors of light, and around him there was light..." (p. 245).

Similarly, Ms. Eadie (like many others who have experienced "life after death") came upon a man standing in the light which "radiated all around him. As I got closer the light became brilliant...I saw that the light was golden, as if his whole body had a golden halo around it, and I could see that the golden halo burst out from around him and spread into a brilliant, magnificent whiteness that extended out for some distances" (pp. 40-41).

That so many people, regardless of culture or antiquity, have similar experiences (or hallucinations) after "dying" (e.g. the Tibetan and Egyptian Books of the Dead) or leaving their body, is presumably due to all possessing a limbic system and temporal

lobe that is organized similarly. The fact that although ostensibly similar, many of these experiences are also colored by one's cultural background, can in turn be explained by differences in experience and cultural expectations and thinking patterns. As explained in the Tibetan Book of the Dead: "It is quite sufficient for you (the deceased) to know that these apparitions are [the reflections of] your own thought forms."

### Death and the Temporal Lobe

Presumably conditions involving extreme fear and/or traumatic injury, and in some cases of temporal lobe epilepsy, result in hyperactivation of the amygdala and hippocampus, which in turn will begin to hallucinate and/or trigger a vision of brilliant light, as well as secrete opiate-like neurotransmitters which induce a state of euphoria and thus eternal peace and harmony. Given that similar experiences are reported by those who have been declared "clinically dead" also raises the possibility that the hippocampus and amygdala may be the first areas of the brain to be effected by approaching death, as well as one of the last regions of the brain to actually die. That is, as one approaches death and even after medical death, the amygdala and hippocampus may continue to function briefly and not only become hyperactivated, but produce a feeling of eternal peace and tranquility and a hallucination of floating outside the body and of meeting relatives and other religious figures; like a dream.

On the other hand, it is curious that so many individuals have basically a very similar "dream" and only under conditions suggestive of death. Moreover, it is exceedingly difficult to reconcile these experiences with the Darwinian notion of evolution. That is, what is the "evolutionary" adaptive significance of so many members of the human race having a dream of the "Hereafter" after they die.

### Hell and Alien Abductions

Over the course of the last fifty years there have been numerous reports of alien abductions (Bullard, 1987; Mack, 1994; Ritchie, 1994). Typically they are "abducted" while asleep or dreaming, or just upon waking in the middle of the night -which raises the specter of hallucination and temporal lobe limbic system activation. Other claim they were abducted while driving late at night, while tired and under conditions where the head lights, moon light, and oncoming lights may flicker past (Bullard, 1987; Mack, 1994; Ritchie, 1994) -thus inducing possible seizure activity.

The experience of having undergone an alien abduction is in some respects similar to the life after death and near death experience, in that some claim to have undergone a religious theophany or awakening at the conclusion of the abduction (Bullard, 1987; Mack, 1994; Ritchie, 1994). Many "abductees" also claim a sequence of perceptual experience similar to those who have died and returned to tell the tale. Abductees report the presence of a bright light, or a strange illumination

which may envelop them in a beam or halo of light. They feel drawn upward toward the light, and they feel and see themselves as floating in air (Bullard, 1987; Mack, 1994; Ritchie, 1994). Similar to those those who have "experienced" life after death, abuctees report going on voyages through the air, where they rapidly fly over the land or sea, to destinations including the Egyptian pyramids, New York City, and the North pole (Bullard, 1987; Mack, 1994; Ritchie, 1994).

However, in contrast to those who go to heaven, the religious experience of these abuctees is often hellish, and the aftermath includes prolonged feelings of depression, and horror and dispair. Abductees" frequently report that once they were drawn up toward the light, they felt overwhelmed with terror and that once they "arrived" they were subjected to painful and agonizing procedures (Bullard, 1987; Mack, 1994; Ritchie, 1994).. Women often report that they were stripped naked and their legs spread, and that they were sexually molested, raped, or painfully robbed. Male and female abductees frequently report undergoing painful and invasive physical exams by alien monstrocities who loom demonically, probing vaginas, wombs, the anus, the eyeballs, and the viscera, with needle-like devices, or twisting wires, or sharp, painfully cold lancelike instruments that may deliver electric, burning, or shock like sensations (Bullard, 1987; Mack, 1994; Ritchie, 1994).

Like those who experience life after death, some abductees report undergoing a "life review." They may see themselves or others on a viewing screen, usually engaged in sexual or violent activity. Similar sexual flashbacks are not uncommon with amygdala activation (Gloor, 1990; Halgren, 1992).

Once they are returned to earth and/or awake in their beds, many abductees are amnesic for the experience, though they may be troubled by fleeting, horrifying images and flashbacks (Bullard, 1987; Mack, 1994; Ritchie, 1994). They also suffer from depression, sleeplessness, anxiety and panic attacks; which again are suggestive of limbic system and temporal lobe abnormalities as well as post-traumatic stress disorder.

It is noteworthy, however, that some of those who undergo life-after-death also report exceedingly unpleasant experiences. This includes feelings of terror, sensations of terrible physical pain, the presence of demonic monstrosities, or hallucinations of people crying, moaning, screaming, and burning in flames.

## Death and the Body

### In the Beginning there was Life

In most instances death is a gradual process, with some cells and tissues disintegrating in advance of others, and yet other tissues living for hours or even days before the body completely decays. Presumably, so long as the body (or at least the limbic system) lives, one's sense of a personal soul and identity remains intact

(in the form of an out-of-body experience) -an ethereal existence and sense of personal identity which remains tethered to the body (or limbic system) until the body completely dies and decays.

Indeed, the linkage of the personal soul and individual immortality to the body were widespread beliefs and practices among the ancient Egyptians which is why they expended so much effort to preserve the body via mummification. If the body could be preserved, so could one's personal soul and sense of individuality, leading to "immortality". Others, including the Tibetan Buddhists sought just the opposite, to free the soul from the body and so as to escape the "illusion" of individuality and personal existence.

Perhaps too, what some experience as their personal soul upon death, is but a gradual liberation of LIFE that at first retains its bodily (limbic) links, thus preserving one's sense of individuality; the shadow of one's previous form as the body dies. Thus as the body is consumed, perhaps so too is the sense of individuality, freeing the soul, one's LIFE, to be embraced by the radiance of all LIFE thereby becoming One with the Great Spirit and the Gods.

"Thine own consciousness, shining, void, and inseparable from the Great Body of Radiance, hath no birth, nor death, and is the Immutable Light--Buddha Amitabha [source of life and boundless light]. If all existing phenomena shining forth as divine shapes and radiances be recognized to be the emanations of one's own intellect, Buddhahood will be obtain at that very instant of recognition."-Bardo Thodol (Tibetan Book of the Dead)

### The Frontal Lobes, Limbic System, Murder and Religious-Sexual Experience

The amygdala and hypothalamus often act in a highly coordinated manner in reaction to an exceedingly important emotional stimulus (e.g. fear), or in response to a specific limbic need, such as hunger, thirst, rage, or sexual desire (Joseph, 1992a, 1996; MacLean 1969, 1990). For example, in response to hypothalamically monitored needs (hunger, sexual desire), the amygdala may scan the environment until it determines that a particular food item or person, has the necessary attributes (Gloor 1992; Joseph 1992ab, 1996; Kling et al., 1987; O'Keefe and Bouma 1969; Ursin and Kaada 1960). In response to urgent hypothalamic desires, the amygdala might even assign sexual attributes to an individual that normally might not be viewed as sexually enticing.

It is also through hypothalamic and amygdala activity that a particular item or object (e.g. a banana) might be viewed as both a food item and sexual object. Or conversely, why certain individuals may be viewed as sexual as well as aversive and hateful (e.g. one's husband or wife). Indeed, because the hypothalamus and amygdala are so concerned with sex, rage, fear, and hunger, not only may these attributes be assigned to one individual, animal, or object simultaneously (e.g. fear of the beast one is going

to enjoy killing and eating; hunger, guilt, and aversion regarding a high caloric treat; hatred for a loved one) but they may be combined so as to give rise to exceedingly intense, albeit abstract emotional states; e.g. religious awe. The amygdala in particular is exceedingly important in generating feelings of fear (Davis, Walker and Lee, 1997; Gloor, 1992; Halgren, 1992; Rosen and Schulkin 1998; Scott et al., 1997; Williams 1956). In this regard, feelings of religious awe may be based on fear (d'Aquili and Newberg 1993), rage, extreme, hunger, or sexual arousal (see below). In fact, the "God" Yahweh, depends on fear to reveal his presence and power.

"The beginning of wisdom is the fear of the Lord (Proverbs 1:7, 9:10, 15:33). And now, Israel, what does the Lord your god require of you, but to fear the Lord your god (Deuteronomy 10:12). God has come... in order that the fear of Him may be ever with you so that you do not go astray" (Exodus 20:17).

However, in addition to these nuclei (including the temporal lobe and hippocampus), d'Aquili and Newberg (1993) point out that the right frontal lobe also plays a significant role in the generation of mystical experience. It is thus noteworthy that the right frontal lobe can pray, swear, and curse "God" even when the (speaking) left cerebral hemisphere has been severely damaged and the patient is aphasic (Joseph, 1988a, 1996).

The right frontal and temporal lobe, hypothalamus, and amygdala also interact in regard to sexual arousal (Freeman and Nevis 1969; Joseph 1986a, 1988a, 1992a; MacLean 1969, 1990; Remillard, et al. 1983; Robinson and Mishkin 1968; Spencer, et al. 1983). This is a very important relationship, and in part explains why (although there are exceptions), religions tend to be quite sexual and/or exceedingly concerned with sexual mores and related activity. As is well known, female pregnancy and matters pertaining to birth control and abortion are of extreme concern to most modern as well as ancient religions (Campbell 1988; Frazier 1955; Parrinder 1980; Smart 1969)

However, the limbic system as well as the frontal and temporal lobes are also highly concerned with acting on or inhibiting aggression and murderous rage reactions which also arise in the limbic system (Joseph 1986, 1988, 1992a, 1996). This may also explain why many religious sects are so "righteously" belligerent and hateful and have employed torture, human or animal sacrifice, and sanctioned if not encouraged the murder of non-believers: What could be referred to as limbic-religious blood lust. "Shed man's blood, by man be your blood shed" (Genesis 9:6).

In fact, the "God," Yahweh, repeatedly required that the ancient Israelites undergo a blood ritual of submission (e.g. Exodus 24:1-14), and in fact proscribed a ritual of incredible bloodiness for the investiture of his priests (Exodus 29: 1-46). This "God" also required the slaughter and sacrifice of living creatures whose blood is splashed on his altar, and on his priests. King Solomon, for example, slaughtered 22,000 oxen and 22,000 sheep as an offering to this "God." In fact, as this "God" is apparently a

meat eater, this may explain why he criticized Cain, a tiller of the soil, and rejected his first harvest offering of vegetable matter (Genesis, 4).

For ancient hunters, aggression and the killing of animals (and other humans) was a way of life. Hunters often employed hunting magic and related religious rituals to insure success. Religion and murder, like religion and sex, are linked to the limbic system and evolved accordingly. Consequently, when in the throes of religious excitement, torture and murder may even receive the blessing or might be actively encouraged by one's "God."

Throughout history, many of the patriarchal Gods have been aggressive, jealous, conquering, angry and war-like, i.e., "the Lord of hosts." Indeed, these warrior gods, including Yahweh, were prone to extreme violent rages. Yahweh would threaten and engage in the slaughter of enemies and believers alike, without mercy or regard for women and children.

"Terror, and the pit, and the snare are upon you, O inhabitant of earth (Isaiah 24:17). And as the Lord took delight in doing you good and multiplying you, so the Lord will take delight in bringing ruin upon you and destroying you" (Deuteronomy 26:63). The Lord will bring a nation against you from afar, from the end of the earth, which will swoop down like the eagle... a ruthless nation, that will show the old no regard and the young no mercy. (Deuteronomy 28:47-50). It shall devour the offspring... you shall eat your own issue, the flesh of your sons and daughters... until He has wiped you out... leaving you nothing.... until it has brought ruin unto you..." (Deuteronomy 28:50-55).

"In the Name of God... by the Troops shall the unbelievers be driven towards Hell, until when they reach it, its gates shall be opened... for just is the sentence of punishment on the unbelievers...." Koran, XXXIX

"Behold I send an angel before thee, to keep thee in the way. Beware of him and obey his voice, for I will be an enemy unto thine enemies, and an adversary unto thine adversaries, and I will cut them off..... I will send my terror before thee, and will destroy all the people to whom thou shalt come..... and I will drive them out from before thee, until thou be increased and inherit the land." Exodus 23:20-30

"...when you approach a town, you shall lay siege to it, and when the Lord your god delivers it into your hand, you shall put all its males to the sword. You may, however, take as your booty the women, the children, the livestock, and everything in the town--all its spoils--and enjoy the spoil of your enemy which the Lord your god gives you.... In the towns of the people which the Lord your god is giving you as a heritage, you shall not let a soul remain alive Exodus 20:15-18; Deuteronomy 20:12-16

"When Israel had killed all the inhabitants of Ai....and all of them, to the last man had fallen by the sword, all the Israelites turned back to Ai and put it to the sword...until all the inhabitants of Ai had been exterminated... and the king of Ai was impaled on a stake and it was left lying at the entrance to the city gate." Deuteronomy 8:24-29.

Despite the commandment "thou shall not kill" the ancient Israelites received special permission from their "God" to murder wayward Jews, non-Jews and Jewish non-believers, including women and children whom they slaughtered without mercy (e.g. Numbers, 31 15-18; Numbers 34, 50-53). For example, throughout the Old Testament in the Bible, it was a Jewish tradition to kill and slaughter not only non-Jewish males in general and first born Jewish sons (a custom until the time of Moses, e.g. Bergmann 1992), but babies and women prisoners with children.

"And they warred... as the Lord commanded and slew all the males. And they slew the Kings... and they took all the women and their little ones... and they burnt all their cities wherein they dwelt, and all their goodly castles with fire... And Moses was wroth...and said unto them. Have ye saved all the women and the little ones alive? Now therefore kill every male among the little ones, and kill every woman that hath known man by lying with him. But all the women and female children that have not known a man, keep alive for yourselves." Numbers, 31

The sacrificial murders of first born males was originally demanded by this "God," but became a practice which He later condemned.

"A blessing on him who seizes your babies and dashes them against rocks (Psalm 137:9). I polluted them with their own offerings, making them sacrifice all their first-born, which was to punish them, so that they would learn that I am Yahweh (Ezekiel 20:25-36. See also Ezekiel 22:28-29). "This very day you defile yourselves in the presentation of your gifts by making your children pass through the fire of all your fetishes (Ezekiel 20:31).

This "God" even required the death of the son of King David. Oddly, by killing this little boy, "God" in effect pardoned King David for repeatedly breaking two of His commandments, i.e., murder (of Bethsheba's husband) and adultery. David, in fact, had a fondness of the wives of other men (e.g. Abigail wife of Nabal, and Michal wife of Paltiel). However, David the murderer and adulterer, was also a fierce warrior who had killed tens of thousands--and this "God" loved him most dearly.

It was upon these images of the murdering warrior God, the Lord of Hosts, that Pope Urban II proclaimed that war for the sake of God was holy. In fact, acting under the religious delusion they were serving Jesus Christ, when in fact they were following the philosophy of Paul (who spent the first half of his life harassing Christians) and the dictates of Peter whom Jesus repeatedly castigated as "Satan" e.g. St. Matthew 16: 23; Matthew 17: 24-25; Mark 8:33: "But he turned and said unto Peter, "Get thee

behind me, Satan, thou art an offence unto me; for thou savourest not the things that be of God, but those of men) the Catholic Popes instigated numerous Crusades and inquisitions. In consequence hundreds of thousands of Moslems, Jews, and women and children, were sexually tortured, slaughtered, spitted, and roasted alive, and their cities and villages pillaged and set ablaze. All in the name of God. So intense was their limbic blood lust that even Christians were murdered.

For example, in the 13th Century an army of some thirty thousand Christian knights and Crusaders descended into southern France and attacked the town of Beziers in search of heretics. Over thirteen thousand Christians flocked to the church's for protection. However, when the Bishop, one of the Pope's representatives, was informed that the army was unable to distinguish between true believers and heretics, he replied, "Kill them all. God will recognize his own."

However, in order to recruit those worthy of such a glorious undertaking, the Pope had to appeal to murderers, rapists, molesters of children, and those who enjoyed the prolonged torture of their victims. "You oppressors of orphans, you robbers of widows, you homicides, you blasphemers, you plunderers of others' rights... If you want to take counsel for your souls you must go forward boldly as knights of Christ..." so proclaimed the Pope who offered "indulgences" and forgiveness to all those who would commit blasphemies in the name of God and Jesus Christ.

The limbic system is also concerned with sex. Unfortunately, an abnormal limbic system may abnormally link sex with murder; and among men, the sexual murder or torture of women.

Hence, after the men had marched off to Catholic Crusades or had been killed, the women were left unprotected and were temporarily freed of male dominance. In consequence, some began to practice their own religion and worship their own Gods. In consequence, the Popes and the Catholic Church proclaimed them witches and declared war against women. Hence, in 1252, Pope Innocent IV issued the *Ad Exitrpanda*, which authorized the execution of heretics (e.g. wealthy landowners) and the seizure of their goods, and the prolonged sexual torture of women who were beautiful, wealthy, or old, ugly, and eccentric and/or who gathered in groups to talk and converse and possibly worship pagan goddesses.

Indeed, when the Papal fathers and the Dominicans Heinrich Kramer and Johann Sprenger issued the infamous Papal Bull and the *Malleus Maleficarum* (witch's hammer), a blood lust regarding "woman the witch, healer and sorceress" was unleashed and hundreds of thousands were burned and/or sexually tortured to death (Achterberg, 1991; Gies and Gies 1978; Lederer 1968). "For she is a liar by nature, so in her speech she stings while she delights us...for her voice is like the song of the Sirens, who with their sweet melody entice the passerby's and kill them..." (*Malleus Maleficarum*).



As noted, because many of the men (the Crusaders) had been killed or were serving in the army of the Catholic God, the women were often left unprotected and sometimes whole villages were destroyed, or all the women in a given area were rounded up by the Catholic authorities. These females, particularly those who were exceedingly attractive or ugly, were then hideously tortured and then slaughtered by burning, boiling in oil, crushing, and via whatever device the religious authorities felt appropriate or which suited their sick minds. In Germany huge ovens were constructed for the purposes of mass female murder (Achterberg, 1991; Lederer 1968).

However, it was not just beautiful females, for they come in a limited supply, but those who were old, eccentric, childless, and particularly women who owned property and pets, such as cats. Indeed, the cats would be tortured and murdered alongside the women. The "Black Plague" in fact was in part a consequence of the denunciation and killing of cats, coupled with the sanctification of rats and mice (the proverbial church mouse), by the Catholic authorities.

As is well known, the Spanish and Catholic missionaries, acting at the behest of the Catholic Popes (and their Spanish/Catholic Sovereigns), continued these Satanic practices once they invaded the Americas during the 1500's and up through the 19th century. As the Catholic Dominican Bishop Bartolom de Las Casas reported to the Pope: the Aztec and Indian natives were hung and burnt alive "in groups of 13... thus honoring our Savior and the 12 apostles."

Of course the Aztecs did not practice a benign form of worship, for they tore the beating hearts from their victims in order to please their God (Carrasco 1990) and they killed thousands if not hundreds of thousands in so doing. Similarly, many Indian tribes of the Mississippi valley practiced human sacrifice as did the ancient Jews, Europeans, and so on.

What is the origin of these sadistic religious practices? The human limbic system.

Nevertheless, mass murder, torture, rape, pedophilia, and the castration of young boys were probably not what Jesus Christ had in mind when he preached his gospel despite his own depressed, irritable, and labile character: "But love ye your enemies and do good and lend, hoping for nothing and your reward shall be great. Be ye merciful...judge not, and ye shall not be judged: condemn not and ye shall not be condemned: forgive and ye shall be forgiven" (Luke, 7: 35-37); "For the Son of man is not come to destroy men's lives, but to save them" (Luke 10: 56; however, see Matthew 10:16 vs 34-35). On the other hand, the "God" of the "Old Testament" repeatedly approved of mass murder and rape, and in fact employed these practices against His own chosen people. Indeed, does not this "God" tell us He is the source of all evil.

Modern Religious Murderers

Murder of the innocents and the slaughter of infidels and non-believers are not antiquated religious customs. Cults and religious groups regularly arise in various lands and cultures and frequently indulge in similar practices, e.g. Jim Jones and "Jonestown" mass suicide, David Koresh and the fiery death of he and his followers at Waco Texas. David Koresh, in fact, had sex not only with the wives of his followers, but with their children; and in the end apparently ordered the death of one and all.

Consider, also the Japanese religious cult "Aum." Their leader Shoko Asahara and many top cult members were arrested and charged with murder in June of 1995 for releasing the nerve gas Sarin in five subway cars during rush hour injuring over 5,500 Japanese commuters (New York Times, 6/7/95).

Similarly, although the "modern" Islamic, Christian and Jewish religions forbids it, many modern day Middle Eastern and African Islamic, Christian, and Jewish fundamentalists, regularly preach murder and hatred. Indeed, it has been reported that "militant rabbis in Israel had encouraged and condoned the assassination of Israel's Prime Minister, Yitzhak Rabin, and had issued a "pursuer's decree," which in effect morally required that he be killed (New York Times 11/11/95). And, he was murdered by a student of religion, Yigal Amir, who claimed he acted upon "God's" instructions.

What is the source of these religious murderous feelings? The limbic system and the same cluster of nuclei which subserve sexuality and spirituality. It is the limbic system which enables human beings to respond with irrational and murderous blood lust in the name of "God" and religion.

### Sex, God, & Religion

Sexuality is a major concern of most major religions (Lederer 1968; Parrinder 1980; Smart 1969) as well as the limbic system. In fact, almost all major religions and their Gods, either act to promote sexuality, or to suppress it. This should not be entirely surprising for religions are very sexual and many were originally concerned with the fertility of the fields and the abundance of prey (Campbell 1988; Frazier 1950; Harris,1993; Kuhn 1955; Malinowski 1948; Parrinder 1980; Prideux 1973). Religious rituals evolved accordingly.

Many modern mystical and religious practices also involve the ritual control over sex and food. This includes many American Indian, Christian, Jewish, and Moslem sects (Campbell 1988; Parrinder 1980; Smart 1969). Thus the commandment "thou shalt not...." These are limbic taboos, as eating and sexuality (like murder and violence) are under limbic control.

Many limbic taboos, however, promote survival, for example, by proscribing the eating of poisonous plants or unclean animals. Similarly, by forbidding anal or

indiscriminate sex one was spared the wrath of this "God" and whatever plagues he might send in the form of venereal disease or viruses. If we rule out the possibility of an attack with nuclear armed missiles, mass death due to disease is presumably what became of Sodom and Gomorrah where the anal sex crazed mobs attempted to sodomize even the angels sent by the Lord "God" himself (Genesis 19).

Sex and food (along with fear, rage, and aggression) are probably the most powerful of all limbic emotions and motivators, and when harnessed or stimulated, can completely overwhelm or control the brain and lead to limbic hyperactivation coupled with religious or spiritual sensations, or, at a minimum, complex dreams or hallucinations (Joseph, 1996). Hence, hungry men, women, and infants will dream of food, and those who are sexually aroused (but are unfamiliar with the theories of Freud 1900), will dream of sex. However, a parched and starving man will not just dream, he will hallucinate food and water and will attempt to slake his desires by consuming a hallucination.

Given that early (as well as modern) human populations were often concerned with obtaining food (as well as a sex partner) many of their earliest religious beliefs and rituals were therefore concerned with increasing the abundance of game animals as well as preserving their own progeny (Armstrong 1994; Campbell 1988; Frazier 1950; Harris, 1993; Kuhn 1955; Parrinder 1980; Prideux 1973). As noted, many an ancient Upper Paleolithic cave was decorated with fertility and sex symbols, including pregnant women (Venus figures) and animals (Bandi 1961; Joseph 1996; Kuhn 1955; Leroi-Gurhan 1964), whereas Egyptian tombs contain numerous paintings of food.

Thus, given our ancient hunter-gatherer (and then later, farming) heritage, many religions both ancient and relatively modern are highly concerned with fertility and food, or tend to be very sexual and limbic in orientation if not origin. This is also why there have always been gods who are associated with eating and drinking, especially alcohol (Campbell 1988; Frazier 1950; James 1958; Parrinder 1980; Smart 1969). This also includes, for example, Osiris, and especially Dionysus who was among other things, a sex crazed dancing god of the vine. In fact, one of the first miracles performed by Jesus involved making wine from water.

Even among the ancient religions of India and China, the sexual activity of the Gods and the promotion of similar sexual activities among the believers were widespread religious practices and beliefs (Campbell 1988; Parrinder 1980). For example, the ancient Vedas were greatly concerned not only with the worship of various nature gods, but with the rituals of sexual union. Ancient Indian religious texts are filled with love charms and instructions as to how to win the love of a man or woman, or to protect against demons. In fact, temple prostitutes were quite common throughout India and the Middle East (as well as in Rome and Greece), and some temples employed so many girls that they were like giant brothel emporiums (Parrinder

1980). As noted, sexuality and desire (like religious feeling) are directly mediated by the amygdala and hypothalamus.

In fact, sexual intercourse became a religious ritual among Hindus and Buddhists who practiced "tantra." Those who practiced tantra were inspired by visions of cosmic sex and were highly concerned with sexual energy. It was through tantra that one might be confronted with the cosmic mystery of creation as exemplified by another deity, Shakti, the divine mother. However, restrictions on where one could have sexual intercourse (not in public) and certain types of sexual acts such as oral sex, were prohibited as well as sex with strange women or those of a lower caste (Parrinder 1980). Nevertheless the joys of sex were continually emphasized and embraced. Hence, the Kama Sutra, the "love text".

On the other hand, it was believed by some ancient far Eastern sects that in order to gain power, one had to break taboos and, for example, have sex with women while they were menstruating and/or engage in sexual orgies. This was also a form of tantra, referred to as "left handed tantra." Those who followed the way of the left handed tantra claimed that passion was nirvana and that adepts should cultivate all sexual pleasures (Parrinder 1980). Moreover, both male and female deities, usually in the act of having sex, were worshiped.

Ancient Chinese and Taoists religions are also quite sexual (Parrinder 1980). These beliefs are exemplified by the concepts of Yin and Yang which appeared about 3000 years ago and which represented the male and female principles of the universe. In this regard, sexual intercourse was viewed as a symbolic union of the earth and heaven, which, during rainstorms were believed to mate. It was in this manner that man and woman achieved harmony by following the example of the gods.

However, around 3,000 years ago, at about the same time that the Judaic religion became more dominant in the Middle East, there occurred over the following thousand years a tremendous change in sexual thought which continued to grow and prosper, enveloping the Roman Empire, and which eventually paralleled and coincided with the development of Christianity and Islam.

The Lord of the Gods (Genesis) gradually became the Lord God, the only "God," and there is no hint of sexual duality in his personage. Moreover, the God of Abraham, and thus the God of the Israelis, Christians, and Moslems, was not in any manner a sexual being (however, see Proverbs 8:22-31), and he in fact required a form of sexual self-mutiliation and thus a diminishing of the male's sexual pleasure. As part of his covenant with Abraham and the Jews, it was ordered that every male child would suffer the amputation of the tip of his penis (which is densely innervated by fibers that yield intense sexual pleasure): "And ye shall circumcise the flesh of your foreskin; and it shall be a token of the covenant betwixt me and you" (Genesis 17: 10-11). Nor does this "God" lust after or engage in sexual relations with women; which had been a common god-like (and "sons of God") behavior in the past. Rather,

in those instances where women became pregnant due to the actions of this "God," sex per se appears to have been precluded.

On the other hand, this God, when angry, also found pleasure in using explicit sexual imagery when condemning his people, Israel--whom he repeatedly threatened to strip "naked" and whom he referred to as a "whore." "And let her put away her harlotry from her face and her adultery from between her breasts. Else I will strip her naked.... And I will snatch away My wool and My linen that serve to cover her nakedness. Now will I uncover her shame in the very sight of her lovers..." (Hosea 2). From the nature and content of these jealousy-induced misogynist diatribes, it might be assumed that this "God" did not hold a positive sexual view of women; which may explain the rather distant, clinical and non-physical manner in which He impregnated the women of his choosing.

For example, Mary, the mother of the "son of man," Jesus Christ, became pregnant only indirectly, possibly secondary to the implant of an embryonic clone; that is, if we are to believe the stories that Joseph was not the father of Jesus (e.g. St. Luke 1: 26-35). And the angel Gabriel "came in unto her... and said unto her, And behold thou shall conceive in they womb, and bring forth a son..." Mary asked the angel, "How shall this be, seeing I know not a man? And the angel answered and said unto her, The Holy Ghost shall come upon thee, and the power of the Highest shall overshadow thee..."

Nevertheless, although this volatile and masculine seeming "God" was asexual, sexual behavior was of tremendous concern to "Him", for He commands sexual moral obedience and repeatedly tells his people, starting with Adam and Eve, "be fruitful and multiply".

Why the concern regarding sex pro or con in religious thought? As noted, the relationship between fertility, the abundance of prey, and the evolution of hunting magic, accounts in part for religious sexuality. In addition, sex, like religious experience, or the ability to derive pleasure from eating and drinking, is mediated by the limbic system; i.e. the hypothalamus, amygdala, and temporal and frontal lobes (e.g. Freeman and Nevis 1969; Joseph 1992a, 1996; MacLean 1969, 1990; Remmillard 1983; Robinson and Mishkin 1968).

Hence, in many ways violence (hunting) and religious-sexual beliefs are highly interrelated and appear to be derived from or at least strongly associated with the most ancient regions of the brain; the limbic system. As noted, activation of these structures (particularly the hypothalamus and amygdala) can give rise to rage reactions, sexual posturing, erection, ejaculation, orgasm, hypersexuality, as well as hyper-religiousness, even in people who were not all that sexual or religious prior to their "conversion" or being "born again."

Etiological and Diagnostic Speculations

## Sexuality, Religious Experience, Seizures, & Temporal Lobe Hyperactivation

A not uncommon characteristic of high levels of limbic system and inferior temporal lobe activity are changes in sexuality as well as a deepening of religious fervor (Bear 1979; Slater and Beard 1963; Trimble 1991; Taylor 1972, 1975). It is noteworthy that not just modern day evangelists, but many ancient religious leaders, including Abraham, Jacob (Israel) and Muhammad, tended to be highly sexual and partook of many partners (e.g. St. Augustine of Hippo: "Give me chastity, 'o lord, but just not yet"), or, they shared their wives (Abraham), or they married women who were harlots (e.g. Hosea) or had sex with other men's wives (Muhammad, King David), or killed other men in order to steal their wives (King David). King Solomon (like his father King David) suffered numerous dream states in which he communicated with God, and required the sexual services of 700 wives and 300 concubines. Many of the prophets and other religious figures also displayed evidence of the Kluver-Bucy syndrome, such as eating dung (Ezekiel), as well as temporal lobe, limbic hyperactivation and epilepsy, coupled with hallucinations, catalepsy, insanity, or language disorders.

Whereas Moses suffered from a severe speech impediment, Muhammad, God's messenger, was apparently dyslexic and agraphic. Moreover, in order to receive the word of God, Muhammad would typically lose consciousness and enter into trance states (Armstrong 1994; Lings 1983). In fact, he had his first truly spiritual-religious conversion when he was torn from his sleep by the archangel Gabriel who enveloped him in an terrifying embrace so overpowering that Muhammad's breath was squeezed from his lungs. After squeezing and suffocating him repeatedly Gabriel ordered Muhammad to speak the word of God, i.e. the Qur'an. This was the first of many such episodes with the archangel Gabriel who sometimes appeared to Muhammad in a titanic kalidescopic panoramic form.

In accordance with the voice of "God" or his angels, Muhammad not only spoke but he began reciting and chanting various themes of God in a random order over the course of the following 20 years; an experiencing he found quite painful and wrenching (Armstrong 1994; Lings 1983). In addition to his religious zest, Muhammad was reported to have the sexual prowess of forty men, and to have bedded at least 9 wives and numerous concubines including even one young girl (Lings 1983). On one occasion, after being rebuffed, he went into a trance, and then claimed "God" had commanded that another man's wife become his wife. Women, in fact, tended to be his first and earliest converts (Armstrong 1994).

Although Islam (which means "peace" or "surrender") is an exceedingly tolerant religion, and Muhammad was basically a kind and considerate man, he was also known to fly into extreme rages and to kill (or at least order killed) wealthy infidels and merchants and those who opposed him. These behaviors when coupled with his increased sexuality, heightened religious fervor, trance states, mood swings, and possible auditory and visual hallucinations of a titanic angel, certainly point to the

limbic system and inferior temporal lobe as the possible neurological foundation for these experiences. Indeed, Muhammad also suffered from horrible depressions and on one occasion sought to throw himself from a cliff -only to be stopped by the archangel Gabriel.

Abraham (like his nephew Lot), the patriarch of Jewish, Christian, and the Moslem religions, also experienced what could be considered visual as well as auditory hallucinations. Abraham also engaged in some unusual sex practices. For example, after Abraham left Babylon and before he arrived in Egypt, he told his wife Sara to pretend they were brother and sister because she was so beautiful and other men might wish to have sex with her.

"And it came to pass, that when Abram was come into Egypt, the Egyptians beheld the woman that she was very fair... and the woman was taken into Pharaoh's house." However, the Pharaoh thought Abraham and Sara were brother and sister, for he gave to Abraham, in order to pay for her sexual services, "sheep, and oxen, and he asses and servants and camels" (Genesis 13, 24-16). However, when Pharaoh found out she was married, he was so disgusted he threw them both out of Egypt (Genesis 13: 18-20). According to Abraham he lied because he was "afraid."

However, when Abraham arrived at Gerar he repeated the lie and informed the King of the city that Sara, "is my sister." And again he offered her to those who wished to partake of her charms. "And Abimeleeh king of Gerar sent and took Sara. But God came to Abimeleech in a dream by night and said to him, Behold thou art but a dead man, for the woman which thou has taken; she is a man's wife" (Genesis, 20).

Abraham, of course, also had sex with other women, banished his first born son, and the handmaiden who bore him, sending them out into the desert to a certain death, and he also attempted to murder his second son, Isaac. However, Abraham believed he was following the orders of "God," for he heard a voice that instructed him to "Take now thy son, thine only son Isaac, whom thou lovest, and offer him for a burnt offering upon one of the mountains which I will tell the of." However, after binding his son, laying him upon an altar and picking up his knife, Abraham suddenly heard the voice of an angel who ordered him to let the boy go free (Genesis, 22).

Abraham, therefore, heard voices, engaged in unusual sex practices, and was capable of extreme cruelty including repeated instances of attempted murder. Is it possible that Abraham suffered from excessive limbic system activity, or even temporal lobe epilepsy? Consider, after hearing the voice of "God," Abraham left ancient Babylon (automatic traveling) forgot his identity and changed his name (i.e. from Abram to Abraham) -as if he were experiencing a fugue state. Hence, he travels to a distant land, is no longer Abram, and he no longer recognizes Sara as his wife. Hence, he tells the Pharaoh, she is "my sister." Temporary fugue states are associated with abnormal temporal lobe activity, including temporal lobe epilepsy.

Epilepsy can be due to a number of different causes, such as head injury, heat stroke during infancy, and tumors. However, the predisposition to develop epilepsy can also be inherited.

Like his uncle Abraham, Lot also saw angels and talked to God. It was God's angels who warned Lot to leave Sodom; reportedly the most sexually corrupt city on Earth. However, once Lot escaped from Sodom, he celebrated by getting drunk and impregnating both his daughters who willingly snuck into his bed on two separate nights (Genesis, 20: 33-38). In fact, even before they left Sodom Lot had offered his daughters to some of the men of the city to do with as they pleased (Genesis 19: 8).

We do not know if Lot followed Abraham's example and also let other men have sex with his wife. However, both Abraham and Lot clearly demonstrated signs of temporal lobe and limbic hyperactivation.

### Religion, Limbic System Hyperactivation and Temporal Lobe Seizures

Under conditions of deprivation, abuse, isolation, drug use, or following a head injury, the nuclei of the limbic system may become abnormally activated and possibly hyperactivated such that subclinical seizure activity (kindling) develops. Under conditions of limbic kindling, hyperactivation, or seizure activity, emotions may be perceived or expressed abnormally, and the sensory and emotional filtering that normally takes place in these nuclei is reduced or abolished. Moreover, those affected may suddenly experience extreme anger, rage, paranoia, depression, sexual desire, or even religious ecstasy or feelings of persecution. And they may hallucinate the presence of threatening people, animals, or even religious figures. Deepening of emotions, hallucinations, alterations in sex drive, and the development of extreme religious beliefs; i.e. hyper-religiousness, are not uncommon manifestations of limbic-temporal lobe seizures and hyperactivation (Bear 1979; Daly 1958; Gloor 1986, 1992; Horowitz et al. 1968; MacLean 1990; Mesulam 1981; Penfield and Perot 1963; Schenk, and Bear 1981; Slater and Beard 1963; Subirana and Oller-Daurelia 1953; Trimble 1991; Weingarten, et al. 1977; Williams 1956).

In fact, certain individuals who develop "temporal lobe epilepsy" or irritative lesions to this tissue, may suddenly become hyper-religious and spend hours reading and talking about the Bible or other religious issues. Once this condition develops they may spend hours every day preaching or writing out their mystical or religious thoughts, or engaging in certain actions they believe have religious significance. Many modern day religious writers who also happen to suffer from epilepsy are in fact exceedingly prolific, whereas conversely, thus who feel impelled to preach tend to do just that. In part this is a consequence of amygdala activation of Wernicke's area, the adjacent inferior parietal lobe, and Broca's area, thereby giving rise to "voices" or strange thoughts, and/or a desire to write or to speak.



People who suffer from periodic episodes of limbic and temporal lobe hyperactivation, such as those with temporal lobe epilepsy, typically have seizures which may be indistinguishable from a trance state. It is not uncommon for these seizures to be preceded by a hallucination (Joseph 1996; Penfield and Perot 1963; Trimble 1991; Williams 1956). Patients can have any number of very odd hallucinations, such as smelling horrible odors, hearing voices, music, or conversations, and a rare few experience mystical awe, and might hallucinate religious entities including angels, demons, ghosts, and God.

The great existential author, F. Dostoevsky, apparently suffered temporal lobe epilepsy. Dostoevsky, alleged (via one of his characters) that when he had a seizure the gates of Heaven would open and he could see row upon row of angels blowing on great golden trumpets. Then two great golden doors would open and he could see a golden stairway that would lead right up to the throne of God.

As noted there is some evidence that many religious and spiritual leaders have had similar temporal lobe, limbic system induced religious experiences. For example, Moses may have suffered from temporal lobe seizures. Presumably this was a consequence of being left for days to bake in the sun, after his mother abandoned him in a basket on the Nile. If that were the case his infant brain could have become overheated and damaged by the scorching Egyptian sun.

If Moses subsequently developed temporal lobe epilepsy, this could explain his hyper-religious fervor, his rages and the numerous murders he committed or ordered. Similarly, his speech impediment, hyper-graphia, and hallucinations such as hearing the voice of God are not uncommonly associated with temporal lobe seizures and limbic hyperactivation.

Jesus Christ also was known to fly into violent and destructive rages, such as when he yelled, cursed, overturned the tables and struck and chased the money lenders from the temple (St. John, 2: 14-15). He also frequently appeared irritable, sullen, gloomy, depressed, distrustful and angry with his Disciples whom he would sometimes curse e.g. referring to Peter as "Satan" (e.g. St. Matthew 16: 23). Jesus was also not beyond behaving in a petulant and sadistic manner, such as when he repeatedly refused the request of "a woman of Canaan" who "came and cried unto him, saying, Have mercy on me, O Lord; my daughter is grievously vexed with a devil." Instead, he refused by referring to her as a "dog". "It is not meet to take the children's bread and cast it to dogs," (St. Matthew 15: 22-26). He even cursed a fig tree for lacking fruit when he was hungry, "Let no fruit grow on thee henceforward for ever" (St. Matthew, 21: 19). However, as a possible "clone" of "God," his behavior in this respect was little different from his "Father." Jesus was also apparently hypo-sexual. Although surrounded by unmarried female followers, many of whom had been prostitutes, he apparently never succumbed to temptation, though he certainly enjoyed having women kiss and wash his feet or rub expensive oil on his body.

Depression, mood swings, episodic violence, and hypo-sexuality (as well as hyper-sexuality), are also associated with temporal lobe and amygdala hyperactivation. As per "hallucinations", Jesus did go alone into the wilderness for forty days, and there he saw and spoke with "Satan." Jesus frequently sought solitude and isolation. Many religious figures have done likewise.

### Isolation, Limbic Hyperactivation, and Hallucinations

It has been well established that even short-term social and sensory isolation lasting just a few days can induce emotionally and visually profound and complex hallucinations. Even after just a few days these isolation-induced hallucinations may become so emotionally charged and personally distressing that volunteers will refuse to discuss them (Bexton, Heron and Scott 1954).

John C. Lilly (1972) combined LSD with prolonged water immersion and social and sensory isolation for about 7 hours on several occasions. According to Lilly he experienced and observed the presence of spiritual, god-like beings who beckoned to him (see also Eadie's similar description of "three men" noted above).

Isolation, as well as food and water deprivation, increased or decreased sexual activity, pain, drug use, self-mutilation, prayer and meditation are common methods of attaining mystical states of religious and spiritual awareness, and have been employed world wide, across time and culture (d'Aquili and Newberg 1993; de Ropp 1993; Frazier 1950; James 1958; Lehmann and Myers 1993; Malinowski 1948; Neihardt and Black Elk 1989; Smart 1969). These conditions also activate the limbic system as well as the overlying temporal lobe, thereby giving rise to hallucinations and the secretion of opiate-like enkephalins.

The amygdala is capable of processing visual, tactile, auditory, gustatory, olfactory, and emotional stimuli simultaneously, and many single amygdaloid neurons are multimodally responsive. Normally much of this data is suppressed and filtered so as to prevent the tasting of colors, or the visualization of sound, and so on. Deprivation and isolation are exceedingly stressful, however, and can result in the depletion of serotonin (and other transmitters) which normally acts to inhibit sensory reception within the amygdala. Hence, when the limbic system is denied normal modes of input, be it sensory, emotional, social, or nutritional, it becomes hyperactive and stimuli normally deleted or subject to sensory filtering are instead perceived (Joseph 1982, 1988a, 1992a). That is, limbic sensory acuity is increased and in many respects what is perceived is not necessarily a hallucination but instead represents the perception of overlapping sensory qualities that are normally filtered out.

"If the doors of perception were cleansed everything would appear... as it is, infinite... -W. Blake

## The Birth of God, Fugue States, and Limbic Hyperactivation

In ancient Sumer (in southern Iraq around 6,000 years ago), it was believed that the Universe was ruled by a pantheon of Gods (Armstrong 1994; Kramer 1956, Wooley 1965); perhaps the same pantheon alluded to in the first chapter of Genesis. However, many of the Sumerian people also worshiped household Gods, including a personal God, which in some respects could be likened to a "guardian angel" or a spirit (totem) helper, as was common among the Plains Indians.

With the fall of Sumer and the rise of Babylon, many of these same Gods, including these individual, personal Gods, continued to be worshiped (Kramer 1956, Wooley 1965). This personal God served almost as a conscience and as a mediator between the head of the household and the great Gods which ruled the cosmos (Joseph 1992b).

Because this was a private, personal God, it was not uncommon for a believer to engage in prolonged and daily discussions with his deity (Kramer 1956: Wooley 1965). To this god one could bear their heart and soul regarding sins, injustice, personal shortcomings and hopes for the future. Hence, this god was indeed a personal god with whom one could "talk" and maintain a special personal relationship.

One day, however, something astounding and revolutionary occurred in the city of Ur of the Chaldees, in ancient Babylon, birthplace of Abram a rich Babylonian prince. Abram began hearing voices. It was coming from his personal God and it later gave him a command (Genesis 12): "Get thee out of thy country ...and I will make of thee a great nation... and in thee shall all the families of the earth be blessed..."

And Abram and his personal god walked and talked, as God had not done since the time of Adam and Eve. And then one day this personal God came to a decision and said to Abram (Genesis 17) "Thy name shall be Abraham, for a father of many nations have I made thee. And I will make thee exceedingly fruitful.. and I will make thee the father of many nations... and I will be their God."

Abraham, both saw and heard his God on numerous occasions both awake and dreaming, often falling on his face as God appeared. However, they walked and spoke together during the heat of the day, and during the darkest hours of the night; his god making all types of grandiose promises and predictions, all of which apparently came to pass.

Is it possible that Abraham was dreaming? Could this personal God from ancient Ur have been but a hallucination, and (given Abraham's odd sexuality and murderous actions) a product on temporal lobe epilepsy or subclinical seizure activity?

When we consider that this is the same God (at least in religious theory) who today is worshiped by Jews, Christians, and Moslems alike, the possibility of hallucinations, although quite plausible, seems unlikely. Likewise, when we consider how many other prophecies were fulfilled, including the recreation of Israel in 1947--the aftermath of a world war led by an Austrian German-Jew, Adolf Hitler--as well as the hundreds of millions who worship a Jew (Jesus) as "God," it borders on the irrational to simply dismiss these events as a hallucination, a myth, or a coincidence.

In fact, given that the God experienced by Abraham and Sara (and in fact, with few exceptions, the God repeatedly described in the Bible) appeared as a man and not a supernatural being, the possibility of hallucinations does not seem likely.

As noted, above, under conditions of limbic hyperactivation, not all hallucinations are hallucinations, but instead may represent the perception of stimuli which are normally filtered from consciousness. As these same nuclei are also implicated in dream states, near death experiences, and out-of-body phenomenon, it could thus be argued that individuals who for whatever reason are "blessed" with an overactive amygdala-temporal lobe are also given access to god-like stimuli which are also normally filtered from consciousness.

Likewise, a person who lives a highly spiritual or mystical life style might perpetually activate this region of the brain and achieve what others can only hope for via drugs, fasting, self-mutilation, and isolation/deprivation; i.e. access to God, or the spiritually sublime. As the limbic system and structures such as the amygdala are involved in regulating or influencing arousal levels, the relaxation response, the the immune system and cardiovascular functioning, the activation of these structures may also account for the fact that those who are religiously inclined have a lower incidence of sickness and disease.

### The Transmitter to God

The question as to why any particular individual might be chosen to serve as a prophet or messenger of "God" cannot be answered here. However, as noted, those who are chosen display peculiar characteristics suggestive of amygdala and temporal lobe hyperactivity. Perhaps those blessed with a hyperactivated limbic system, or a limbic system which is more "evolved" than those of other humans, are able to gain access to the many worlds of perception which are normally filtered from consciousness (see below). Perhaps this hyperactivated or advanced limbic system provides access to "God," or conversely, perhaps the presence of "God" triggers hyperactivity in the limbic brain of Abraham and others which then continued to kindle. That is, just as something frightening or sexual will activate limbic neurons, something exceedingly frightening, sexual, spiritual, or god-like, might hyperactivate these same neurons, eventually creating supersensitive conditions; a transmitter to "God?"

Might this mean that maybe people who claim they are able to speak with God, or commune with spirits are actually able to do so because these nuclei periodically become hyperactivated and "open" up a window leading to the Other Side? For the most part this seems unlikely.

Consider Mary (described by Mesulam, 1981), a 26 year old female, A-average college student. For several months she had been complaining of odd mystical experiences involving alterations in consciousness, accompanied by auditory and visual hallucinations as well as frequent experiences of *deja vu*. These mystical experiences soon progressed to feelings of being possessed by the Devil. She was convinced the Devil was urging and trying to make her do horrible things to other people or to herself. She also claimed he would sometimes loudly cackle inside her head. Finally, a priest was brought in and a rite of exorcism was performed, as the Catholic hierarchy became convinced of the authenticity of her experiences, that she was possessed. However, her condition failed to improve. Finally an EEG was performed and abnormal activity was discovered to be emanating from both temporal lobes.

Another 44 year old female college graduate suffering from temporal lobe abnormalities instead came to believe she was possessed by God and at times also thought she was the Messiah, and at the behest of God, had a special mission to fulfill (Mesulam 1981). At the urgings of the "God" she ran for public office and almost won. However, she also engaged in some rather bizarre actions including widespread and inappropriate sexual activity -another manifestation of limbic hyperactivation (see also Schenk, and Bear 1981; Trimble 1991).

### Souls, Spirits and Poltergeists

As noted, another source of amygdala hyperactivation is extreme fear as well as extreme joy and ecstasy. In this regard d'Aquili and Newberg (1993; p. 194) note that "a combination of the experience of both fear and exhalation" is "usually termed religious awe." They also note that these feeling states are "almost always associated with religious symbols, sacred images, or archetypal symbols" which flow "from the inferior temporal lobe" and which "appear sometimes as monsters or gods". Indeed, angels, demons, and poltergeists may be experienced.

Most people find these experiences quite terrifying. They also frequently believe their perceptions are completely real and are not hallucinations.

"Cindy", a 22 year old college student, was plagued by demons and ghosts for months until her right inferior/anterior temporal lobe were surgically removed. Cindy, however, had never been very religious, and had certainly never seen a ghost until following her auto accident. She had been thrown over 50 feet through the windshield of her car and suffered a fracture of the right temporal region of the skull and developed a subdural hemotoma which was pressing on the temporal lobe

inducing herniation. This was surgically evacuated and over the following weeks she seemed to quickly recover. However, several days after her release from the hospital she was startled while watching television when the arms, legs, hands, feet, and heads of the various actors began protruding from the screen into the living room where she sat.

Cindy said that at first she thought the television was broken and turned it off. But, as she stared back at the blank screen she saw what looked like her dead father staring back at her (which was probably her own reflection). As she backed away, the figure emerged from the television and began approaching and beckoning to her as even more spooks and wraiths streamed from the picture tube. Crying for her mother she raced for the bathroom and locked herself in. However, even as she hid within the inner sanctum of the washroom, spirits, sprites and poltergeists streamed from the bathroom mirror and swirled about her. However, when she ran back into the living room she was even more horrified to observe a spirit enter and take possession of her mother.

Frightened and bewildered, Cindy ran into the street to flag down a police officer who after investigating the scene brought her to the local hospital and psychiatry unit. Later she decided what she had experienced were ghosts and lost souls of people who had either died in or had been entombed beneath her house.

Over the course of the next several weeks (until the temporal lobe was surgically removed) she also claimed to see "animal spirits" and complained that the "secret souls" of her mother's house plants were watching and observing her and that she could sometimes see filmy, soul-like entities traveling to and fro across the room and between different plants. And yet, in this regard, Cindy is not all that unusual.

## Dreams and the Royal Road to the Spirit World

### Animal Spirits and Lost Souls

Across time and culture, people have believed that not just humans and animals, but plants and trees were alive, sensitive, sentient, and were the abode of spirits including the souls of dead ancestors (Campbell 1988; Frazier 1950; Harris, 1993; Jung 1964; Malinowski 1948). Because of this, among the ancients, before felling a tree, the spirit sometimes had to be conjured forth so as to not harm it (Campbell 1988; Frazier 1950). However, be it animal or plant, souls were also believed capable of migrating to new abodes.

Among the ancients and many so called primitive cultures, it was believed that souls are reflected in shadows, in streams, and pools of water (Campbell 1988; Frazier 1950; Harris 1993; Jung 1964; Malinowski 1948). However, because ghosts or demons sometimes attempt to abduct souls, this required that one's shadow and

reflection be protected. Indeed, even water spirits might try to capture a person's soul.

Moreover, the shadows and reflections of others had to be avoided so that one did not come into contact with the soul of a witch, sorcerer, or a demon. It was believed that the soul can be abducted by demons and witches as well as the recently departed. This is also why in some cultures people turn mirrors to the wall after a death and lay down pictures of the recently departed (Frazier 1950). This insures that living souls are not stolen by the souls of the dead who are leaving this world for the next one.

### Soulful Dreams

Souls were also believed by ancient humans to wonder about while people sleep and dream (Brandon 1967; Frazier 1950; Harris 1993; Jung 1945, 1964; Malinowski 1948). That is, among many different cultures and religions the soul is believed to sometimes escape the body via the mouth or nostril during sleep. Moreover, during a dream the soul may wander away from the body and may engage in certain acts or interact with other souls including those of the dear but long dead and departed.

Sometimes the soul is believed to take a form, such as that of a bird, or deer, fox, rabbit, wolf, and so on. It could also hover about in human-like, ghostly vestiges, at the fringes of reality, the hinterland where day turns into night (Campbell 1988; Frazier 1950; Jung 1964; Malinowski 1954; Wilson 1951). However, sometimes the soul of an animal, such as a wolf or predatory bird, might take on various forms including woman or man.

Hence, not just men but animals too had souls that had to be respected. However, it was believe that these souls could be influenced, their behavior controlled, and, in consequence, a good hunt insured. These beliefs gave rise to both animal worship and animal sacrifice, as well as the avoidance of certain animals which were not to be killed or eaten, or killed or eaten only in a certain ritualized manner (Campbell 1988; Frazier 1950; Malinowski 1948; Smart 1969).

Over the course of human cultural and cognitive evolution, these beliefs became increasingly complex and required specialists to interpret and minister the rituals and rites (Armstrong 1994; Brandon 1967; Campbell 1988; Frazier 1950; Smart 1969; Wilson 1951). Soon priests, prophets, and even the Gods evolved. However, priests and prophets as well as the common people, often experienced God as well as animal spirits and the souls of the dead, during the course of a dream (Campbell 1988; Frazier 1950; Jung 1945, 1964; Malinowski 1954).

Dreams (although mediated by brainstem nuclei) have their source in the amygdala (and hippocampus) and inferior temporal lobe (Joseph, 1988, 1992ab). Indeed, activity within the amygdala may in fact trigger the first phase of dreaming (REM)

sleep which is heralded and then accompanied by what has been referred to as pontine-geniculate-occipital (PGO) waves. That is, the amygdala is active not only during REM, but amygdala activity triggers PGO waves (Calvo, et al. 1987) which then lead to dream sleep.

In addition to amygdala activity during REM, the hippocampus (which is immediately adjacent and also buried in the temporal lobe) begins to produce slow wave, theta activity (Jouvet 1967; Olmstead, Best, and Mays 1973; Steriade and McCarley 1990). Presumably, during REM, the hippocampus and amygdala act as a reservoir from which various images, emotions, words, and ideas are drawn and incorporated into the matrix of dream-like activity being woven by the right hemisphere (Joseph 1982, 1988, 1996). It is probably just as likely that the hippocampus and amygdala serve as a source from which material is drawn during the course of a daydream.

### Dreams, Spirits and Reality

"I the Lord will make Myself known to him in a vision, and will speak with him in a dream." Numbers 12.6 When the limbic system becomes hyperactivated it is not at all uncommon for an individual to experience a dream. Dreams, it has been proclaimed, are the royal road to the unconscious (Freud 1900). It is also via dreams that gods frequently speak to men and women (Campbell 1988; Jaynes 1976; Jung 1945, 1964), and it was via dreams that hunter-gatherers and ancient humans were able to gain access to the domicile of the soul (Frazier 1950; James 1958; Neihardt and Black Elk 1989). Indeed, it has been argued that dreams (and thus the limbic system) enable an individual to come into contact with a different reality; the same reality shared and experienced by our ancestors and the Great Spirit (see Frazier 1950; Jung 1964; Neihardt and Black Elk 1989).

Our ancient human ancestors lived in two realities, that of the physical and of the spiritual, both of which were undeniable and experienced by enemies and friends alike (Frazier 1950; Jung 1945, 1964). One need only spend a night alone in the woods among the trees and the elements to become quickly convinced that one is not alone, but is being watched by various entities both alive and supernatural, animal and spirit, benevolent and unkind.

Like modern day humans, the ancients had dreams by which they were transported or exposed to a world of magic and untold wonders. It is as if one had been transported to a different world and a reality which obeyed its own laws of time, space, and motion. It is through dreams that human beings came to believe the spiritual world sits at the boundaries of the physical, often where day turns to dusk, the hinterland of the mind where imagination and dreams flourish and grow (Frazier 1950; Jung 1945, 1964; Malinowski 1954); hence the tendency to bury the dead in a sleeping position even 100,000 years ago.



It is also via dreams that humans came to know that spirits and lost souls populated the night. The dream was real and so too were the Gods and demons who thundered and condemned and the ghosts and phantoms that hovered at the edge of night. Although but a dream, like modern humans, our ancient ancestors experienced this through the senses, much as the physical world is experienced. Both were real and were taken seriously.

Again, just as religious experiences can be secondary to amygdala and temporal lobe activity, dreams are also limbically produced. That is, neurons subserving spiritual experiences also give rise to dreams. Thus the link between the world of dreams and the spirit land of gods and demons is the limbic system; i.e. the "transmitter to god" -as unlikely as that may seem.

**Right Hemisphere, Temporal Lobe Hyperactivation and Dreaming** The amygdala and the neocortex of the temporal lobe, therefore, are highly interactionally involved in the production of religious and hallucinatory experiences including dream states; the right temporal lobe and amygdala in particular (Joseph 1988a, 1992a).

Similarly, d'Aquili and Newberg (1993) argue that the right hemisphere (and right amygdala) is more involved than the left in the reception and production of religious imagery. This is likely as the right hippocampus and amygdala, and the right hemisphere in general (Broughton 1982; Goldstein et al. 1972; Hodoba 1986; Humphrey and Zangwill 1961; Joseph, 1988, 1990ab; Kerr and Foulkes 1978; Meyer, Ishikawa, Hata, and Karacan 1987) also appear to be involved in the production of hallucinations, dream imagery as well as REM during sleep (Joseph 1988, 1990ab).

For example, electrophysiologically the right temporal lobe becomes highly active during REM, whereas, conversely, the left temporal region becomes more active during N-REM (Goldstein et al. 1972; Hodoba 1986). Similarly, measurements of cerebral blood flow have shown an increase in the right temporal regions during REM sleep and in subjects who upon wakening report visual, hypnagogic, hallucinatory and auditory dreaming (Meyer et al. 1987). Interestingly, abnormal and enhanced activity in the right temporal and temporal-occipital area acts to increase dreaming and REM sleep for an atypically long time period (Hodoba 1986).

Conversely, LSD induced hallucinations are significantly reduced when the right but not the left temporal lobe has been surgically ablated (Serafintides 1965). Similarly, it has been reported that dreaming is abolished with right but not left temporal lobe destruction (Bakan, 1978). Hence, it appears that there is a specific complementary relationship between REM sleep, hallucinations, mystical experiences, and right temporal (and thus right amygdala and hippocampus) electrophysiological activity.

Day Dreams and Foreseeing the Future

During dream states we see and experience events which are normally filtered from the conscious mind. We can also gain insight into problems which have plagued us, or gain access to knowledge of events which occurred in the past or which will occur in the future (Joseph 1988a, 1992b; Jung 1945, 1964)--just as we can think about the future.

Consider the day dream. In addition to its images and memories, the fantasy produced also consists of anticipations regarding the future, and in this respect, they could be considered an imaginal means of preparation for various possible realities. Interestingly, daydreams appear to follow the same 90-120 minute cycle that characterize the fluctuation between REM and NREM periods, as well as fluctuations in mental capabilities associated with the right and left hemisphere (Broughton 1982; Kripke and Sonneschein 1973). That is, the cerebral hemisphere tend to oscillate in activity every 90-120 minutes -- a cycle which appears to correspond to the REM-NREM cycle and the appearance of day and night dreams, both of which may contain important information, not just regarding the past or the world of souls and spirits, but the future as well. As possible harbingers of the future, the intentions of the gods, and the future of self, friends and family, it has long been believed that dreams should be observed most carefully (Campbell 1988; Frazier 1950; Freud 1900; Jung 1945, 1964; Malinowski 1954).

In fact, among the ancients, the American Indians, and even the highly cultured Romans, every once in a while someone would have what is called "a big dream," which is of great importance to the whole clan, tribe, city, or nation. Often, the man or woman having the dream would gather the others together and announce it.

Given that dreams reflect mental activity, it is thus not terribly surprisingly that meaningful information might be derived particularly in that the manner in which data are analyzed is so different and involves variables, as well as sensory stimuli, which are normally ignored or filtered out. During dream states, serotonin levels diminish (similar to what occurs under LSD) and multimodal neurons begin to fire such that the brain becomes overwhelmed by sensory and ideational events which are normally filtered out (Joseph, 1990ab). Hence, because the limbic system and temporal lobe are hyperactivated during dream states, not only does the brain become freed of inhibitory restraint, but one is presumably able to gain access to dream-like alternate realities, including, perhaps, the spiritual reality of the Hereafter. Presumably the same occurs when fasting, isolated, in pain, under LSD, in trance, or in the throes of religious ecstasy.

### In Search of the God Neuron: The God Within

Mystical, spiritual, and religious feelings, experiences, and beliefs are world-wide and have been in evidence for over 100,000 years. It is also clear that these beliefs and perceptions, including the capacity to dream and to experience the spiritual world through fasting, isolation, pain, drugs, dreams and hallucinations, are

dependent on specific and specialized neurons located in the limbic system (e.g. amygdala, hippocampus) and temporal lobe.

That there are neurons and neural networks which make it possible to perceive geometric patterns, forms, and faces, or (at least among some people) spirits or angels, would explain why hyperactivation of the limbic system and temporal lobe might result in dreams and hallucinations of faces, geometric shapes, colors, and so on, as well as gods, angels and demons. During a dream, and/or due to temporal lobe and limbic system seizures or abnormalities, neurons subserving the perception of various visual and auditory stimuli become activated. The brain believes it is seeing a face or a demon, because "face" and "demon" neurons have been activated and infused with intense emotion; i.e. the brain begins to hallucinate and dream.

Of course, it may be that the neural basis for the perception or hallucination of a ghost or demon is composed of input from a variety of different neurons, each of which contributes some feature to the resulting visual/auditory religious emotional hallucinogenic mosaic. That is, there are no "demon", or for that matter, "God" neurons, but rather neural assemblies that interact under certain conditions to produce hallucinations and feelings of God and the spiritual Hereafter. Thus, the source is within the brain. The brain is "wired" for God.

According to the Bardo Thodol (Tibetan Book of the Dead), "These realms are not come from somewhere outside thyself. They come from within... they exist from eternity within the faculties of thine own intellect... issuing from within thine own brain...reflections of thine own thought-forms..."

On the other hand, why are these spiritual states most likely to be experienced under conditions involving extreme fear (which may induce even a committed atheist to pray to god for help) or following death, or where the yoke of sensory inhibition and filtering has been removed? As noted, some of what is experienced, even under LSD, are not hallucinations per se, but are the result of disinhibition and multi-sensory neurons processing signals from divergent sources simultaneously. In consequence, one can see sound, feel colors, and so on: "Real" stimuli that the brain can perceive but are normally filtered out. Is it possible that gods, demons, or angels are filtered out?

Similarly, if religious and mystical experiences are hallucinations, and there is no Hereafter or spirit world, then why has our brain become adapted for perceiving and dreaming about what supposedly does not exist? Why would the limbic system evolve specialized neurons or neural networks that subserve the capacity to dream about, experience, or hallucinate spirits, angels, and the souls of the living and the dear departed, if these entities have no basis in reality?

That is, we are able to hear because there are sounds and voices that can be perceived and because we possess specialized brain tissue (e.g. auditory cortex) which

analyzes this information. First there were sounds, and then later, specialized nerve cells that could initially analyze vibrations and then later, sounds.

We see because there are people and objects to view and because we possess neurons which code for various visual features and shapes. If there was nothing to visually contemplate we would not have evolved eyes or visual cortex which analyzes this information. However, visual stimuli existed prior to the neurons that evolved in order to process these signals.

Shouldn't the same evolutionary principles apply to the limbic system and religious experience? Indeed, it could be argued that the evolution of this neuronal spiritual, mystical, religious capacity is the consequence of repeated and exceedingly intense perceptual and emotional experiences with "God" and the spiritually sublime over countless generations. Via perhaps, the guiding influence of "God," or perhaps, after repeated experiences with gods, spirits, demons, angels, and lost souls, Homo sapiens evolved these "neurons" which enabled them to better cope with the unknown, as well as to perceive and respond to spiritual messages which increased the likelihood of survival. A true scientist would not rule out such a possibility.

On the other hand, it is possible that these and related spiritual-like, psychic experiences may represent a quasi-dormant capacity, a "6th sense" which has yet to evolve or fully emerge. On the other hand, if we consider the massive 1800 cc brain of the 6ft tall Cro-Magnons (whose brain is one third larger than the cerebrum of modern humans) and legends of an advanced race of exceedingly tall humans who according to the ancient Sumerians and the Greek Philosopher Plato, long ago built towering civilizations (destroyed in a world wide flood some 10,000 years ago), perhaps these "abilities" are but pale remnants of capacities which have since regressed. Indeed, following the demise the Cro-Magnon, at the close of the last (quite sudden) ice age, the human brain and body regressed in size. Even among modern humans, the brain is 1/3 the size of the Cro-Magnon and it is only within the last 100 years that Western human males have grown significantly in stature, attaining a height of 5 ft. 9 inches on average--short (and small brained) compared to the average Cro-Magnon.

There are, however, other likely explanations which may even account for religious experience, the belief in a life after death, and thus a world of spirits and souls. For example, the limbic system is exceedingly concerned with and desirous of maintaining life. Hence, perhaps it generates a desire to physically survive which is so intense, that it has evolved specific neural networks which creates dreams and hallucinations of souls and spirits of friends and relatives, so as to promote the promise of spiritual salvation and the illusion of eternal self-preservation, even after death.

The ability to experience God and the spiritually sublime is obviously an inherited limbic trait that is variably expressed and experienced to varying degrees in different

people. However, from an evolutionary (Darwinian) standpoint, these hallucinations and illusions must contribute to the survival (or spiritual salvation) of those capable of experiencing these states. Presumably this is why the ability to experience God and the spiritually sublime is obviously an inherited "limbic" trait which is variably expressed by different individuals. The preservation of these traits are the result of natural selection and environmental influences on the survival and neural-biology of past generations. Those who did not possess these neurons were weeded out as "unfit." Those who possessed religious and spiritual capabilities were "selected for." For example, those who developed and practiced limbic taboos and religious rituals, and who evolved a religious-moral conscience capable of redirecting and controlling the more dangerous limbic impulses, were more likely to survive, and, presumably, more likely to successfully breed.

Presumably, an evolutionary process such as this would have led to an exponential increase in the number of survivors and "religious" neural networks. Soon religion and religious beliefs, as well as mystical experience and related "hallucinations" became world wide and increasingly intense and profound. However, if that is the case, then the limbic system has evolved the capacity to not only regulate itself, but to deceive itself via heightened emotional and opiate induced religious euphorias, and the creation of false hopes and dreams whose only purpose is to promote the survival of the species.

In this regard it could be argued that these mystical images, archetypes, and spiritual feeling states, have always been internally generated, like a dream, that again have no basis in external reality, but which serve only the need and desire to survive. That is, there may not be an "out there" or "Heaven" or external God, in some mystical space and alternate spiritual dimension, but rather, an internal heaven (or Hell) dominated, controlled, and produced by the limbic system. Thus the limbic system and temporal lobes insure the survival of the self by dreaming and hallucinating ghosts, spirits, and avenging angels, and by promoting the illusion of perpetual and eternal survival (or damnation) if taboos, rituals, and the laws of God, are (not) obeyed.

Unfortunately, this argument does not explain why even after death, individuals continue to dream and hallucinate, and why so many who return from the dead report similar religious and spiritual experiences that include being welcomed by the dear departed. That is, what is the adaptive significance of these neurons firing and creating a hallucination even after death? A capacity such as this would represent a degree of limbic-evolutionary foresight that is almost too incredible to accept without positing some guiding intelligent force behind it's design. Does that intelligence belong to the Gods, and/or to the limbic system of woman and man?

Consider also the massive secretion of opiates which guarantees most prey and other hapless creatures, a "merciful death" as they fall and lie still while they are simultaneously eaten alive by predators. What is the adaptive significance of a

"merciful death?" Can a merciful loss of life promote the survival of the creature which is dying an otherwise horrible death? Obviously not. Rather, "mercy" such as this again raises the possibility of an intelligent force which purposefully and thoughtfully insured its "evolution."

### God and Evolution in the Ancient Corners of the Cosmos

"And when you look up to the sky and behold the sun and the moon and the stars, the whole heavenly host, you must not be lured into bowing down to them or serving them. These the Lord your God allotted to other peoples..." Deuteronomy 4.19

This Universe has been in existence for up to 20 or more billion years (reviewed in Cowen 1995; and Hellemans 1995), whereas the infant Earth is a scant 4.6 billion years young. There are billions of ancient galaxies consisting of trillions of aged solar systems that are likely ringed with planets -many probably quite like our own. And, just as Life has evolved on this world, it could be predicted that Life has emerged on at least a few of these planetary archipelagoes including creatures who long ago evolved in a fashion similar to woman and man. Indeed, the Universe may well swarm with the seeds of life, a few of which may well have washed to shore soon after our planet was formed (Joseph, 1996, 1997).

Although fashioned in an obscure corner of the cosmos, among trillions of ancient spiraling galaxies already billions of years in age, times were tumultuous and for 700 million years the new born Earth was continually bombarded with meteors, oceans of ice, and planetary debris--some of it, perhaps, containing dormant but still living tissue, and its all important genetic memories and DNA-instructions, the genetic code. It is the likely extra-terrestrial origins of earthly life which explains why although less than 700 million years young, a mere child of the cosmos, the swirling oceans and deep blue seas were soon swimming with life and harboring a variety of hardy, single celled organisms, and, their DNA (Joseph, 1997).

Although temple priests masquerading as scientists have claimed that life miraculously emerged fully formed from the dust and muck of the earth, this is an impossibility, as the primeval organic alphabet soup was missing three important letters: DNA. Given the incredible complexity of even the simplest of single celled organisms, as RNA, on Earth, was also nowhere to be found, and as the cosmos is awash with all the constituent elements of life, then it stands to reason that first earthlings were probably cast offs, creatures who hitchhiked across the chasms of uncharted space, clinging to cosmic dust and pieces of planet, and encased in moonlets, titanic meteors, asteroids, and jagged blocks of ice -raining, raining upon the face of the deep- debris and living matter which wouldn't have burned up as it entered the young Earth's thin atmosphere.

If life were to suddenly appear on a desert island, we would assume that it fell from the sky, or washed to shore. The Earth too, is an island swirling upon an ocean of

space, and living matter, and single celled organisms, may have been washing ashore since the creation.

We are immigrants. Our ancestors lived on other planets.

Repeatedly impregnated from afar, the new Earth soon became yet another breeding ground for life. And not just the Earth, but other suitable planets were likely repeatedly contaminated and seeded with extra-terrestrial life forms whose own ancestral and genetic/DNA heritage already extended interminably into the long ago. And just as these seeds of life have blossomed to produce all manner of myriad creatures, similar life form have probably evolved on other suitable worlds, including the likes of woman and man. As I have detailed elsewhere, this genetically encoded progressive unfolding which has led from fish, frog, to woman and man, is best described as metamorphosis: "evolutionary metamorphosis" (Joseph, 1996, 1997). That is, what would become human was in fact encoded into the DNA of those multi-cellular creatures who were among the first to claim the Earth as their own.

The wholly caterpillar sprouts wings and flies.

On Earth, the step-wise progression which has led from multi-cellular creature to shark, teleost, amphibian, reptile, mammal, and woman and man, has taken place over the last billion years. Given that over 96% of human DNA is dormant and silent and as tens of thousands of silent intronic genes have yet to be expressed, the likelihood is that evolutionary metamorphosis on this planet will continue well into the future. In fact, the genome of most simple single celled and complex multicellular creatures also contains silent DNA (introns). Hence, given what has taken place on this planet over the course of the last billion years and the human-genetic potential which is yet to be realized, if similar DNA-based life forms exists elsewhere, then those who dwell in the more ancient corners of the cosmos may have evolved beyond modern humans billions of years before the Earth became a twinkle in God's eye.... twenty billion years before the first upright human emerged from the mists of time.

In fact, when we consider that the light from innumerable stars may have winked out of existence billions of years ago, and as current estimates of the age of the Universe are based on the light still detectable, the age of the Universe may in fact extend interminably into the long ago. The implications are staggering.

Consider: What might be the technological and scientific capabilities of a civilization a million years older than our own? What of a civilization that has had ten million, or a billion, or 20 billion years to seek technological perfection? They might seem as "gods" even if they were merely human.

And yet, it could be expected that these ancient ones would have evolved new brain tissues... additional limbic nuclei... and layer upon layer of gray matter... gaining

intellectual and perceptual capabilities which provide not just a "6th sense" but a 10th sense, and so on. Indeed, of the 3% of human DNA which is activated, 50% is devoted to the development and maintenance of the brain. Similar assumptions could therefore be advanced regarding the role of at least 50% of those 90,000 human genes which have so far remained silent.

Since increased complexity and progressive cerebral encephalization is characteristic of the evolution of life on this planet, the same could be expected elsewhere. If that is the case, then it can be predicted that those creatures evolving in the more ancient corners of the cosmos may have acquired more complex neuronal capabilities, as well as increased association and assimilation neocortical tissue, and may have also evolved additional limbic nuclei and layers of neocortex, exceeding the 6 to 7 layered neocortex that is characteristic of primates and mammals, billions of years ago. Hence, the brains of some exo-biological organisms may consist of 8, 10, 12 or more layers of neocortex, as well as enlarged neocortical associational, intellectual, and memory capacity, thus dwarfing the human brain in neuronal and cognitive ability. These peoples would be as "gods" even if they were merely human.

And what are the powers of a "god?" What might be the creative and intellectual potency of a being whose brain and civilization has evolved over tens of billions of years, and who has 10 or 20 or more layers of neocortex --compared to those seven we call our own?

The human ability to comprehend the intellectual, scientific and technological accomplishments and capabilities of an alien brain organized in this evolutionary advanced fashion, might be analogous to a lizard's ability to comprehend a man. That is, the mental, intellectual, creative, and technological capabilities of creatures who began to evolve 10 or 20 billion years ago, would lie well beyond human understanding. They would be as gods even if they were merely human.

Given the above, is it thus so difficult to consider at least the possibility that a "superior" life form that is more intelligent than human beings, and which has continued to evolve and which lives or exists in a manner or physical dimension that is beyond our comprehension, may have been "playing god" and long ago fashioned this world, our Earth, and sewn the seeds of all manner of life?

If such creatures exist, and if these advanced life forms are still human, although they appear as Gods, might this also explain the fact that the "God" of the Jews (and many other ancient peoples) not only repeatedly appeared in the shape of a man, but also possessed human attributes including egotism, jealousy, irrational rages... including perhaps a tendency to brag and to take credit for achievements not "His" own --such as the creation of the universe?

And if humans were in fact created in the image of the Gods, having descended from similar genetic seeds of life, and if evolutionary metamorphosis is an ongoing



phenomenon, is it also possible that humans have the potential to evolve and become more God-like? Is this why our brain is in fact "wired for god?"

## ALPHA & OMEGA

Although questions about God cannot be answered here, the role of the limbic system in spiritual and religious experience cannot be rationally denied--though Temple Priests masquerading as scientists may wish us to believe otherwise. Indeed, when it comes religious experience many of those who dare to call themselves scientists become irrational and hysterical, closing their minds and cloaking themselves in the mantle of dogma as they bow down and worship at the altar of innumerable "scientific" myths. These so called "scientists" are in fact proclaiming: "though shalt not know," and in this regard they have no right to call themselves scientists, as they are little more than Temple Priests who fear discovering the hand of "God" in the creative process.

Nevertheless, it is rather clear that there is in fact a scientific foundation for religious and spiritual experience, though why that is, is yet to be determined. Indeed, given the obvious role of the temporal lobe and limbic system in the generation and perception of myriad spiritual states, it also appears (at least at the level of metaphor) that the limbic system may well be the seat of the soul, and/or serve as the transmitter to God. If that is indeed the case, then Buddha, Lao Tzu, Chuang Tzu, the Taoists, Sufis, and Jesus (like so many other Jewish, Arabic, Muslim, Indian, Babylonian, Sumerian, Egyptian, Greek, Roman, and Gnostic mystics), were correct when they proclaimed:

"The kingdom of God is within you."