

THE NEUROPSYCHOLOGICAL BASIS OF RELIGIONS, OR WHY GOD WON'T GO AWAY

by Eugene G. d'Aquili and Andrew B. Newberg

Abstract. By the end of the eighteenth century, the intellectual elite generally believed that religion would soon vanish because of the advent of the Higher Criticism and the scientific method. However, two hundred years later, religions and the concept of God have not gone away and, in many instances, appear to be gaining in strength. This paper considers the neuropsychological basis of religion and religious concepts and tries to develop an understanding of why religion does not go away so easily. In general, religion appears to serve two major functions—it is a system of self-maintenance and a system of self-transcendence. Since both of these functions bear directly on human survival and adaptability, the neuropsychological mechanisms that underlie religions appear to have become thoroughly ingrained in the human gene pool and ultimately human experience. This paper reviews these two functions of religions from a neuropsychological perspective to try to explain why religion continues to thrive. Finally, we consider the conclusions regarding reality and epistemology that a neuropsychological analysis of religious experience suggests.

Keywords: neuroepistemology; neuropsychology; religion; self-maintenance; self-transcendence.

1. RELIGION AS A PROBLEM

In the eighteenth century, religion was sometimes described as *cette espèce d'ignorance profonde*. It was believed toward the end of the eighteenth century that religion as a form of profound ignorance would simply vanish with general education, along with its God or gods and its superstitious trappings. In this scenario the development of the higher criticism with

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[*Zygon*, vol. 33, no. 2 (June 1998).]

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respect to the Judeo-Christian scriptures and the triumph of the scientific method in general put the final two nails in the coffin of religion. There remained only the actual burial, which was scheduled for the near future. It has been more than 200 years since the scheduled date for the burial of religion, but the event has not yet occurred. Indeed the coffin has been opened and its occupant seems to have escaped. What can possibly have gone wrong? Universal education has been in place for well over 100 years in the West, and neither religion nor its God seems to want to go away.

Although the mainstream Western religions have suffered somewhat, religion has reappeared everywhere under new guises. Bizarre cults of all sorts have sprung up all over the world, and a sort of New Age mysticism seems to be capturing the hearts and minds of many well-educated persons. Furthermore, the old mainstream religions are undergoing a resurgence in many places. The refusal of religion to die even though eighteenth- and nineteenth-century intellectuals considered it rank superstition has become an embarrassment. Obviously religious phenomena, if not religions themselves, must arise out of pretty tenacious material. This paper will attempt to analyze why religions and their gods won't go away. But first we must attempt to discover whether there is any generality to the concept of religion, as opposed to individually existing religions, in order to see if there are universal core elements in these religions that specifically won't go away.

Defining religion is a notoriously difficult task. Indeed there are many who maintain that the concept has no single referent. This is easy to understand, because the term *religion* often encompasses such disparate elements as Eastern monism, Western dualism, divine immanence, divine transcendence, attempts at controlling nature and the environment, achieving and maintaining a plethora of interior states, emphasis on moral behavior, and so forth. It is difficult to see much in common between the religions of various primitive societies and, for example, the exalted spiritual awareness of Theravada Buddhism. Likewise, it is often very difficult to see much similarity between certain practitioners of the same religion. Thus, a behavioral analysis, and to a certain extent a cognitive one, would see very little in common between the Catholicism of a rural South American Indian and that of a Meister Eckhart or of an Anselm of Canterbury. In view of such differences can we even hope to arrive at anything like a unitary concept of religion?

Until the late eighteenth century there was practically no attempt at defining religion per se. Consequently religions, particularly in the West, were defined by their cognitive content or dogmatic formulations. It is only in the works of Friedrich Schleiermacher in the late eighteenth century that an attempt was made to define religion, as such, by switching the emphasis from a cognitive or doctrinal emphasis to a more visceral or

intuitive one. Schleiermacher defined religion as a "feeling of *absolute* dependence." Since his day, all attempts at a general definition of religion have relied heavily on emphasizing the intuitive, emotional, or visceral. A major step forward in the attempt at formulating a general definition of religion was the rise of anthropological and sociological theory. These approaches asserted that religion is always embedded in a cultural matrix and that religious beliefs, customs, and rituals must be understood in a radical relationship to the cultures in which they arise. Durkheim in his *The Elementary Forms of the Religious Life* maintained that "a society has all that is necessary to arouse the sensation of the divine in minds, merely by the power it has over them" (1926, 207). Thus, in the Durkheimian analysis, religion is nothing more than a transform of society. On the other hand, psychologists from Freud to Skinner have seen in religion a projection either of various intrapsychic dynamics or of hopes and expectations based on previous experience.

Since the turn of this century, however, scholars have begun to devote themselves to the phenomenology of religion on its own terms. They believed that there were phenomena that needed to be explained which eluded both sociological and psychological determinism. An example of such an approach has been the analysis of religion in terms of an awareness of the *sacred* and the *holy*. Rudolf Otto, in *The Idea of the Holy* ([1917] 1970), defined the essence of religious awareness as "awe." This he understood as a mixture of fear and fascination before the divine. Otto saw the essential religious experience as a *mysterium tremendum et fascinans*. Otto betrayed his Western origins, however, by understanding this as a sensed "wholly other" of the divine being. Such an approach began to get at a dominant form of Western mysticism but was not so applicable to Eastern religions or to primitive ones.

The most recent and subtle reworking of Otto's concept of the sacred as the central core of all religious experience has been done by Mircea Eliade (1959). For Eliade the sacred is no longer to be found almost exclusively in Otto's god-encounter type of experience. Rather, every culture exemplifies the existential sense of the sacred in its rituals and symbols, especially primitive and Asian cultures. In fairness it must be stated that Eliade's position, though intriguing and subtle, is hard to verify in actual cases across cultures. Many anthropologists, linguists, and psychologists question whether the concept of the sacred is identifiable as such in an analysis of the language, experience, and thought of most primitive societies. Such scholars assert that religious experience is not *sui generis* but is rather an amalgam of diverse cultural phenomena and experiences.

This cursory review of the history of Western attempts to understand religion leaves us in a somewhat confused state. The account of Winston King at least draws out some important characteristics of religion which

keep recurring. After first making the point that *salvation* is but another name for religion in general, he asks,

Are there distinguishing characteristics of religious salvation? The first is that religious salvation tends to concentrate on the needs that a culture defines as most fundamental, neglecting needs that a culture defines as less important. Religious means of salvation, often indirect and extrahuman, seek to use supersensible forces and powers either in addition to or in place of ordinary tangible means. The second distinguishing characteristic is that religious salvations tend to aim at total, absolute, and sometimes transcendent fulfillment of human needs. As defined by the cultural context, this fulfillment ranges all the way from the fullness of physical satisfactions to the eternal ecstasy of union with the Absolute. (King 1978, 288)

In this paper we are proposing that there are two classes of neuropsychological mechanisms that underlie the development of religious experiences and behaviors. These two classes of mechanisms represent two lines of neurological development involving the evolution of structures that comprise what we have called in other works the “causal operator” on the one hand and the “holistic operator” on the other. What we mean by *operators* are networks of nerve tissue in the brain that perform specific functions—in the first case allowing us to perceive causality and in the second allowing us to perceive wholeness in the midst of diversity. In considering these two brain operators we are led to the heart of what King is talking about, that is, the use of supersensible forces and powers to control the environment in such a way as to attain those needs which the culture defines as fundamental. Furthermore, these operators allow for the movement toward the fulfillment of human needs in a total, absolute, or transcendent fashion often involving holistic unusual states or experiences.

2. RELIGION AS CONTROL OF THE ENVIRONMENT

For several years now we have proposed the existence of a number of neural operators in the brain which are responsible for various higher cortical functions and have also proposed the probable neuroanatomical substrate for these operators. The cognitive operators we are referring to handle abstraction of generals from particulars, the perception of abstract causality in external reality, the perception of spatial or temporal sequences in external reality, and the ordering of elements of reality into causal chains giving rise to explanatory models of the external world, whether scientific or mythical. Briefly, the inferior parietal lobule on the dominant hemisphere of the brain, the anterior convexity of the frontal lobes primarily on the dominant side, and their reciprocal neural interconnections have been fairly definitively shown to account for causal sequencing of elements of reality abstracted from sense perceptions. The operation of

cross-modal transfer, which is specific to the function of the inferior parietal lobule, is particularly implicated in causal sequencing. For convenience we refer to the anterior convexity of the frontal lobe, the inferior parietal lobule, and their reciprocal interconnections as the *causal operator*. Thus the causal operator performs its functions on any given strip of reality in the same way that a mathematical operator functions. It organizes that strip of reality into what is subjectively perceived as causal sequences back to the initial terminus of that strip. In view of the apparently universal human trait, under ordinary circumstances, of positing causes for any given strip of reality, we postulate that if the initial terminus is not given by sense data, the causal operator automatically generates an initial terminus.

Western science differs only accidentally from the more usual form of human cognition. Science refuses to postulate an initial terminus or first cause for any strip of reality unless it is observed or can be immediately inferred from observation. Under more usual conditions the causal operator generates the initial terminus or first cause of any strip of reality. The initial terminus is a mental construct drawn from elements encoded in memory and characterized by the nature of the operator itself. That is, the construct causes, or in some sense has the power to generate, the strip of reality. We are proposing that gods, powers, spirits, or in general what we have come to call personalized power sources, or any other causative construct, is automatically generated by the causal operator. Note that in speaking of Western science we have not have been speaking of Western scientists. The restrictions imposed on human thought in Western science are of a social and contractual nature. The brain of the scientist, however, functions no differently from that of anyone else. Although scientists may reject the idea of gods, spirits, demons, or any other type of personalized power source, they nevertheless experience them in dreams and fantasy life. The causal operator simply operates spontaneously on reality, positing an initial causal terminus when none is given. When the strip of reality to be analyzed is the totality of the universe, then the initial terminus or first cause that is automatically produced by the causal operator is Aristotle's First Mover Unmoved.

If this analysis is correct, then human beings have no choice but to construct myths consisting of personalized power sources to explain their world. The myths may be social in nature, or they may be individual in terms of dreams, daydreams, or other fantasies of the individual person. Nevertheless, as long as human beings are aware of the contingency of their existence in the face of what often appears to be a capricious universe, they must construct myths to orient themselves within that universe. Thus, the brain constructs gods, spirits, demons, or other personalized power sources with whom individuals can deal contractually

in order to gain control over a capricious environment. Once unknown or mysterious causes of strips of reality are perceived as persons or personalized forces, people can deal with them as they would deal with powerful persons. For example, people can offer gifts in return for the spirits' beneficence. Thus, the concept of sacrifice as the *do ut des* of ancient Roman religion is the most primitive contractual obligation entered into by man with power sources or gods. All this is inherent in the obligatory functioning of the neural structures we have just considered. Since it is unlikely that humankind will ever know the first cause of every strip of reality observed, it is highly probable that people will always generate gods, powers, demons, or other entities as first causes to explain what they observe. Indeed, people cannot do otherwise.

The development of higher cortical functions may be regarded as a blessing insofar as these functions allow humans to solve abstract problems, an adaptive mechanism in any environment. They can also be regarded as a curse. Because humans can think abstractly and causally, they can transcend their immediate perceptual field. From experience, they can postulate probable events under given circumstances. Most of all, these functions make humans acutely aware of their own mortality and of the contingency of their existence in an unpredictable world. This is the basis of the existential anxiety that all humans bear within them. It is to relieve this curse of cognition, this existential anxiety, that humans first seek mastery over their environment by attempting to organize it mythically and by attempting to control it through the intervention of personalized power constructs. We propose that the control aspect of religion is a self-maintenance system par excellence. Religion allows for a sense of control over the environment which preserves the necessary positive psychological outlook to allow individuals and social groups to perform the actual manipulations in the external world which, in fact, do lead to some measure of control and ultimately to survival. This control aspect of religion, in which the brain generates gods, spirits, and powers and manipulates them by sacrifice, prayer, and other contractual situations, is probably the most primitive form of religion. It is the predominant form in primitive societies and during the early historic period. Early Roman religion is a particularly pertinent example in that it was a state religion which concerned itself almost exclusively with the manipulation of deities for the purposes of the state. Although this manipulative and contractual aspect of religion predominates in primitive societies and in the early historic phases of the higher cultures, it is nevertheless present, to some extent at least, even in the most developed and advanced religions. This is certainly true of contemporary popular religious practice. We propose that the attempt to control the environment by means of the positing of, and control of, personal power sources is sufficient in and of itself to constitute religion.

We should note that the causal operator also may impose a spurious causality relating inanimate objects directly to each other, but not through the mediation of personalized power sources. This process we have chosen to call *magic*, and not *religion*. Thus, when a direct causal connection is seen between sticking a pin in a doll and a victim's having a heart attack, we would call this magic. Religion, understood as we are presenting it, requires the mediation of personalized power constructs. Thus, the *ex opere operantis* theory of sacramental efficacy of classic Protestantism would be seen as a religious model, whereas the *ex opere operato* theory of classic Roman Catholic sacramental theology would be seen as a magical model within an overall religious system.

3. RELIGION AS SELF-TRANSCENDENCE

There is a second neural mechanism which produces phenomena that are quite distinct from the control aspect of religion but that are nevertheless seen as intrinsically religious when they occur. In fact, in most of the world's high religions, the class of phenomena arising from this second neural mechanism is usually seen as expressing the summit or the ultimate in each religious tradition. However, it is extremely rare for this class of phenomena to occur independently of some aspect of religion generated by the control mechanisms alluded to in section 2. What we are talking about here is what is often referred to as *mystical phenomena*, or altered states of consciousness generating a sense of some interaction with another, mysterious world which in some way is perceived as ultimate or transcendent. Since the early 1960s there have been many attempts on the part of philosophers of religion and others to define mystical experiences and to categorize them. As with religion in general, so with mysticism in particular, there seems to be no way to arrive at a general definition of mysticism that encompasses all of its manifestations. Gimello, however, points out some cogent characteristics of mysticism which seem to get at core manifestations:

A mystical experience is a state of mind, achieved commonly through some sort of self-cultivation, of which the following are usually or often the salient, but not necessarily the only, features:

A feeling of oneness or unity, variously defined.

A strong confidence in the "reality" or "objectivity" of the experience, i.e. a conviction that it is somehow revelatory of "the truth."

A sense of the final inapplicability to the experience of conventional language, i.e. a sense that the experience is ineffable.

A cessation of normal intellectual operations (e.g. deduction, discrimination, ratiocination, speculation, etc.) or the substitution for them of some "higher" or qualitatively different mode of intellect (e.g. intuition).

A sense of the coincidence of opposites, of various kinds (paradoxically).

An extraordinarily strong affective tone, again of various kinds (e.g. sublime joy, utter serenity, great fear, incomparable pleasure, etc.—often an unusual combination of such as these). (Gimello 1978, 178)

If we take this as a tentative definition of *mystical experience*, the problem is that it is not clear which elements, if any, are invariant across cultures. We are beginning to feel that a neuropsychological analysis of mysticism and altered phases of consciousness in general can begin to bring some order out of the confusion if we attempt to set up a typology of mystical experiences based on the underlying brain functions that seem to generate such experiences.

Although we do not have sufficient space to consider the details of neurophysiology, we will briefly review some basic aspects. The human autonomic nervous system is divided into two subsystems: the sympathetic and parasympathetic systems. The sympathetic system is concerned with short-term energy-expendng reactions to unforeseen environmental circumstances. It is the system regulating *fight or flight*. The parasympathetic system governs homeostasis or maintenance functions of the body such as digestion and regulation of baseline temperature, respiration, and blood pressure. In the late 1920s and early 1930s, a number of investigators following Hess proposed that these two peripheral nervous systems extended into the midbrain and beyond. They proposed naming the entire sympathetic system, including parts projecting into the midbrain, the “ergotropic,” or energy-expendng system. Likewise, they proposed that the parasympathetic system extending into the midbrain be called the “trophotropic” or energy-conserving system. In our work we have adopted this nomenclature, because *energy-expendng* and *energy-conserving* capture the essence of what these autonomic subsystems do.

We have previously suggested that rhythmicity in the environment, be it visual, auditory, tactile, or proprioceptive, drives the sympathetic-ergotropic system to maximal capacity with intermittent spillover and simultaneous activation of the parasympathetic-trophotropic system, thus creating unusual subjective states. One of the things that happens is progressive activation of certain parts of the nondominant parieto-occipital region of the brain (which we are calling the “holistic operator”), creating an increasing sense of wholeness becoming more dominant over the sense of multiplicity of baseline reality. All this has very complicated consequences, which we will consider later.

Activation of the holistic operator and the attainment of certain ecstatic and blissful states also can be strongly reinforced, if not totally achieved, by means of other mechanisms. Thus, meditation approaches the problem from the direction opposite from ritual and highly rhythmic behavior. Certain types of meditation drive the parasympathetic-

trophotropic system to saturation and spillover, with simultaneous activation of the sympathetic-ergotropic system. The end result is the same in both cases. Likewise, the use of incense and other powerful fragrances directly affects the limbic system, which, in the old neurological terminology, used to be called the *rhinencephalon*, or the *nose brain*. There are a number of connections both direct and indirect between the olfactory bulb and various midbrain-limbic structures, including the median forebrain bundle. This latter structure is generally considered a major pleasure center, and it has been shown that rats would much rather stimulate this center than eat. In fact, rats can die of starvation by overstimulating their median forebrain bundles and not taking enough time to eat. The stimulation of the olfactory bulbs and adjacent structures by the use of incense represents a powerful synergistic mechanism to both rhythmicity and meditation in the production of ecstatic unitary states.

It seems that as far as religion goes, *unitary states* are of fundamental importance. The essential point in understanding the phenomenology of subjective religious experience is to understand that every religious experience involves a sense of the unity of reality at least somewhat greater than the baseline perception of unity in day-to-day life (d'Aquili 1986). This is another way of saying that a more intense application of the holistic operator to incoming stimuli, over and above its baseline function, coupled with the limbic or emotional stimulation that accompanies such increased functioning, always results in experiences that are described as religious or spiritual in varying degrees. Whatever the mechanism for the increased functioning of the holistic operator may be, whether it is rhythmicity and entrainment of brainwaves, profound meditation, olfactory stimulation in certain contexts, extreme fasting, or electrolyte imbalance, the end result is stimulation of the holistic operator with accompanying experiences of increased unity over multiplicity.

This now brings us to the most important mystical state, Absolute Unitary Being, or AUB. AUB is a state described in the mystical literature of all the world's great religions. When people are in that state they lose all sense of discrete being, and even the difference between self and other is obliterated. There is no sense of the passing of time, and all that remains is a perfect timeless undifferentiated consciousness. When such a state is suffused with positive affect, there is a tendency to describe the experience, after the fact, as personal. Hence, such experiences often are described as a perfect union with God (the *unio mystica* of the Christian tradition), or else the perfect manifestation of God in the Hindu tradition. When such experiences are accompanied by neutral affect, they tend to be described, after the fact, as impersonal. This likely results in generating concepts such as the abyss of Jacob Boeme, the Void, or Nirvana, of Buddhism, or the Absolute of a number of philosophical traditions. There

is no question that whether the experience is interpreted personally as God or impersonally as the Absolute, it possesses a quality of transcendent wholeness without any temporal or spatial division whatsoever.

We have postulated that these rare states of AUB are attained through the absolute functioning of the holistic operator (d'Aquili 1982). In all likelihood, the neurological substrate for the holistic operator involves the function of a part of the parietal lobe on the nondominant side. We have previously described a model which attempts to explain the attainment of Absolute Unitary Being by integrating W. R. Hess's ergotropic-trophotropic model with the split-brain research described by Roger Sperry (1974) and elaborated upon by J. E. Bogan (1969), C. Trevarthen (1969), and others. In this model we proposed that the ergotrophic system actually extended upward to include the dominant hemisphere, and that the trophotropic system extended upward to include the nondominant hemisphere. We postulated that if either one or the other system were driven to a state of saturation, the opposite system would be briefly stimulated, as we know occurs in third-state autonomic stimulation such that for a brief period there would be firing of both systems. Thus, during Absolute Unitary Being, not only would there be maximum discharge from the holistic operator and other neural structures on the nondominant side generating a sense of absolute wholeness, but there would also be an intense firing of structures on the left, or dominant, hemisphere associating with that wholeness the intense consciousness of the reflexive ego associated with normal left-hemispheric functioning. Thus, the experience of Absolute Unitary Being is not a vague sense of undifferentiated wholeness but a sense of intense consciousness, because both systems are firing maximally. If this model is correct, it should be obvious that AUB involves an extreme state of functioning of the holistic operator. More usual or ordinary perceptions reflect some sort of balance between analytic and synthetic, or gestalt, perception. We propose, however, that even in more normal perceptions, whenever the sense of wholeness exceeds the sense of multiplicity of parts or of discrete elements, there is an affective discharge by means of the right brain–limbic connections that Schwartz, Davidson, and Maer (1975) have shown to be of such importance. This tilting of the balance toward an increased perception of wholeness, depending on its intensity, can be experienced along a spectrum as beauty, romantic love, numinosity, or the religious awe described by Smart (1958, 1967, 1969), or religious exaltation in the perception of unity in multiplicity described by Stace (1961) as extrovertive mystical experience, all merging into various trance states ultimately terminating in AUB.

We are proposing that there is an aesthetic-religious spectrum and that the point on this spectrum of any perception depends on how far it is tilted in the direction of wholeness (d'Aquili 1986). As we move to the far

end of the spectrum, we enter into the realm of trance states often associated with hyperlucid visions in which the increased sense of unity begins to obliterate the boundaries between perceived entities, both in the external environment and especially in the boundaries between self and other. Examples of such trance states and visions include the states achieved by members of flagellant sects during the Middle Ages, the states known to be achieved by Taiwanese mediums, and states attained by practitioners of voodoo in Haiti and the Umbanda of Brazil. Certainly trance states can exist in varying degrees, from a mild blurring of boundaries at one end all the way to merging into the state of Absolute Unitary Being at the other. As we have described it, AUB represents the extreme of the aesthetic-religious continuum and the absolute functioning of the holistic operator. During this final state there is nothing but a timeless and perfect sense of meaning and wholeness without any perception of discrete entities. One might call AUB the ultimate trance.

It is clear that all these experiences in one way or another involve self-transcendence. This is the second manifestation of religion. Theoretically it can stand on its own, but it rarely if ever does. It is usually integrated in one form or another, at least minimally, with the first aspect of religion mentioned above, that is, an attempt to control the external environment. One might ask why one would wish to transcend oneself. It is intuitively obvious why human beings would wish to control their environment. It is not so clear why one would wish to transcend the self. The answer is obvious to those who have had mystical experiences. It seems that such experiences are characterized, at the lower end of the aesthetic-religious spectrum, by a sense of insight into the world of the mysterious bordering on the supernatural, and at the extreme end of the spectrum, by a sense of attaining absolute reality, union with God or the Absolute, a sense of either bliss or utter tranquility, and perhaps most important of all, a lack of fear of death. It is almost universally reported from those who have experienced the final two stages of the aesthetic-religious spectrum, that is, either cosmic consciousness or Absolute Unitary Being, that they simply have no fear of death. This is not necessarily because they believe in an afterlife. They may or may not, depending on the general structure of the religious belief which they hold separate from their mystical experiences. Even if they do not believe in a specific afterlife, mystical experiences tend to generate a sense of the ultimate goodness and appropriateness of reality, and death is perceived as simply an ordinary part of that reality, something which is not feared.

Thus, it is easy to see why self-transcendence is highly prized. To a greater or lesser extent it makes an individual invulnerable to the exigencies of life and to the effects of evil in the world. It is something of a paradox that this second manifestation of religion, at least toward the end of

the aesthetic-religious spectrum, seems to involve a surrender to God, the Absolute, or to the universal fact of ultimate reality. In some respects, the state of AUB is distinguished from the first manifestation of religion that we considered in this paper, that is, the attempt to control the environment. It seems that AUB actually represents a surrender of the individual to absolute reality. In its more perfect or complete forms this second aspect of religion positively rejects any attempt at control of the physical universe, or even of one's own life, as being inimical to spiritual development. This being the case, it is curious that it is rare for either the first or the second manifestation of religion to stand on its own. However, the surrender of the self in AUB leads to a feeling of oneness with the universe and in this way allows the persons to feel ultimate control, because they actually are the universe. In other words, control of the universe from the perspective of the individual self is lost, but control is obtained on a more fundamental level.

Thus, in most cultures, the two manifestations of religion are integrated to a greater or lesser extent. The first manifestation of religion, control of the environment, is more likely to stand on its own, but even in primitive religions shamans or witch doctors enter into the other world of the gods and spirits and return to testify to its reality. Indeed, it is not too difficult to see how the second, or mystical, manifestation of religion can help the first. Insofar as altered states of consciousness and hyperlucid visions can be perceived as experiencing the world of the gods, they can be seen as immediate empirical verification of the existence of the personal power sources that are automatically constructed by the causal operator.

We are now in a position to see more clearly why religions and God won't go away. It seems that the essential elements of religion are hard-wired in the brain. Cultural input may advance or diminish their effect, but they are always there ready to make an appearance when they are needed, psychologically for the individual or socially for the group. Their older cultural manifestations may recede from prominence, but ever-new ones jump on the stage ready to replace the older actors. Unless the hard-wiring of the brain is fundamentally changed by evolution, which, by the way, would alter our humanity into an unrecognizable form, we must expect that religions and their gods will always be with us.

4. RELIGION AND REALITY—THE TRUTH CLAIM

Although on the basis model presented in this paper, it seems clear that all hyperlucid unitary states including AUB have their basis in neuroanatomy, neurophysiology, and the flux of neurotransmitters, it is equally true that baseline reality (lucid consciousness), which both the average person and the average scientist construe to be really real, is based on exactly the

same parameters. Thus, one can never get at what is really out there without its being processed in one way or another by the brain.

Many find it deeply disturbing that the experience of God, the sense of the absolute, the sense of mystery and beauty in the universe, the most profoundly moving experiences of which humans are capable, might be reducible to neural tuning, to specific patterns of neural blips on an oscilloscope, or to measurable changes in brain-imaging studies. However, such a pessimistic interpretation misses a few rather important points. First of all, our experience of baseline reality (e.g., chairs, tables, love, hate), indeed of our whole physical and psychological environment, can also be reduced to neural blips and fluxes of brain chemistry. So what criteria can we use to evaluate whether God, other hyperlucid unitary experiences, or our everyday world is more real? Can we use our subjective sense of the absolute certainty of the objective reality of our everyday world to establish that that world is really real?

To simplify the issue somewhat, let us for the moment contrast the most extreme hyperlucid unitary state, that of AUB, with baseline reality. In such an exercise one can see that there is no question that AUB wins out as being experienced as more real. People who have experienced AUB, and this includes some very learned and previously materialistically oriented scientists, regard AUB as being more fundamentally real than baseline reality. Even the memory of it is, for them, more fundamentally real than reality. A number of years ago we interviewed several people who had undergone this experience. There is no doubt that it, and even the memory of it, carried the sense of greater fundamental reality than that generated by their experiences of day-to-day living. If we use the criterion, therefore, of the sense of certainty of the objective reality of that state, AUB wins hands down.

To further clarify this point, let us compare four characteristics of baseline reality (coherent lucid consciousness) with the hyperlucid consciousness of the various unitary states. Baseline reality demonstrates the following four fundamental properties:

1. A strong sense of the reality of what is experienced.
2. Endurance of that reality through very long periods of time, usually interrupted only by sleeping.
3. The sense that when elements in baseline reality disappear from all forms of sensory detection, they have ceased to be.
4. High cross-subjective validation both for details of perception and core meaning. In other words, other people corroborate our perceptions of the world, that is, reality is a collective hunch.

The essential characteristics of hyperlucid unitary consciousness are the following:

1. An extremely strong sense of reality, to the point of its being absolutely compelling under almost all circumstances.
2. Endurance for short periods of time relative to the sense of time of baseline reality.
3. A sense of its underlying persistence and continued existence even when the perception of the overall state has ended.
4. High cross-subjective validation for core perceptions. Moderate to low cross-subjective validation for perceptual detail in those hyperlucid states in which discrete being is perceived (as in near-death experiences).

We would maintain that it is impossible to determine whether the various hyperlucid unitary states or baseline reality is more real, that is, which represents the ultimate objective reality without the need for gratuitous and unsubstantiated assumptions. Clearly baseline reality has some significant claim to being ultimate reality. However, Absolute Unitary Being is so compelling that it is very difficult indeed to write off the assertion of its reality. Actually, for individuals who have experienced AUB, it seems virtually impossible to negate that experience, no matter what level of education or sophistication such experiencers may have. This being the case, it is a foolish reductionism indeed that states that, because hyperlucid unitary consciousness can be understood in terms of neuropsychological processes, it is therefore derivative from baseline reality. Indeed the reverse argument could just as well be made. Neuropsychology can give no answer to the question of which state is more real, baseline reality or hyperlucid unitary consciousness often experienced as God. We are reduced to saying that each is real in its own way and for its own adaptive ends.

Specifically, the essential characteristics of different states of reality are eventually reducible only to the strength of the sense of reality, the *phantasia catalyptica* of the Stoics or the *Anwesenheit* (compelling presence) of certain modern German philosophers. A vivid sense of reality may be the only thing that we can use to help determine what is really real until someone determines a method for going beyond the brain's perception of reality. This conclusion may not be very satisfying epistemologically, but until now any alternative has escaped us.

Therefore we must conceive of the brain as a machine which operates upon whatever fundamental reality may be and produces, at the very least, two basic versions. One version is a world of discrete beings, usually baseline reality, and the other version is Absolute Unitary Being, usually experienced as God. Both perceptions are accompanied by a profound subjective certainty of their objective reality. Whatever is prior to the experience of either Absolute Unity or the baseline reality of everyday life

is in principle unknowable, because what is in any way known must be translated, and in this sense transformed, by the brain. Such considerations indeed put us in the presence of the *mysterium tremendum et fascinans*.

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