

On Evolution of God-Seeking Mind

An Inquiry into Why Natural Selection Would Favor Imagination and Distortion of Sensory Experience

Setting the Stage for Imagination and Religious Behavior

“It was the experience of mystery—even if mixed with fear—that engendered religion” (EINSTEIN 1954, p11).

For early *Homo sapiens*, big-brained and naturally curious, the emergence of self-awareness and a nascent awareness of mortality (perhaps as spandrels: as unavoidable consequences of increased brain size and intelligence) surely would lead to that experience of mystery. It also would lead to a new kind of survival problem. In contrast with specific responses to specific threats, what could be an appropriate response to awareness of a pervasive threat, an unavoidable danger that was not salient in the natural environment? How could such awareness benefit survival? Feeling the presence of such a predator, where there is no possible flight or fight, might more likely incapacitate or frighten one to death. Such awareness could hardly be reproductively beneficial unless it led to some adaptation that reduced the perceived danger. But what? Swifter legs? Keener sight? Sharper teeth? Stronger arms? None of these would do. What then? Since that “predator” lurks somewhere in the brain, so too, the adaptation—as some mental structure to counter or at least mitigate that awareness.

Abstract

The earliest known products of human imagination appear to express a primordial concern and struggle with thoughts of dying and of death and mortality. I argue that the structures and processes of imagination evolved in that struggle, in response to debilitating anxieties and fearful states that would accompany an incipient awareness of mortality. Imagination evolved to find that which would make the nascent apprehension of death more bearable, to engage in a search for alternative perceptions of death: a search that was beyond the capability of the external senses. I argue that imagination evolved as flight and fight adaptations in response to debilitating fears that paralleled an emerging foreknowledge of death. Imagination, and symbolic language to express its perceptions, would eventually lead to religious behavior and the development of cultural supports. Although highly speculative, my argument draws on recent brain studies, and on anthropology, psychology, and linguistics.

Key words

Evolution, imagination, mortality, self-awareness, fear, religious behavior, language.

The unique and yet unexplained aspects of human evolution are common knowledge. Among the multitude of adaptations that evolved in species, there appears to be this one set for which there is no antecedence in other species: the adaptations that form the human mind (LORENZ 1977). There appears to be a discontinuity in evolution when it comes to the human mind (DONALD 1991). “Biologically, we are just another ape. Mentally, we are a new phylum of organisms” (DEACON 1997, p23). In considering the distinct form of life that is the human mind, some might consider it to be a new kingdom (LORENZ 1977). That such adaptations

evolved and flourished only in *Homo sapiens* suggests the existence of a unique stimulus in the formation period of our species. This paper focuses on that stimulus, and on evolutionary and behavioral responses to it.

We have evolved with an awareness of the world that goes beyond externally sensed reality, with an inner “sense” that creates its own reality. We have evolved with unique ways of perceiving the world, and with unique ways of passing on information to future generations, who benefit from the survival value of our behavior as well as the information in our genes (DEACON 1997; DENNETT 1995, 1978;

DONALD 1991; LORENZ 1977; MITHEN 1996; PINKER 1997). Consider certain quantitative and qualitative differences in the animal world. The difference between the brain of a fruit fly and that of a chimpanzee can be viewed as quantitative: the chimp has much more and much better of the same kind of brain material. In contrast, the difference between the brain of a chimpanzee and that of a human must be viewed as qualitative: beyond the measure of DNA, as seen in differences in behavior and cognition, we have some qualitatively different material, which other primates do not have (BRONOWSKI 1977, DONALD 1991, LORENZ 1977, MITHEN 1996). "It is as if all life evolved to a certain point, and then, in ourselves turned at a right angle and simply exploded in a different direction" (JAYNES 1976, p9). The extraordinary gap in mental performance between humans and the rest of the animal world has defied efforts to bridge it with plausible explanation. LORENZ refers to a great gulf produced by "a creative flash", a "fundamental revolution of all life brought about by the coming into existence of the human mind" (1977, p167), "utterly impenetrable to the human understanding" (p169). Part of that "fundamental revolution" can be understood, I suggest, by looking at a new kind of self-preservation behavior stemming from a threat to life that only humans have perceived.

All animals behave to survive and reproduce, and all require sensory equipment in order to gain accurate information from the environment. Indeed, in this kind of behavior, we are just like other primates. However, there is also "and not by bread alone behavior" to account for: unique behavior and a unique problem. Humans have had an awareness of a non-specific threat to life, and humans have evolved with equipment and behavior in order to cope with that perceived threat. At some evolutionary stage, proto-humans began to be aware of *self* and *other*, of time past, and of approaching time beyond the given moment. As a consequence, they eventually became aware of their mortality (a still evolving awareness), and suffered the throes of that awareness as well as that of death itself (BECKER 1973; BROWN 1959; LANGS 1996; LANGER 1982, 1972, 1967; PYSZCZYNSKI/GREENBERG/SOLOMON 1997). Other animals, whose awareness is imprisoned in present time (BRONOWSKI 1977), merely suffer the throes of death. Animals have developed brains; humans have developed additional equipment and the ability to communicate symbolically (DEACON 1997; DONALD 1991). I argue that some part of that equipment and that linguistic behavior developed in response to the

stimulus of potentially debilitating fear brought on by an evolving awareness of mortality. Rather than an adaptation (what reproductive benefit is there in this awareness?), it may have been an inevitable consequence of a certain level of brain complexity. Once in place it would lead to new human behavior. "The function of the brain is to produce behavior. The function of behavior is to promote the DARWINIAN fitness of the behaver" (STADDON/ZANUTTO 1998, p242). What is true for the animal brain should also be true for that additional equipment known as the human mind.

DENNETT, shifting the mind-brain problem by referring to "animal minds", discusses the "huge difference between our minds and the minds of other species... We are also the only species with language" (DENNETT 1995, p371). Why only us? He answers by posing another question: "What varieties of thought require language?" (p371). One such variety of thought, I suggest, is religious in nature. DENNETT proposes a design structure for the ascendance of human mind which he calls "the Tower of Generate-and-Test" (p373). Here again, why would only human minds climb to the top of such a structure? DENNETT suggests the advent of tool use, but does not address the question of why only humans so used tools. He speaks of a device for lifting the brain to human heights: "the crane to end all cranes: an explorer that *does* have foresight, that can see beyond the immediate neighborhood of options" (p379). Again, the question as to what need led only human brains to look "beyond the immediate neighborhood of options?" is unanswered. DENNETT disagrees with those who refer to human "mysteries" such as free will: human puzzlement that cannot be solved. My thesis suggests at least a partial answer to the question of human uniqueness and a solution to one of the mysteries: the development of religious behavior. Whether we call it *mind* or *brain*, the human intellect-imagination system evolved to engage in behavior that cannot simply be described in terms of physical survival. Part of this "and not by bread alone" behavior is religious in nature. "As every creature and even every living tissue responds to stress with heightened activity, so the mind meets the challenge its own evolution has created by a radical deepening of religious feeling and dawning of religious ideas" (LANGER 1982, p110).

My thesis does not address the complexity of needs served by organized religion, the moral aspects of religious activity, or other aspects of the ubiquitous *mind*. The focus is not on whether religious behavior is adaptive in the modern world.

Rather, the focus is on imagination as a possible adaptive response for early *Homo sapiens* to that cardinal human fear: mortality (LEYHAUSEN 1973), and on the associated memory devices essential for storing the products of imagination (LANGER 1982, 1972). Apprehension of death developed as a free fear: the sensing of a danger that cannot be avoided or fled from (LEYHAUSEN 1973; LANGS 1996). Having such apprehension, “we die a thousand deaths, that is the price we pay for living a thousand lives” (BRONOWSKI 1977, p25). When and to what extent this apprehension became *conscious* (in the ordinary murky sense of the word) are questions beyond the scope of this paper. This apprehension might have developed as a consequence of that prereflective consciousness SARTRE and others consider as awareness of an object and awareness that *it* is not that object (MALHOTRA 1997). I avoid modern issues of authenticity of self and self awareness: issues of whether and to what extent such self and awareness exist and are known by the individual, apart from social content (WEIGERT 1988). It seems that at least some amount of self-awareness is required to enter the state of being a self (MARTIN 1985, p3). I intend *awareness*: of self and other, and of mortality, to mean some “knowing” of these things that leads to behavior, whether or not the knowing can be squeezed into thought and expressed. Thus, this sense of *awareness* encompasses various forms of *knowing*, some of which were (and still are) ineffable: anxiety, feelings of foreboding, dread, and individual moods that find expression in some form of human behavior, including inaction (out of fear) in a situation calling for action. There is FREUD’s controversial conception of a *death instinct* to consider, as well as other instinctual knowing that exists at the borderline of animal and human awareness (BROWN 1959). Considering these levels of the knowing of fear, I focus on that cardinal fear and on the potential loss of vitality that I suggest paralleled its development: “a number of factors, psychological as well as physiological in nature, at work in causing actual, concrete fears; the cardinal source (not the experienced but the essential one) of the phenomenon of fear as a whole, however, is man’s mortality” (LEYHAUSEN 1973, p248).

I argue that human imagination evolved as a way of coping with that cardinal fear and its potentially debilitating consequences. This fear could not be alleviated by further evolution of the external senses. An inner sense offered an escape from a “predator” that did not appear within the physical environment. This escape mechanism quite likely developed

as a distortion of sensory experience (LORENZ 1977; LEYHAUSEN 1973). This *disorder* had survival value for our species. LORENZ offers a clue in understanding such a development: “Far from hindering the investigation of the organism affected by it, a pathological disorder very often gives us the key to the understanding of how the organism works” (1977, p5). This “key”, I suggest, is useful in understanding the evolution of imagination as an adaptation. Human self-awareness leading to an awareness of mortality can be considered a disorder, and just that kind of disorder that “gives us the key to understanding” how that anomalous part of the human animal came into being. “We have developed ‘organs’ only for those aspects of reality of which, in the interest of survival, it was imperative for our species to take account, so that selection pressure produced this particular cognitive apparatus” (LORENZ 1977, p7). Since human imagination appears to be unique, it seems reasonable to inquire as to what unique survival problems might have developed for proto-humans. I suggest that an evolving awareness of self and of death of self led to a new kind of survival problem that, in turn, led to the evolution of a new kind of “solution”. As it evolved, imagination would lead to the development of “belief”, a pro-attitude superimposed on information and experience, and to a new kind of behavior: religious behavior. “Its original function may have been to keep men’s minds in balance with the rest of nature, but what has led to its own elaboration is a purpose it soon acquired: the denial or masking of death” (LANGER 1982, p137).

“Religious behavior” is used here in a broad sense, to include the nascent mental activity hominids, newly aware of self and mortality, might have engaged in individually and, as emerging language made possible, in small groups. With regard to investigating the sources of religious behavior, there is, of course, a great rift in human views of “mind”, “soul”, and individual afterlife: a largely unspoken-of dichotomy between scientists and secular academicians on the one hand, and the rest of the world on the other, between the staunch materialists (monists) and the mass of people (dualists) who feel that mind and soul exist as non-material stuff. “I suppose most people in our civilization accept some kind of dualism. They think they have both a mind and a body. But that is emphatically not the current view among the professionals in philosophy, artificial intelligence, neurobiology, and cognitive science” (SEARLE 1997, p43). Few professionals address this rift. There is some risk in doing so, especially when the different views are taken beyond academia. Our

beliefs have detrimental consequences for ourselves and others (LANGS 1996). Ancient and still active concepts such as *faith*, *sacred*, *worship*, as well as the central concept of *God*, all with little or no direct relationship to physical survival in the externally sensed world have, nonetheless, led to life and death conflict. Wars have been fought, and are even now being fought, masses of people killed, because of differences in religious belief. Undoubtedly, all this has contributed to the dearth of scientific inquiry into evolutionary sources of belief and the potential role of imagination in the development of religious activity. Many religious differences, at the rarely-exposed marrow of belief, center on what continuance there might be for an individual mind after death, and on what behavior might influence such continuance. The question appears to be as old as the mental equipment required for asking it.

Imagination: Structure and Process

Unlike the information-seeking external senses, *imagination* creates its own information: new and sometimes distorted images of the natural world. It is a basic human characteristic, more basic than intelligence, which is abundant in the animal world (BRONOWSKI 1977). As here described, *imagination* is an aspect of mind that we know by its lexical meaning: “the act or power of forming mental images of what is not actually present; the act or power of creating mental images of what has never been actually experienced, or of creating new images or ideas by combining previous experiences; creative power” (WEBSTER 1996). It is the “employment of past perceptual experience, revived as images in a present experience at the ideational level” (DREVER 1964, p130), “the process of creating objects or events without the benefit of sensory data” (CHAPLIN 1985, p221). STEPHEN speaks of the existence of *autonomous imagining*, “imagery so compelling, so powerful it can even override all demands of external reality” (1989, p56), imagery “experienced as an external, independent reality”, and propose that religious experience “is grounded in the psychological reality of a special imaginative process operating outside ordinary awareness” (p212). JAMES describes that experience, “the convincingness of what it [imagination] brings to birth. Unpicturable beings are realized, and realized with an intensity almost like that of an hallucination. They determine our vital attitude as decisively as the vital attitude of lovers is determined by the habitual sense, by which each is haunted, of the other being in the world” (1936, p71).

It is useful here to distinguish between two fundamental mental attributes: intellectual and imaginative. Compared to the intellect, imagination is a more subtle mental phenomenon, seemingly impossible to quantify (ECCLES 1989). “The imaginative process is the human capacity to evoke an image or an idea in the absence of a direct perceptual stimulus” (RANGELL 1988, p63), “to make images and move them about inside one’s head in new arrangements” (BRONOWSKI 1977, p24). BERES defines imagination broadly, “as the capacity to form a mental representation of an absent object, an affect, a body function, or an instinctual drive... a *process* whose *products* are images, symbols, fantasies, dreams, ideas, thoughts, and concepts” (1960, p327). DENNETT speaks of images as existing within a *phenomenal space* that can contain a god or heaven as well as a tangible object: “Phenomenal space is Mental Image Heaven, but if mental images turn out to be *real* they can reside quite comfortably in the physical space in our brains, and if they turn out not to be real, they can reside, with Santa Claus, in the logical space of fiction” (1978, p186). I suggest that for early *Homo sapiens* with emerging imagination (as for a large number of modern humans), real objects and “Santa Claus” reside together quite harmoniously.

To all this I would add that, in relation to the brain’s processing of external information, imagination functions as sensory-distorting perception. To the extent that this perception leads to something new that can be shared, we might call it “creative imagination”. Here, individual processes are extended to those of a social nature: to the sharing of illusions and the formation of new images as a social process. Products of imagination are qualitatively different from mere illusions, from that perversion of sense-data which might occasionally have taken place in pre-imaginative hominid brains (and in those of other animals). With the advent of imagination, illusions would increase and assume new forms and new functions. One positive function would be to divert the individual from fearful thoughts involving “self” and change. KOESTLER speaks of this function as: “the transfer of attention from the ‘Now and Here’ to the ‘Then and There’—that is, to a plane remote from self-interest” (1964, p303). In an imaginative state, a state identified as Absolute Unitary Being, a state described in the mystical literature of the world’s most ancient religions, individuals lose their sense “of discrete being, and even the difference between self and other is obliterated” (D’AQUILI/NEWBERG 1998, p195). Religious literature describes imaginative states in which indi-

viduals lose their awareness of self and with it lose their mortal fears. In such states, rather than adding to awareness, imagination acts as a filter, a curtain, or even as a screen, distorting, dimming, or obliterating awesome perceptions. In such states, imagination serves to transport or sever the individual from the sources of mortal fear. Historically, in literary theory, “it was opposed to reason and regarded as the means for attaining poetical and religious conceptions” (HOLMAN/HARMON 1992, p241).

As it first evolved, imagination, undoubtedly, would merge with older forms of illusion—in and out of dreams. “In primitive stages of hominid specialization dream may not have occurred exclusively or even mainly in sleep. For eons of human (or proto-human) existence imagination probably was entirely involuntary, as dreaming generally is today, only somewhat controllable by active or passive behavior” (LANGER 1972, p283). LANGER gives support to the view of the pioneering French psychologist Jean PHILIPPE who described imagination as a kind of biological entity: “In the complexity of our mental organization it is a sort of living cell, which maintains its life through manifold and diverse transformations” (PHILIPPE 1903, p4). Whatever it physically consists of, imagination most likely evolved with *Homo sapiens*. Expressions of it are difficult or impossible to detect from the monotonous tools and other archeological finds from the long record of *Homo erectus*, although it seems likely that at least gestation of human self-awareness had begun by the end of this period of some hundred thousand generations of big-brained and potentially aware creatures who became extinct 200,000 years ago. MITHEN, pondering how little *Homo erectus* seemed to create with his large brain, speaks of a “shuffling of the same essential ingredients” in their technology for more than a million years, with only “minor, directionless change” (1996, p123).

Imagination in Its Early Forms

The earliest artifacts that have been found to express imagination, those from the late Middle and early Upper Paleolithic periods, express religious activity having to do with death and mortality. The earliest traces of beliefs and practices are of such religious form: Neanderthal burials seventy thousand years ago and perhaps even older burials in China; elaborate Paleolithic cave art drawn in dark, tortuous, difficult to access recesses; evidence of animal worship and of rituals associated with hunted animals; and other prehistoric evidence of the struggle

to understand and come to terms with individual death and glimmers of mortality (DONALD 1991; HOLMES 1996; PARRINDER 1984). In historic times we see this struggle for understanding expressed in the earliest literature, in all known cultures. These cultural products express the religious thought that seems to be the primal focus of human imagination, as we first encounter such imagination in salient human behavior (BROWN 1959; DENNETT 1995; FREUD 1950; HOCART 1954; JAMES 1936; JAYNES 1976; LANGS 1996, LANGER 1982; MITHEN 1996). I argue that the imaginative parts of *mind* were naturally selected in response to debilitations that paralleled awareness of mortality. Imagination and companion devices to process and store its products in memory evolved to mitigate that awareness, to discover offsetting information beyond the apparent horizon, to sense a more favorable reality, and thus, to make the emerging awareness of death more bearable, and to make the aware individual more fit. Although much of the prehistoric process may never be known, evidence for this function of imagination permeates history and contemporary human life. DONALD describes the universal importance of religious belief within hunter-gatherer societies, all of whom appear to have an elaborate mythological system similar in principle:

“Myth permeates and regulates daily life, channels perceptions, determines the significance of every object and event in life. Clothing, food, shelter, family—all receive their ‘meaning’ from myth. As a result, myths are taken with deadly seriousness: a person who violates a tribal taboo may die of fear or stress within days, or be ostracized, or put to death” (DONALD 1991, p215).

There is neuropsychological data to suggest that “human beings have no choice but to construct myths consisting of personalized power sources to explain their world” (D’AQUILI/NEWBERG 1998, p191). Supporting this, a range of cultural products reveals the primacy of mortal fears and religious hopes in diverse societies throughout time and throughout the world. Every known social group has had a religion that includes some sense of immortality or some attempt to deny the reality of death (BROWN 1959). As one well-documented example, Egypt, four thousand years ago, a society of some seven million people, devoted the bulk of its surplus and some of its essentials to the building of monuments for its Pharaohs. To prepare dead bodies for entry into an imagined next world, living bodies suffered hunger in this world. There is evidence, in the caves that housed them, that many of the hundreds

of thousands of pyramid builders and artisans labored willingly for their Pharaoh's afterlife and for their own. Today, with five billion of the world's six billion as adherents, ancient religions are alive and flourishing, 143 years after *On the Origin of Species* and their predicted demise. In a nationwide poll by The New York Times and CBS News of over a thousand teenagers, "ninety-four percent say that they believe in God" (GOLDSTEIN/CONNELLY 1998). DENNETT writes of religions, "They have kept *Homo sapiens* civilized enough, for long enough, for us to have learned how to reflect more systematically and accurately on our position in the universe" (1995, p518). Yet, from the record, the majority of people reflect on our position in the universe in much the same way that they did before DARWIN. The refusal of religion to die has become an embarrassment (D'AQUILI/NEWBERG 1998). I believe that part of the explanation for this lies in the nature of the mind itself.

"Okay", the reader might say; "we can agree that religious belief has been of prime importance since the beginnings of human culture. So what? What does that have to do with natural selection and other natural forces? Are you suggesting a marriage of heaven and earth, with religious belief an offspring of God *and* Mother Nature?" No. I argue that the products of imagination, including religious belief, are natural products (memes: cultural material, based on genes: DNA), and that the brain structures to conceive and store such belief are natural structures that aid human survival. However, I am suggesting a somewhat different view of *nature*: the nature of "human".

In relation to human phylogenetic processes and cultural change, LORENZ notes: "If we discover that certain behaviour patterns and norms of social conduct are found in all human beings in all cultures in exactly the same form, we can assume with virtual certainty that they are phylogenetically programmed and genetically specified" (LORENZ 1977, p182). While the content of religions differs from culture to culture, "the behavior patterns and norms" of seeking meaning and continuity in life, of searching for supersensory powers, and developing belief in such powers, this seems to be present in all existing cultures, even those practicing Buddhism (BROWN 1959; SMITH 1958). This behavior existed at the dawn of civilization some ten thousand years ago, and, I suspect, existed earlier, shortly after the advent of imagination in *Homo sapiens*. D'AQUILI and NEWBERG, based on their neurological research, make the claim that "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" (1998, p191). Religious behavior seems part of the nature of "human", in dual existence with the animal behavior (PERSINGER 1987).

As scientific investigation led to the seemingly impossible dualism of light: "how can something *really* be both wave and quanta?" so too, I suggest, has scientific investigation led (at least temporarily) to a certain dualism of the human animal: *animal* in the evolution of all its quantifiable parts, *human* in the evolution of *mind*, and in behavior based on beliefs. LORENZ goes so far as to say, "the human mind—and this one can say without exaggeration, is a new kind of life" (1977, p172). If so, a DARWINIAN approach should be to look for a new situation that might have led to "this new kind of life", which appears to be both animal and some other form that is still evolving. Human survival requires nourishment for this new form: the mind, as well as nourishment for the animal housing it. The mind and the animal brain seem to be shaped differently; they seem to have different needs. This conception is compatible with a materialist philosophy; brain and mind fit together. However, they do not simply fit together. The irregular-shaped human mind cannot be pounded into the preexisting animal brain cavity; the attempt to do so seems to be based on a preconceived belief of "mind" as merely an extension of brain ("what else could it be?"), and a yearning for evidence to support that belief. A structure for doubting reality, for imagining an alternate reality, adapts a qualitatively different approach to the world than does the animal brain (BERES 1960). It seems to have evolved to make use of that different approach for survival purposes. This does not mean that such a structure is in all respects superior for survival. LORENZ, commenting on the double edge of the reflecting process, "man's greatest discovery in the history of the human mind", states that it was "immediately followed by the greatest and gravest mistake—that of doubting the external world" (1977, p15). I suggest a simple explanation of that doubt: "man's greatest discovery" was made to do *just that*: to justify the doubting of an external world that showed human death as the final reality of life. Denial of death and other "unacceptable" realities seem an inherent part of human emotional life (BROWN 1959; BECKER 1973; LANGS 1996).

It seems plausible that an inner-directed sense, a sense "that creates images of what is not actually present", was not designed to search the external environment for food; the preexisting primate

brain, 50 million years in its formation, did that quite well. Other primate species, lacking human imagination, have survived quite well, in diverse and changing environments (MITHEN 1996). There is a counter theory in “the psychology of imagination, pointing out the origins of this capacity in the development of object consistency relative to the stimulus of vanished objects” (RANGELL 1988, p63); this is similar to BERES idea of the mental representation of an absent object (1960). Such a useful capacity, I suggest, might develop as a byproduct. It is useful to preserve an image of a real object after it vanishes from the senses. However, it would be *essential* for a created image, an “object” that could never otherwise return to be “sensed”. Storing would be the only way to “sense” the image of something that never existed, and without imagination would never return—could never return. It is the preservation of such unreal and distorted images, vital for human survival, as I hope to show, that would drive the evolution of imagination. Once in place, imagination would serve in many other ways for human survival. Primate senses were old and successful devices in hunting within the real environment. An inner-directed sense, creating its own reality, would seem to have been designed for some different purpose, one that would lead to nascent psychological adaptations for survival. MITHEN, in considering evolutionary research, speaks of “integrating material from evolutionary ecology and human psychology ... [towards] a DARWINIAN psychology [that] lies ahead” (MITHEN 1989, p492). I suggest that research in the evolution of human imagination should be an important part of such a DARWINIAN psychology. RANGELL describes the functional evolution of imaginative products known as fantasies: “With reference to the linkage between the cognitive and the affective, fantasies are cognitive products designed to produce a wished-for affective result. The aim is to produce pleasure and safety, while keeping anxiety or any other form of unpleasure at bay” (RANGELL 1988, p65). Just such imaginative mental activities are involved in the process of developing religious behavior and in other responses to awareness of death.

Recent work in neuroscience identifying areas of the brain especially active during religious experience (RAMACHANDRAN/BLAKESLEE 1998) and on parts of the brain’s autonomic systems stimulated by religious rituals and practices (D’AQUILI/NEWBERG 1998) may advance part of my argument. Cutting across disciplines, an important area barely touched on in this paper, is gender studies: studies of the special

role women must have played in the evolution of imagination and religious behavior.

Women, from earliest times seen as the source of life, would also, with stillbirths and infant deaths, be seen as a source of death. Even before imagination was directed elsewhere, women would naturally be looked to for clues in understanding the great mysterious processes of birth and death. Not only men, looking from the outside, but women themselves, as imagination evolved, would surely give special thought, imaginative thought, to their bodies and to understanding themselves in relation to life forces and those of death. Not merely as the fertility figures shown in early artifacts, women, at an early stage in human evolution, would naturally be looked to for spiritual guidance, based on their special bodily intelligence. Elaine SHOWALTER describes such special female awareness as “the corporeal ground of our intelligence” (1998, p. 338). Imagination would also find employment in sexual relations and pair bonding. Far beyond my ability to explore here, I suggest that, early in the evolution of imagination, sexual dreams and fantasies would intertwine with fears of death and hopes of some rebirth. It might well be that from this bonding would come some of the first imaginative communication: “the earliest source of the profound and complicated relation in human life among sexuality, aging, the certainty of death, and the knowledge of time” (FRASER 1988, p488). At the very least, such use of imagination by a bonding pair would tend to dispel morbid thoughts and lead to better survival strategies. As apprehension of death developed, women, in using their power and ability to choose a mate and potential father, would tend to favor one who at least offered some alternative reality mitigating the pervasive threat.

The Evolutionary Pathway to Imagination

What might have driven the engine of evolution to such a unique adaptation as that of human imagination? I suggest the following rough-and-ready account of a long complex process, as a likely sequence of events. In this account, complex questions of the nature and function of *self* and *self-awareness* will, of necessity, be simplified. In human evolution, there came a stage when big-brained, curious hominids, having practical tools but lacking those associated with mind, took an evolutionary pathway leading to human self-awareness and awareness of “other”, perhaps as the inevitable consequence of their smartness and inquisitiveness.

This perception of one's individual existence in space and time as separate and in potential opposition to other human existence and the rest of nature would become a driving force in the evolution of the human animal (BRONOWSKI 1977; DOBZHANSKY 1964; LANGER 1982, 1972).

The beginnings of this new sense of identity may have taken place about 200,000 years ago, when our moribund *Homo erectus* ancestors, with brains almost as large as our own, appeared to be dying out of boredom. What awareness and what thoughts, beyond the dull archeological evidence, might such brains have expressed? "*Homo erectus* appeared about 1.5 million years ago, and survived until several hundred thousand years ago... The brain was enlarged, at first by about 20 percent, to 900 cc, but eventually, in late *Homo erectus*, to 1,100 cc, or about 80 percent of modern human cranial capacity" (DONALD 1991, p112). Such a creature would be capable of considerable self-awareness, as well as glimmerings of change and of time beyond the current moment (MITHEN 1996). Other primates may have some semblance of self-awareness, but human self-awareness, awareness of self in time, and the ability to represent such awareness, seems qualitatively different (DONALD 1991; BRONOWSKI 1977; LORENZ 1977). Being able to step back from what is represented confers a freedom to thought processes. This is crucial for the development of self concepts (DEACON 1997). DOBZHANSKY called this development "an evolutionary novelty; the biological species from which mankind descended had only rudiments of self-awareness, or, perhaps, lacked it altogether" (1967, p68). Preceding the development of human awareness of time and self "there arose, it seems, the need for a new, internally generated image, an executive agent to help coordinate action and thereby provide flexible responses to the unpredictable behavior of food, friend, and foe" (FRASER 1988, p489). Although this evolutionary process must have been gradual, we can imagine that receptive ancestor who, in bending down to drink from a still pond, stops and gazes at herself, consciously moves her head and hand, and becomes aware of her power to do so. She then comes to recognize that beyond this new-found self lies a larger world of other, no part of which can she move without first grasping it. She may also become aware of some change in herself. Much of this precocious awareness is likely to die with her. Some of it will be passed on. She will have some communication ability that allows her to struggle with and crudely express such awareness. That awareness would also serve the human need

FRASER describes and this too might lead hominids further in the direction of symbolic language (DEACON 1997).

There would be an iterative process involving self awareness and language acquisition. If that process begins with awareness of self, our receptive ancestor, in achieving some glimmer of it, takes a precarious step that will lead her children's children (likely, hundreds or thousands of generations later, but quite rapidly in evolutionary terms) to nascent awareness of mortality. "Self-awareness has, however, brought in its train somber companions—fear, anxiety and death awareness" (DOBZHANSKY 1967, p68). Undoubtedly, this awareness would also advance words and grammar of human language as the way to express it, as a parallel development to the earlier form of communication: calls and gestures (DEACON 1997). Evolution is unevenly slow. Human evolution seems marked by periods of "punctuated equilibrium", by certain speciation events that cause dramatic changes (GOULD/ELDREDGE 1993). There might have been many such events and changes on the road to humanhood. Imagination, and language to express its products, would parallel those changes.

Although this analogy can take us only so far, compare the awareness of mortality that would follow an awareness of self to the awareness of cold that would follow the most recent advance of ice. With increasing awareness of cold (and a less protective outer surface than hominids had during the previous ice age) would come discomfort, pain, and eventually, some disability in hunting and in other survival tasks. Initially, nothing need have been done; individuals and tribes could suffer and survive. Nature would favor traits that increase the body's ability to withstand cold. At some point in time, with increasing cold, the more successful hominids would have gone through certain adaptations of brain and behavior, would have developed sufficient smartness and dexterity to fabricate protective covering from animal skins (DOBZHANSKY 1964). Now consider awareness of mortality. With this too would come discomfort and pain of another sort, and eventually, this might lead to some disability: some apprehensive state of mind which might reduce effectiveness in hunting and in other survival tasks. As with the cold, initially, nothing need have been done; individuals and tribes could suffer with their painful emotions and survive. Here too natural selection would be at work, favoring traits that might increase the brain's ability to withstand the painful emotions, and thus, potentially debilitating fear would be reduced and those individuals

would tend to be more fit in performing survival tasks. Fear is a powerful emotion leading to adaptations for physical protection. Fear of a kind for which physical survival precautions could not be taken would require a special kind of adaptation. I suggest that with increasing awareness, the more successful hominids would have gone through such adaptations (and have been the beneficiaries of other natural forces); they would thus develop smartness and dexterity of a different kind in order to “fabricate” the protection offered by embryonic beliefs and spiritual presences. Imagination, I suggest, would be an adaptation in that evolutionary process. Further, this would tend to drive communication along the road of symbolic language. You can’t communicate religious search and discovery via calls and gestures—no matter how complex these calls and gestures might be. LANGER describes the evolution of awareness of mortality as a still incomplete process:

“With the rise and gradual conception of the ‘self’ as the source of personal autonomy comes, of course, the knowledge of its limit—the ultimate prospect of death. The effect of this intellectual advance is momentous. Each person’s deepest emotional concern henceforth shifts to his own life, which he knows cannot be indefinitely preserved... As a naked fact, that realization is unacceptable; there are few societies, savage or civilized, that admit it today” (LANGER 1982, p103).

On that long road to awareness (which we are still traveling), hominids would become aware of changes in the environment and begin to detect what they would later come to know as life cycles. They would gain awareness of a time beyond the immediate moment. DONALD, in contrasting the awareness of time in humans to that of apes, writes:

“Their lives are lived entirely in the present, as a series of concrete episodes, and the highest element in their system of memory representation seems to be at the level of event representation. Where humans have abstract symbolic memory representations, apes are bound to the concrete situation or episode” (DONALD 1991, p149).

In order to express time beyond the immediate moment, proto-humans had to have some conduit for such thought, some linguistic structure. In the iterative struggle to communicate such thought, previously developed calls and gestures indicating food, courtship, and other opportunities; predators, storms, and other dangers, this utilitarian communication would need to be extended into more conceptual domains, and into what would eventually

become symbolic language. Such shifting of communication into symbolic language would facilitate further conceptual awareness, culminating in awareness of mortality: some crude “imagining” of the possibility of one’s own death. There would now be a greater need for symbolic language, and, undoubtedly, a life and death struggle to achieve it. Although other animals have complex communicative behavior, even a simple language seems impossibly difficult. This poses a profound riddle in understanding the origin of language (DEACON 1997).

A possible answer to this riddle might be found within the developing awareness of mortality and the emergence of imagination. “Imaginative discoveries” require just such a communication device as we have—language, with its set of vocabulary and grammar for communicating the abstractions of imaginative discoveries. At a later stage: “Language and awareness of personal mortality brought with them the emergence of burial practices, rituals, and symbols related to the death experience, along with the origins of religions” (LANGS 1996, p131). “Once symbolic communication became even slightly elaborated in early hominid societies, its unique representational functions and open-ended flexibility would have led to its use for innumerable purposes with equally powerful reproductive consequences” (DEACON 1997, p349).

Accidentally and reluctantly aware early humans (such awareness, I argue, emerging as an impediment to survival) would be forced to consider first the possibility, then the likelihood, and then the yet unthinkable fact of individual death. Imagination, in its early development, although it would prove to be a vital aid in dealing with awareness of death, might also have exacerbated the awareness itself by making it more vivid: “in the evolution of mind imagination is as dangerous as it is essential” (LANGER 1982, p137). Good things hardly ever come easily or without a price tag. Imagining the possibility of one’s death was (and of course still is) an awesome and potentially debilitating awareness, a pervasive “danger” for the individual that cannot, as with specific threats to life, be guarded against. Survival now required something in addition to the satisfaction of physical needs: structures, devices, and processes, for the individual and then for the group, to ameliorate that difficult-to-live-with awareness. Initially, there might be little more than vague feelings of something wrong or threatening. At the very least this nascent awareness would lead to thoughts not conducive to happy hunting. How might that individual deal with such thoughts?

Consider the myriad of religious, social, and psychological support systems, the ability to commiserate, the diversions from morbid thoughts that have been developed throughout history, to mitigate and anesthetize that awareness (BECKER 1973; BROWN 1959; HOCART 1954). We have evolved, somehow, to function with a minimum of morbid thoughts, busy from day to day, planning for the future, and confident that we will live to see it. A human “requires ‘understanding’ not only of his world of survival, but eventually of the immaterial world of thought that is the creation of the increasing complexity and subtlety of his own process of cognition” (LAUGHLIN/MCMANUS/D’AQUILI 1990, p242). By communication and demonstration, we pass on “immaterial world of thought” survival supports to our children, as they become aware of self and death (DONALD 1991; LANGER 1982). Newly aware hominids would have lacked such supports, lacked the linguistic ability to communicate and commiserate, and hence, would have less confidence and less ability to function in survival tasks than they had before.

That you and I will die is as plain as the proverbial “nose on your face”, and as difficult to look at. To avoid damaging that cognitive inner eye, we tend to look at our death much as we look at the sun: peripherally. As with the near impossible act of putting our hand into fire so as to feel the heat, we face the near impossible act of putting our thoughts into death so as to “feel” it. Indeed, we go to great lengths to avoid such activities. BECKER shows us that the entirety of human psychology is rooted in a massive attempt at denial of death. As he describes the difficulty; “the fear of death must be present behind all our normal functioning, in order for the organism to be armed toward self-preservation” (BECKER 1973, p16). A growing body of terror management theory suggests that “the most basic of all human motives is an instinctive desire for continued life, and that all more specific motives are ultimately rooted in this basic evolutionary adaptation” (PYSZCZYNSKI/GREENBERG/SOLOMON 1997, p1), and that, over thousands of years, culture has developed to manage the existential terror brought on by awareness of mortality. “But the fear of death cannot be present constantly in one’s mental functioning, else the organism could not function” (BECKER 1973, p16). There are aspects of our individual death that we dare not look at and other aspects that we cannot look at. For example, try to imagine yourself dead; where would the *you* who is looking be? There seems to be no place from which this “imagining” could be emanating (FLEW 1993). We are able, through most of our lives, to put

aside our individual death, to act as if *it* were not there, or as if we might change the reality of its existence in good time. Indeed, there are diverse human-devised systems that allow us to do so, elaborate systems of belief in some continuity of existence after death, and simpler systems involving ways of looking at “reality” so that “the finality of death does not exist at all” (HOCART 1954, p87). Our imagination is well designed to make use of such systems to redirect our morbid thoughts and our unpleasant sensations. We seem quite able to countermand the external senses when this suits our purpose, to alter sensory information and thus *revise* the world that would otherwise be seen, heard, and touched (KOESTLER 1964). “Mental images have the power to affect us in many of the same ways as our perceptions of reality. Consequently, our imaginations can afford us a means of experiencing loss and then being able to rejoice in still having the ‘lost’ object” (VICKIO 1994, p611).

In “Can the Subject Create His World?” METZGER gives an historic overview of ideas suggesting that the world, or some significant part of it, is created by mental acts. He is interested in perception rather than imagination, and he concludes that “perception is not a way of adding new facts to the world—this is the task of art and invention—but to find what there is before perceiving begins, which has not yet been found by the present perceiver” (METZGER 1974, p67). Part of what there is that has not yet been found is in the task set for imagination; perception and imagination coexist and function simultaneously. No other animal has developed such ability to willfully embellish sensed information, to perceive that which is not sensed, to deny that which is, to fantasize, to hallucinate, or to imagine things that have never existed and things that may never exist; no other animal has the linguistic ability to communicate such things. No other animal has shown the need for it; indeed, for others, these abilities would be impediments to survival. Other animals might, for survival purposes, behave so as to deceive others. Only humans seem capable of self-deceptive images, since only humans have evolved with *imagination*: reality-distorting input to the brain and nervous system. Examples of intentions in the literature of human self-deception include: avoiding pain and painful reality, evading trauma, and seeking comfortable beliefs (MARTIN 1997). All these would apply to newly aware-of-death hominids who had the nascent imagination with which to achieve such self-deception. The senses and nervous system of higher animals, including humans,

function to supply the brain with accurate information for survival. Our external senses act as hunters, perceiving as well as sensing the environment for accurate information (GIBSON 1966). At that stage of human evolution “when our early ancestors first noticed the images in a pool of water, or the shadows of things, and especially when they began to make pictures, we may fairly assume that they became puzzled about the problem of appearance and reality” (GIBSON 1966, p310). If we look at a field and “see” a fish moving across it, our control center, in effect, signals our eyes to look again; perhaps the field is a lake or pond. Or, if it remains a field, perhaps the fish is a rodent or some other land animal. (A similar example could be given for what our ears might hear.) I suggest that our internal senses developed to act as hunters of a different kind: rather than for accurate information, they hunt for that which is acceptable, and “meaningful”. If they report a “senseless” presence or voice, an embellished memory, such a report might well be acceptable and even welcomed. Although “senseless”, it might “make sense”. It would be particularly welcomed if such a presence had been sought. But since our external and internal senses function simultaneously, it is not always clear what kind of information and experiences they (we!) are hunting for. STADDON and ZANUTTO refer to examples “of organs evolving (often not very efficiently) from one function into organs that serve a very different one” (1998, p241). In the case of the brain with its sensors, one can consider the organ to have retained its original function while taking on the added function of imagination. How might such conflicting functions of the human brain have evolved?

The Prehistoric Background

Although there is little clear evidence for how “*Homo religious* and Its Brain” evolved, (HOLMES 1996, p441), we do know quite a bit about how pre-religious brains evolved, how new structures grew around older ones, and how animals housing larger brains grew smarter in processing information from their environment. But such informational smartness, nuts-and-bolts-survival smartness, need not lead to, and certainly does not explain, the development of human imagination and such things as spiritual experiences; *they* are different kinds of *things*. Humans, together with the evolution of bigger and smarter brains, obviously useful in the struggle for survival, evolved with an addition to that system: a companion device whose usefulness

is not obvious (DONALD 1991; MITHEN 1996). It is a device that gained awareness of itself and its fate, and then developed structures and processes: conceptual thought and symbolic language, to bear the weight of that awareness, to make sense of the world, to discover “meaning” in it, and hence, to make fragile, finite existence more bearable (LANGER 1982). Humans use them to ascribe “purpose” to a seemingly indifferent environment, to ameliorate frightening sensory information, to countermand unacceptable empirical evidence, and to create an altered image of the world which is then stored as mental images of what is not actually present, of what has not been actually experienced (LORENZ 1977; LANGS 1996).

Before gaining imagination, the actions of our ancestors were, undoubtedly, operant behaviors, responses to stimuli that operate on the environment. DENNETT calls such lower-order animals, creatures susceptible to operant conditioning: *Skinnerian Creatures* (1995, 1978). In time, our ancestors developed the ability to learn about the environment in ways far beyond mere trial and error behavior. DENNETT speaks of creatures like ourselves that “have *two* environments, the outer environment in which they live, and an ‘inner’ environment they carry around with them... we are talking of the evolution of (inner) environments to suit the organism, of environments that would have survival value in an organism” (1978, p77). DENNETT further explains: “the inner environment is simply any internal region that can affect and be affected by features of potential behavioral control systems” (p79), an environment in which advanced creatures ask, “what they should think about next” (1995, p378). Having such an inner environment, hominids, as they evolved towards human self-awareness, observing the violent end of a young comrade, the weakening and deterioration of an older one, the long sleep without an awakening, from all this, a new kind of behavioral response would begin to emerge. There would be a need for new and different survival adaptations. As awareness emerged, perhaps in dreams, first the gnawing feeling, then the shocking thought, must have taken hold: “This may happen to me”. Later, the more awesome extension of thought: “Death is a common happening. This *will likely* happen to me”. A less dramatic but quite likely scenario is that proto-humans came to that thought gradually over generations of increasing melancholy, moving toward depression, encountering death with a growing awareness of mortality and a feeling of helplessness. They would look at dead comrades and feel some-

thing bad, dangerous, even ominous, without knowing just what or why. They might have been prey to psychosomatic illness while in the very process of developing psyche! They might engage in unproductive searches for the cause of their feeling the physical presence of something bad or dangerous, the cause of this new kind of fear.

“Evolution has bred into the members of every animal species a rate of production of fear which corresponds to the average degree of endangerment in which the species must live and survive” (LEYHAUSEN 1973, p254). With most animals, production of fear is limited to present dangers: dangers that can be guarded against. Some animals are faced with incessant danger:

“An animal of this kind can better afford to go without food or sleep for a whole day or even longer, or to miss a mating, than to relax its constant alertness for five minutes... As long as the endogenous production of fear roughly matches actual endangerment and the overall harmony of the instinct system which has been won in the process of evolution is maintained, then for the organism concerned this is only right” (LEYHAUSEN 1973, p254).

Constant alertness could not be “right” for humans faced with nascent fears of dying, even if its initial negative effects were minimal. Human survival was already precariously balanced (MITHEN 1996). Natural selection could not provide any state-of-the-art flight or fight adaptation. Some adaptation quite new in nature was required if the species was to survive. Indeed, only one species, of those who might have had nascent awareness of mortality, perhaps the only one to develop imagination, did survive.

Of such fear and “subjective emotional experiences” LEYHAUSEN speculates: “the relationship between the propensities or instincts of fear and the experience of fear as seen from the view of the ethologist are unavoidable... in part still hypothetical and insofar represent an appeal for the development of a research program designed to test them” (1973, p255). In regard to genetic differences, from atrophy to hypertrophy of fear:

“If hypertrophy has affected the production of fear, we get the whole range from the overfearful to the serious case of anxiety neurosis, where the minimum level of the automatic production of fear has shifted considerably farther ‘upward’ and thus does not fall victim to atrophy from disuse even when there is a complete lack of adequate releasing situations. The person affected is therefore constantly under pressure from the strongest appetences for fear,

looks for and finds a ‘substitute object’, and since this is, of course, not the real cause of his fear, in this instance no habituation to stimulus or decline in stimulus-specific sensitivity can set in” (LEYHAUSEN 1973, p267).

Over generations, with increasing awareness of changes and then a glimmering awareness of time itself, individuals must have struggled with increasing nonspecific fears before grasping the specific (if yet unthinkable) fear: “Death can happen to me”. Such nascent feelings and thoughts may have occurred in many forms before taking root in the soil of mind as a specific fear of death. Earlier, an individual sense of life would be somewhat diffuse and impersonal: not strongly felt as a single being (LANGER 1982). Gaining self-awareness, the individual would gain an increasingly specific fear of death of self. Full awareness of a personal death is still evolving as we enter the 21st century. In the early stages of its evolution, neurological structures and language to express such thought, as well as the thoughts themselves, most likely would develop in parallel: the need and the adaptation to serve that need.

There are many aspects of this growing awareness that must be considered here. For one, human groups during the periods considered here were small: some few dozen individuals (perhaps as many as ten dozen) living together as sub-groups sharing a common space (MITHEN 1996). Bonds of friendship would tend to be strong; individuals would be mentally as well as physically important to each other. Picture now, as awareness was developing, one of a myriad of events: the death of one individual after some period of suffering, with the others trying to give aid. The dead body likely would be salient for some time before burial or other disposal. The others would struggle to come to terms with the event. Two comrades might share looks, tears, and moans; they might then, somehow, create a way of remembering and communicating their sharing the event. In time there would be a symbolic representation of the event that would be stored in nascent memory and retrieved later, around some similar event. I suggest that, in the iterative process, the development of imagination and its cultural expression would be advanced. In considering how you and I differ from our ancestors in facing death, these two matters should be considered first. We do not often look on death; we have language to share, culture and imagination with which to filter thoughts when we do look. There are comforting religious beliefs, but even for those who reject such, there are cultural supports to lean on.

Considering the controversy over the respective roles of genes and memes in evolution (BOONE/SMITH 1998), a useful analogy with the development of imagination may be that of the development of fire. There is the matter of creating the initial sparks for ignition: genetic, and then the matter of fuel to expand and keep it going: social-cultural material. With regard to my thesis here, both the initial spark of awareness of the problem of mortality, and the initial spark of imagination offering a "solution", would seem, of necessity, to be genetically based. By one or another sudden variation or more gradual change to that part of the brain beyond my knowing, imagination would begin with a genetic spark. Given that spark, the "fuel" would come from the need and social-cultural material at hand.

With a growing awareness of mortality, I suggest, would come debilitating apprehension. In order for those individuals to function and survive, that awareness, as with current mortality awareness, would need to be managed (PYSZCZYNSKI/GREENBERG/SOLOMON 1997). Such awareness would tend to be most debilitating for a creature lacking even the ability to commiserate with others: the linguistic ability to express such apprehensions. I suggest that it was such social needs, more than any direct survival need, which led and sped the evolution of those mental processes we loosely call "mind", partly individual in nature and partly communal processes: evolution of individual structures and abilities, as well as complex social organization. "Knowledge of the inevitability of death gives rise to the potential for paralyzing terror which would make goal directed behavior impossible" (PYSZCZYNSKI/GREENBERG/SOLOMON 1997, p2). How could an increasingly smart but bare-brained creature lacking cultural support come to terms with the emerging sense or feeling that he or she, as all others in the tribe, might die? FREUD in considering this question writes, "what primitive man regarded as the natural thing was the indefinite prolongation of life—immortality. The idea of death was only accepted late, and with hesitancy. Even for us it is lacking in content and has no clear connotation" (FREUD 1950, p76). The human senses were well-equipped to sense and perceive the natural world, the local environment in which to hunt and gather, to find a place to sleep secure from leopard and other predators. But how were early humans to secure themselves from this most pervasive and awesome predator? Undoubtedly, from its first glimmer, it would be a problem they would focus on. During the long hours of night, awake and in dreams, there would be few if any more vital matters

of thought. How were they to avoid that sleep without end, that change of warm and vital flesh into something cold and unresponsive? Dead bodies would be salient; death itself, quite likely would be viewed as something caused by unseen predators. Nothing appeared in the sensed environment that offered a defense against these predators, nothing that the brain and its information sensors could discover. Another sensor was needed to look beyond the others, to perceive a more distant or hidden world that might offer such defenses. Needed too was the ability to share perceptions of such a world with others in the tribe, and hence, a brain with long term memory devices for storing the products of imagination.

The human brain reached 80% of its current volume about 200,000 years ago, after a 300,000-year spurt of growth (DONALD 1991; MITHEN 1996). Archaeologists can find no major change in the archeological record correlating with this second period of *Homo erectus* brain expansion; the same basic hunting and gathering lifestyle continued, with the same limited range of tools (MITHEN 1996). Thus, the first expressions of what we can identify as products of human imagination (about 70,000 years ago) occur much after the last major brain expansion. I suggest that it was in the period between 200,000 and 70,000 years ago that fear of death had reached a stage where it might have negative impact on human survival. The brain housing that fear would surely be large enough to store the products of imagination. At this stage of awareness, individuals with feelings of apprehension and an inability to deal with the perceived danger, would tend to be less fit in hunting, would be less willing to take the risks necessary for success, and would lose their leading edge in the struggle for survival. Fear involving those dangers that can be guarded against has survival value (LEYHAUSEN 1973). Fear of impending death, anxious feelings of foreboding, would tend to immobilize, and must be considered to have negative survival value. As well as individuals, entire tribes with such fear might experience higher mortality. If so, natural selection might start selecting for survival in an extraordinary way. It would not simply be those individuals and tribes who had the best physical equipment for adapting to changing environments who would prove the fittest for survival. Instead, it would be those who developed, along with physical equipment for use in hunting and gathering of food, imagination and other mental equipment for use in dampening the debilitating effects of this growing awareness and fear.

The Darwinian Dilemma

In considering natural selection and the human mind, a difficult problem for DARWINISM has been this: given that a utilitarian, unconscious brain is good and sufficient for processing sensed information and using it for survival tasks, what evolutionary pressure, what survival advantage, can be associated with sensory distortion and conscious mind? What were the stages of evolutionary transition leading to the human mind?

“The task of reconstructing the steps through which humans must have passed in their evolutionary transition is so difficult that many have chosen to ignore the problem. One extreme approach, which some may take as a counsel of complete despair, is to proclaim a discontinuity in evolution when it comes to the human mind” (DONALD 1991, p21).

DONALD goes on to elaborate the problems. “No convincing geographic or climactic conditions could have produced enough selection pressure to account for the emergence of modern humans. Hominid culture was already able to cope with a variety of climates. Although climate may have played some role, other forces must have been at work” (p209). DONALD then suggests that “the evolution of humanity is likely to have been driven at the level of cultural change” (p209). But why? “What change could have broken the constraints on mimetic culture with such a vengeance, leading to the fast-moving exchanges of information found in early human culture” (p211)? Materialists have not been able to explain this evolutionary transition. As SEARLE describes it, “materialists have a problem: once you have described all the material facts in the world, you still seem to have a lot of mental phenomena left over. Once you have described the facts about my body and my brain, for example, you still seem to have a lot of facts left over about my beliefs, desires, pains, etc” (1997, p43). At least some of these left over facts are accounted for via a God-seeking mind.

“The mind is almost as hard to define as the soul”, writes JONES. As he describes the confusion within psychological theories of the mind, “it has gone from describing varieties of religious experience to censuring them, from phrenology to scanning brain and DNA, and at last—coming full circle—to explaining belief in DARWINIAN terms. Psychology is a journey from the arts to the sciences and back again” (JONES 1997, p13). On such a journey, I suggest, there is an evolutionary “bridge” to be found connecting imagination and religious behavior to the rest of

adaptive behaviors. Neither anthropologists nor evolutionary psychologists have put forward a viable theory that shows why imagination and conscious distortions of sensory experience might have been more adaptive than the mindless utilitarian brain that predated them. “The brain is the ultimate lying machine” (JONES 1997, p13). Why should natural selection favor such a machine: in particular, why should it favor something that distorts reality, and hence, lies to itself? Further, nature tends to be lavish. If mind is a good survival device, why don’t we find it elsewhere? Why are there no precursors of mind to be found in the rest of the animal world? (DEACON 1997; DONALD 1991; LORENZ 1977). These questions have been thorns in the side of evolutionary explanations of mind. One problem has been to explain natural selection’s favoring of structures unexpressed in overt behavior: consciousness, imagination, and also, quite prevalent if not universal among early *Homo sapiens*, schizophrenia. Could schizophrenia, which (JAYNES 1976) suggests to be a vestige of ancient mind, have come into being as an adaptation for sensing spiritual guidance, and for finding a guiding spiritual voice? Looked at in terms of physical survival, these inner devices would be disadvantageous. What survival advantage could there be in fantasizing and in distorting reality? Steven PINKER suggests that we need not bother with such difficult or impossible to answer questions. He says that “we should expect to find activities of the mind that are not adaptations in the biologists’ sense. But it *does* mean that our understanding of how the mind works will be woefully incomplete or downright wrong unless it meshes with our understanding of how the mind evolved” (PINKER 1997, p174).

Just so. I argue that these questions can be answered: not only how the mind works, but why. I suggest that long before discovering grain and settling in the fertile crescent to harvest it, humans had reached an evolutionary stage where “not by bread alone” was the *modus operandi*. A stage was reached where, driven by the search for supernatural support, mental considerations began to play a role in human survival, sometimes in opposition to physical considerations. Humans might, on occasion, decide to go hungry, to do (or not do) something which then resulted in hunger. They might, with the development of magic or religious belief, decide to fast, to ritualistically sacrifice food, to suffer hunger, for the sake of their mental well-being, which had come to be an important part of their total well-being and of human survival.

PINKER titles a section of *How the Mind Works*, “The Smell of Fear”, in which he lists ancient and still common fears: snakes and spiders, and “large carnivores, darkness, blood, strangers, confinement, deep water ... The common thread is obvious. These are the situations that put our evolutionary ancestors in danger... Fear is the emotion that motivated our ancestors to cope with the dangers they were likely to face” (PINKER 1997, p386). In this he lumps human fears with those of other animals. He does not distinguish “of mice and men”, of that human apprehension put forward in Robert BURNS poem *To a Mouse*; “The present only toucheth thee; But och! I backward cast my e’e, On prospects drear! An’ forward, tho’ I canna see, I guess an’ fear!” PINKER does not mention apprehensions: fear of future sickness or future death, fears not based on current dangers. He speaks of phobias, many of which, he suggests, we share with other animals. “The world is a dangerous place, but our ancestors could not spend their lives cowering in caves” (PINKER 1997, p388). True. But shouldn’t an overview of how the mind works include human apprehensions?

Fear of eventual death, fear of dangers not in the workable environment, fears which could only be offset by imagined sources of protection, these fears only can be disadvantageous and potentially debilitating to the individuals lacking imagination. There is nothing “right” that they can do under those circumstance, but there is much they can do that is wrong for their survival. There are innate functional properties of the phenomenon of fear which evolution delivers ready made; “the individual must accept them as he must the form of his cranial bones... actively avoiding or fleeing from dangers offers the individual better prospects of survival than passivity. It does, however, also contain the possibility of doing the wrong thing” (LEYHAUSEN 1973, p250). The functional properties of human fear, of course, were and are highly complex in nature, and beyond the scope of this paper. One large topic, untouched here, is the relationship between fear and aggression (BECKER 1973; LEYHAUSEN 1973). However, it does seem reasonable to conclude that for the hominid lacking imagination, fear of an unavoidable danger, would surely increase the possibility of his doing the wrong thing—which, in the instance of a devitalizing fear, would include doing nothing in a situation that calls for action.

There have been some five million generations in the evolution of primates, increasingly aware of themselves as prey, and developing neurological structures to increase their security. Consider *Homo*

sapiens, late in that stage of evolution, when, superimposed on those structures for security, there developed apprehensions, an awareness of mortality and an awareness of themselves as a kind of prey for which there seemed no way to increase security. Without the power of imagination, such awareness, I suggest, would be an impediment. Individuals encumbered with fears for which precautions could not be taken would be less successful. I suggest that an individual with such apprehension would be more hesitant in hunting big game, and less willing to take the necessary risks. The individual beginning with such fear would be less fit in making a living. The hunter who starts out hungry but apprehensive would tend to be less successful than one who starts out merely hungry. In the aggregate, entire tribes of such hungry but fearful hunters would tend to be less successful. What adaptation could be developed in response to such fear? Who would now be fittest to survive? Natural selection might favor “lesser-brained” individuals who, still secure in their ignorance, lacked awareness of impending death. Instead, a genetic spark might somehow appear, natural selection might somehow “stumble upon” a brain companion of sorts: a device or process whose function would be to hunt out, via images, ways and means of mitigating the debilitating fear.

The Language of Imagination

Symbolic language ability would undoubtedly be a necessary part of in this new kind of “hunting”. Utilitarian communication, complex calls and gestures for use in hunting, most likely long predated this stage of evolution (DONALD 1991; MITHEN 1996). With awareness of mortality, the task for newly developing thought and language would be to make death livable, to formulate mitigating conceptions around death that would become the precursors to magic and religion and also to imaginative stories. These would be impossible tasks for communication systems based on calls and gestures (DEACON 1997). Via imagination, perception of the external world could be altered. Via stored images and symbolic expression of thought, apprehension of death could be ameliorated (HOCART 1954). What better way to spend countless generations of long cold nights, countless winters of discontent, than around the warmth of the communal fire, struggling to discover ways to make the newly experienced fears bearable? Perhaps there was something within the body that did not die. Per-

haps there were spirits (or demons even) who controlled such life. We can sense the struggle with such questions in the early expressions of art, the search that would lead to a variety of “answers”, some of which might also be terrifying. Spirits, even demons, no matter how terrifying, would be less terrifying than death itself (HOCART 1954). As fire was used to ward off the leopard, spirits might be used to ward off death, or to provide another life. Those individuals or tribes armed with such protection against death might be more willing to take the risks necessary for a successful hunt. The spirits might indeed inspire individuals to hunt more courageously than before. Who in the five thousand years of recorded history has been more courageous in situations requiring courage than those inspired by spirits or gods?

To look at a world beyond that which is sensed, in “mythic modes”, requires that aspect of imagination which in literary theory is known as “suspension of disbelief”: a willingness to suppress doubt (DONALD 1991). Suspension of disbelief, I suggest, is similar to an older use of imagination necessary in order to reconfigure the world to accommodate spirits associated with the dead. The mere telling of stories would make long winter nights less monotonous, but that would hardly drive natural selection towards the adaptation of human imagination. *Homo erectus*, quite likely, lived a million years in such monotony, bored, perhaps, but genetically successful. The storytelling would need to be driven by matters of life and death. DONALD shows life and death mythic constructs to be among the oldest of human inventions:

“Even in the most primitive human societies, where technology has remained essentially unchanged for tens of thousands of years, there are always myths of creation and death and stories that serve to encapsulate tribally held ideas of origin and world structure... These uses were not late developments, after language had proven itself in concrete practical applications; they were among the first” (DONALD 1991, p213).

In discussing the prime uses of language, DONALD adds: “Initially, it was used to construct conceptual models of the human universe. Its function was evidently tied to the development of integrative thought—to the grand unifying synthesis of formerly disconnected, time-bound snippets of information” (p215). To integrate and express life and death thoughts requires that language we now associate with imagination and mind activity. Such thought and such use of language would, I suggest,

from its beginning, intertwine with utilitarian communication, and with the older form of calls and gestures. Once in place, imaginative mind processes would function alongside those of utilitarian brain in human communication, along a continuum from purely sensory expressions to those that are inner directed and conceptual. We see such in current communication, in a continuum from work-related statements, questions and commands, where accuracy is required, to those in religion and poetry, where ambiguity is acceptable and even encouraged. Also intertwined with such expressions of thought in human communication are certain “pseudo-symbolic structures... emotions, feelings, desires. They are not symbols for thought, but symptoms of the inner life, like tears and laughter, crooning, or profanity”, (LANGER 1957, p83). These structures too, I suggest, would evolve alongside the emerging human mind, to express the fear, the apprehension, and later, the joy and other good feelings involved in the new search and discovery process.

Consider that era in prehistoric time when awareness of self and of death-of-self first emerged and found expression. Before this time, the essential role of language would be to communicate as accurately as possible: danger and opportunity, sighting of a predator, sounds of an antelope herd, where food was to be found, when and how to secure it, who should perform the various tasks involved. Plain, concrete, unambiguous communication was needed for success. The payoff was meat or plants that safely could be eaten. With hunting–gathering of information relating to the dead, with tasks related to spiritual well-being, the role of language and pseudo-symbolic structures would be to communicate these thoughts and emotions: death-mitigating ideas and fears, in such a way that belief systems could be built. The payoff was an effective spirit or a god that could be believed in.

Natural selection would favor individuals who “successfully” came to terms with death: who used their emerging minds to find ways of making death bearable. Imagine that stage in evolution when *Homo sapiens* first became aware of the frightening mystery of non-accidental death, of fatal illness, of an aging process toward certain death. Lacking knowledge of disease, they might have feared that death itself might be contagious (LANGER 1957). From their own terrible dreams they might have looked at a dead comrade and wondered as Hamlet wondered; “in that sleep of death what dreams may come?”

“To the dreamer dreams can be just as real, just as rich in experience. Is the world perhaps only a dream? Thoughts such as these must have struck with overwhelming force the man who had just emerged from the twilight of an unreflective, ‘animal’ realism, and it is understandable that, beset by such doubts, he should turn his back on the external world and concentrate his whole attention on the newly discovered inner world” (LORENZ 1977, p15).

The origin of spiritual belief in connection with death is to detach the survivors’ memories and hopes from the dead (FREUD 1950). What “tools” might be found or made to “reshape” death? Those who had the ability to think such questions were on their way to answers. Early humans who developed rituals to mourn the dead, and then developed magic or religion to make the apprehension of death “bearable”, would function better: would tend to be less debilitated by fear of death, as individuals and in community. The foundation of all ritual is that one cannot do it alone. The individual cannot impart life to himself; others: human or superhuman, are needed (HOCART 1954, BECKER 1975).

Natural selection might have favored altruism: such behavior might have had an evolutionary component—favoring those tribes, as well as those individuals within the tribe, who demonstrate altruistic behavior. “There is ample evidence that humans cooperate with people to whom they are not closely related—more so than for any other species... Humans, however, have evolved dispositions to cooperate or compete that take their cues from the actions of other individuals” (SULLOWAY 1998 p38). In a similar way, natural selection might then favor tribes as well as individual members who, having come to the realization that everyone, including themselves, dies, developed the ability to make death bearable—for the tribe as well as for themselves as individuals. Natural selection would then favor those with the ability to imagine and explain, to create and socially share ways of making death bearable. Ultimately, they would search for and find spirits and gods. Memory: stored imagination, would now get to be a communal process, a unique social process for preserving “the meat” hunted down by individual imaginations. Our ancestors, hunting for game with their appetites set on finding antelope meat, might have to settle for lesser game, or even for vegetation that merely took the edge off their hunger. These ancestors, hunting for spirits with their minds set on finding one that could awaken the dead, might have to settle for a lesser god, or even for vaguely sensed spirits that merely offered hope.

Conclusion

All societies, in their rituals and beliefs, have transcended the reality of what their senses and experiences reveal about human death (BECKER 1973; BROWN 1959; HOCART 1954). This is true even of societies where the people deny that such death has occurred (LANGER 1957; 1982). It is also true of Buddhists, who have no God or belief in afterlife. Buddha left these matters sufficiently equivocal to allow beliefs that transcend the sensed reality and even those that “abolish” death (HOCART 1954; SMITH 1958).

The essential difference between human brains and those of other animals, the difference which I believe led to other differences, lies in imagination: an adaptation which enabled humans to wrestle with the one set of problems which no other animal has had: a problem originating with human awareness of self, and then, some shrouded awareness of impending death-of-self, and finally, the problem of how to make that awesome awareness bearable. Early *Homo sapiens*, to the extent they lacked imagination and culture built on imagination, would also lack the individual and collective support systems we now have in place to make such awareness bearable. Modern minds, drawing from past cultures, have developed abilities to keep conscious thoughts of mortality separate from day-to-day business thoughts. Thus we have learned to live and function in pockets of immortality (MONTELL 1999, 2001). We go to work each morning, wrapping ourselves in a mantle of immortality, the fabric of which is sewn in a series of plans and activities we “know” will be executed; we will not die today; we have no thought of it. Intellectually, yes: we are aware of possible mishap. Practically, no: we have developed mechanisms and processes that allow us to function day to day, week to week, and beyond, as if we were immortal. Early *Homo sapiens*, newly aware of their mortality and fearful, lacking such mechanisms and processes, would expend precious energy in a state of unproductive alertness and anxiety, and would function less well in an already precariously balanced existence.

Nature would provide the mechanisms and processes of imagination. Nurture of the human spirit would lead to the rest: untold years of development, recorded over the past five thousand years. Beyond our brief individual struggles, living under the edge of awareness of mortality, we’ve had long years as a species, surviving and even flourishing under this sword of Damocles nature has set for us. Intention-

alists might suggest it to be a two-edged sword: that essentially remorseless nature also has expressed some other quality by giving *Homo sapiens* the edge of imagination with which to shape religious behavior and perceptual realms of immortality—and to re-shape “the self”.

For perhaps the first time in human history, there is now a significant community of materialists who are facing the hard empirical evidence with regard to human life and death, without imaginative extensions of that evidence. The potential impact of this reversal of imaginative thought with regard to “the self” has barely been touched on in public discussion. EINSTEIN felt that “*the true value of a human being is determined primarily by the measure and the sense in which he has attained liberation from the self*” (1954, p12). However, this value system remains largely unexplored. This expression of EINSTEIN’S mind must be viewed against the backdrop of some five billion minds that, in some form, are chained to traditional religious beliefs and to the ancient self of which EINSTEIN speaks. Each of these minds has a survival need.

Human survival is, in and of itself, a dual affair. There is all that we do that, in form, is just as any other animal does in making a living. There is also and-not-by-bread-alone behavior, survival behavior that distinguishes us from all other animals. There

are psychological states, apparently unknown to other animals, in which life seems impossible or not worth living. In such states, although the body may be healthy, humans die: the mind dies, or the self commits self-slaughter—well named since it is only for the aware self that life has become impossible. The animal part (if only the self could be severed) could—and sometimes does—survive. These psychological states are imaginative states but they are as vital as the bodily states. If one accepts the logic of this dualism: animal survival and not-by-bread-alone survival, then science, in its search for human origins, must continually look beyond stone tools, economic forms, and other evidence of smart brains engaged in making a living, to the imaginative aspects of human presence, difficult though these may be to detect with hard evidence. I suggest that these imaginative aspects evolved to engage in a unique struggle based on unique awareness humans had—and have—of their environment. We are witnessing the current dynamics of that struggle.

Much of my argument here is conjecture, with some of it beyond the possibilities of unearthing hard evidence. For that, I appeal to the reader’s mind to join mine in this exploration of the roots of imagination. I hope to encourage, in the biological and behavioral sciences, further investigation of the role of imagination.

Author’s address

Conrad Montell, Diablo Valley College,
3150 Crow Canyon Place, San Ramon, CA,
94583, USA. Email: cmontell@attbi.com

References

- Becker, E. (1973) The denial of death. The Free Press: New York.
- Becker, E. (1975) Escape from evil. The Free Press: New York.
- Beres, D. (1960) Perception, imagination, and reality. The International Journal of Psycho-Analysis 41:327–334.
- Boone, J. L./Smith, E. A. (1998) Is it evolution yet? a critique of evolutionary archaeology. Current Anthropology 39:141–173.
- Bronowski, J. (1977) A sense of the future. The MIT Press: Cambridge MA.
- Brown, N. O. (1959) Life against death: The psychological meaning of history. Vintage Books: New York.
- Chaplin, J. P. (1985) Dictionary of psychology. Dell Publishing: New York.
- d’Aquili, E. G./Newberg, A. B. (1998) The neuropsychological basis of religion, or why God won’t go away. Zygon: Journal of Religion and Science 33:187–201.
- Deacon, T. W. (1997) The symbolic species: The co-evolution of language and the brain. W. W. Norton & Company: New York.
- Dennett, D. C. (1978) Brainstorms. Bradford Books: Cambridge MA.
- Dennett, D. C. (1995) Darwin’s dangerous idea: Evolution and the meanings of life. Touchstone: New York.
- Dobzhansky, T. (1964) Heredity and the nature of man. The New American Library: New York.
- Dobzhansky, T. (1967) The biology of ultimate concern. The New American Library: New York.
- Donald, M. (1991) Origins of the modern mind: Three stages in the evolution of culture and cognition. Harvard University Press: Cambridge MA.
- Drever, J. (1964) A dictionary of psychology. Penguin Books: Baltimore.
- Eccles, J. C. (1989) Evolution of the brain: Creation of the self. Routledge: London.
- Einstein, A. (1954) Ideas and opinions. Crown Publishers: New York.
- Flew, A. (1993) Atheistic humanism. Prometheus Books: Buffalo.
- Fraser, J. T. (1988) Time: Removing the degeneracies. In: Blum, H. P./Kramer, Y./Richards, A. K./Richards, A. D. (eds) Fantasy, myth, and reality. International University Press: Madison CN, pp. 481–501.
- Freud, S. (1950) Totem and taboo. W. W. Norton: New York.

- Gibson, J. J. (1966)** The senses considered as perceptual systems. Houghton Mifflin: Boston.
- Goldstein, L./Connelly, M. (1998)** "Teen-age poll finds support for tradition". The New York Times. April 30, p. 1.
- Gould, S. J./Eldredge, N. (1993)** Punctuated equilibrium comes of age. *Nature* 366:223–227.
- Hocart, A. M. (1954)** Social origins. Watts & Company: London.
- Holman, H. C./Harmon, W. (1992)** A handbook to literature. Macmillan Publishing Company: New York.
- Holmes, R. (1996)** Homo religious and its brain: Reality, imagination, and the future of nature. *Zygon: Journal of Religion and Science* 31:441–455.
- James, W. (1936)** The varieties of religious experience. Random House: New York.
- Jaynes, J. (1976)** The origins of consciousness in the breakdown of the bicameral mind. Houghton Mifflin: Boston.
- Jones, S. (1997)** The set within the skull. *The New York Review of Books* 44(17):13–16.
- Koestler, A. (1964)** The act of creation. Dell Publishing: New York.
- Langer, S. K. (1957)** Philosophy in a new key. Harvard University Press: Cambridge MA.
- Langer, S. K. (1967)** Mind: An essay on human feeling (I). The Johns Hopkins University Press: Baltimore.
- Langer, S. K. (1972)** Mind: An essay on human feeling (II). The Johns Hopkins University Press: Baltimore.
- Langer, S. K. (1982)** Mind: An essay on human feeling (III). The Johns Hopkins University Press: Baltimore.
- Langs, R. (1996)** The evolution of the emotion-processing mind. Karnac Books: London.
- Laughlin, C. D./Mcmanus, J./d'Aquili, E. G. (1990)** Brain, symbol & experience: Toward a neurophenomenology of human consciousness. Shambhala Publications: Boston.
- Leyhausen, P. (1973)** On the natural history of fear. In: Lorenz, K./Leyhausen, P. (eds) Motivation of human and animal behavior: An ethological view. Van Nostrand Reinhold: New York, pp. 248–71.
- Lorenz, K. (1977)** Behind the mirror: A search for a natural history of human knowledge. Harcourt Brace Jovanovich: New York.
- Martin, M. W. (1985)** Self-deception and self-understanding. University Press of Kansas: Lawrence KS.
- Martin, M. W. (1997)** Self-deceiving Intentions. *Behavioral and brain sciences* 20:122–123.
- Metzger, W. (1974)** Can the Subject Create His World? In: Pick, H. L. Jr. (ed) Perception: Essays in honor of James J. Gibson. Cornell University Press: London. pp. 57–71.
- Mithen, S. (1989)** Evolutionary theory and post-processual archaeology. *Antiquity* 63:483–94.
- Mithen, S. (1996)** The prehistory of the mind: The cognitive origins of art, religion and science. Thames and Hudson: London.
- Malhotra, A. K. (1997)** Sartre and Samkhya-Yoga on self. In: Allen, D. (ed) Culture and self. Westview Press: Boulder CO, pp. 111–128.
- Montell, C. (1999)** Creative imagination: Evolutionary theory's recalcitrant problem child. *Psychological Inquiry* 10:342–343.
- Montell, C. (2001)** Speculations on a privileged state of cognitive dissonance. *Journal for the theory of social behaviour* 31:119–137.
- Parrinder, G. (1984)** World religions from ancient history to the present. Facts On File Publications: New York.
- Persinger, M. A. (1987)** Neuropsychological bases of god beliefs. Praeger: New York.
- Philippe, J. (1903)** L'image mentale (evolution et dissolution). Alcan: Paris.
- Pinker, S. (1997)** How the Mind Works. W. W. Norton: New York.
- Pyszczynski, T./Greenberg J./Solomon S. (1997)** Why do we need what we need? A terror management perspective on the roots of human social motivation. *Psychological inquiry* 8:1–20.
- Ramachandran, V. S./Blakeslee, S. (1998)** Phantoms in the brain: Probing the mysteries of the human mind. William Morrow: New York.
- Rangell, L. (1988)** Roots and Derivatives of Unconscious Fantasy. In: Blum, H. P./Kramer, Y./Richards, A. K./Richards, A. D. (eds) Fantasy, myth, and reality. International University Press: Madison CN, pp. 61–78.
- Searle, J. R. (1997)** Consciousness & the philosophers. *The New York Review of Books* 44(4):43–50.
- Showalter, E. (1988)** Feminist Criticism in the Wilderness. In: Lodge, D. (ed) Modern criticism and theory. Longman: London, pp. 330–353.
- Smith, H. (1958)** The religions of man. Harper & Row: New York.
- Staddon, J. E. R./Zanutto, B. S. (1998)** In praise of parsimony. In: Wynne, C. D. L./Staddon, J. E. R. (eds) Models of action: Mechanisms for adaptive behavior. Lawrence Erlbaum Associates: Mahwah NJ, pp. 239–268.
- Stephen, M. (1989)** Self, the sacred other, and autonomous imagination. In: Herdt, G./Stephen, M. (eds) The religious imagination in New Guinea. Rutgers University Press: New Brunswick, pp. 41–64.
- Sulloway, F. J. (1998)** Darwinian Virtues. *The New York Review of Books* 45(6):34–40.
- Vickio, C. J. (1994)** Lost and found: Finding value in life through imagining loss. *Death studies* 18:609–619.
- Webster's New World College Dictionary (1996)** Simon & Schuster: New York.
- Weigert, A. J. (1988)** To be or not: Self and authenticity, identity and ambivalence. In: Lapsley, D. K./Power, F. C. (eds) Self, ego, and identity. Springer-Verlag: New York, pp. 263–281.