9
Religion as the Ultimate Human Evolutionary Survival Strategy

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Abstract

This paper begins exploring an alternative model for thinking about religion. In this alternative view, religion emerged as our evolutionary ancestors faced a challenge common to members of all species: evolving body structures that enabled them to know exactly what they needed to survive in a highly complex, continually shifting environment. In this way, bats rely mostly on sound to model the world, and dogs depend mostly on smell. For our evolutionary ancestors, natural selection chose the genes that would create a brain that transformed the world around them into story-like constructions. Religion emerges in myth as those ancestors faced the powerful forces that often overwhelmed them, driving events such as birth and death, abundance and famine. Moreover, as our ancestors moved out from the rainforests of East Africa to the savannah, natural selection further chose for the ability to cooperate, first through brain developments and then rituals. The stories and rituals that developed as these two developments intertwined enabled hunter-gatherers not only to survive, but to spread across Eurasia. In fact, these myths and rituals proved so powerful that they would enable human beings to create societies of increasing social complexity, as their communities skyrocketed from bands of 20 to cities of 20 million.

Keywords: *natural selection, umwelt, ritualized behavior, social complexity.*

> We are what we remember, which is another way of saying that we are nothing other than the stories we tell about ourselves and our past.
>
> *Jan Assmann (2003)*

Introduction

In this paper[1], I propose that religion emerged as part of the survival process by which human beings evolved from the Great Apes over the last several million years. Like its sisters, science and philosophy, religion seems to have emerged

[1] This paper grew from presentations I made at the International Big History Conference in Amsterdam (Baskin 2016) and the Globalistics Conference in Moscow (Baskin 2017). The feedback at both proved invaluable.

as the uniquely human response to the awe- and terror-provoking 'forces that permeate things but cannot ordinarily be seen' (Hayden 2003: 57). Religion, in particular, has helped our species understand and deal with these forces and the experiences they create – birth and death, sickness and healing, famine and abundance. In the end, human history would make religion so central that to understand religion, one has to examine what it means to be human, and to understand what it means to be human, one has to examine religion.

Many people will find this a radical position. Yet, this sort of radical departure seems necessary. For example, when anthropologist Robert Winzeler opens his book, *Anthropology and Religion*, by asking, 'What is religion?' he can only answer: 'There clearly is something in society that we can call religion, although exactly what it is may not be that simple to specify' (Winzeler 2012: 1). Over the last two centuries, thinkers have characterized religion as a childhood neurosis (Freud 1989 [1927]), a tool of the Capitalist class (Marx 1844), a disease of the human mind (Russell 1957), and a guide to what is best in human beings (James 1950 [1890]). Religion has been described in so many, often contradictory ways that bioanthropologist David Sloan Wilson (2002: 132) suggests the real problem in finding a generally accepted scientific understanding of religion is that 'the ideas that govern [thinkers'] perception' have become an obstacle, rather than a useful guide, to understanding it.

To overcome that obstacle, my discussion begins with a look at three critical differences between *Homo sapiens* and the Great Apes from which our evolutionary line diverged. Then, I want to examine two challenges that these evolutionary differences reflect: First, the challenge of every evolving species to 'know' *exactly what they must know to survive*; and, second, the challenge of every *social* species to encourage cooperation, even to the point of individuals giving up their lives, even though their primary instinct is survival. The human response to these two challenges includes myth, which helps us understand what we must know, and ritual, which encourages strong group ties and cooperation. When myth and ritual became integrated in human behavior – I speculate it might have been between 1.5 and 2 million years ago – they would provide the critical process by which the human social complexity skyrocketed, as communities grew from bands of about 20 to cities of 20 million.

Let us begin with a look at the shifts by which *Homo sapiens* evolved from the Great Apes.

From Great Ape to *Homo Sapiens*

To be human, I suggest, is to have the advantages, disadvantages, and challenges that evolved as our species transformed from Great Ape to *Homo sapiens*. This process was extremely complex, including issues connected with the prehensile thumb, walking on two legs, and the shift to a higher protein diet.

In this essay, however, I want to focus on three key shifts – our evolution as an adventurer, exploring new environments; the developing need to see the world in terms of 'stories' that explain experience; and movement toward being highly social.

Much of what follows is speculative. For instance, our knowledge about the brain structure of our evolutionary ancestors such as *Homo erectus* is based on the endocasts of fossil skulls; so what we know about their brains is grounded partly in the assumptions we adopt to explain the endocasts (*e.g.*, Tattersall and Schwartz 2001). In addition, our understanding of religion *before* writing developed in Mesopotamia and Egypt around 3000 BCE is grounded in assumptions, as with the conclusions anthropologists have drawn about hunter-gatherer religion from studying contemporary hunter-gatherers (*e.g.*, Hayden 2003). Still, I have drawn on what seems to me the best work in a variety of fields to create conclusions that may well be valid as future studies confirm or reject them.

Let me begin with life among the Great Apes, such as gorillas, from which *Homo sapiens* evolved. The Great Apes lived in the rain forests of East Africa, where their ancestors had lived for more than 20 million years. These rain forests were relatively comfortable places for them. Dense foliage provided hiding places from predators; fruit and vegetables were easily available; and the more than 20 million years in which their ancestors had lived in the forests made it familiar. Largely because of these conditions, the Great Apes were relatively solitary, living in groups where close social relationships were unusual. The one strong relationship was that between a mother and her children (*e.g.*, Fagan 2004; Turner *et al.* 2018).

Sometime around 9 million years ago – it is important to remember that these numbers are estimates – a new evolutionary line, the Last Common Ancestors (LCA) of humans, chimpanzees, and bonobos, broke off. Then, by about 6–7 million years ago, the evolutionary line of our ancestors broke off from that of the chimpanzees and bonobos. While the chimps and bonobos would remain in the rain forests, our ancestors would, sometime before 4 million years ago, come down from the trees and begin walking on two legs, taking advantage of the new environmental niche opening up, as climate change turned parts of the rain forest into woodland, savannah, even desert, and then back again (Sarmiento *et al.* 2007).

Taking advantage of that new niche created the first key shift: our ancestors' nature was forged in a world in which, *in order to survive*, they had to become adventurers, exploring environments they had never known, which were also shifting with the climate. Remember: in the process of evolution, natural selection does not 'choose' for behaviors. Rather, it chooses those genetic changes that enable members of a species to survive and reproduce more effec-

tively. To do so, evolution rarely creates *ex nihilo*, from scratch; it 'prefers tinkering with or exploiting what already exists over creating the brand new' (Everett 2017: 88). Or, as biophysicist Stuart Kauffman (2008) puts it, evolution explores the 'adjacent possible', making gradual changes. Often, those genetic changes are not expressed in body structures until a new challenge makes it possible to express those changes in a new and striking way (Jablonka and Lamb 2005). Our evolutionary ancestors need, about 4–6 million years ago, to explore new environments would produce exactly such a set of striking changes. The second and third shifts I want to mention are examples of these changes; both emerge as a side-product of the first shift, the larger brain, structured to meet the challenges of an adventurer primate.

That brain evolved over the last 5 million years, as the average size of the cranium roughly quadrupled from the chimpanzee's 350 cc to the *Homo sapiens*' 1350 cc (see Table 1), although, in terms of body size, brain size tripled (Donald 1991). Current paleoanthropology suggests that, by the time of *Homo erectus*, the shifts in brain structure were essentially complete (*e.g.*, Everett 2017; Donald 1991; Laughlin *et al.* 1990). Much of this growth of the brain seems to have come with an expansion of the neo-cortex and associated areas, such as the hippocampus. These areas expanded memory capacity, allowed for more complex interconnection between brain subsystem, and provide the 'executive functions' by which we can plan and teach, become self-conscious, learn more intensely, and read the behavior of others (Donald 2001).

Table 1. Evolution of the Human Brain

Species	Estimated Cranial Size	Date
Chimpanzee	350 cc	*c.* 5 million years ago
Australophithecus africanus	400 cc	*c.* 3 million years ago
Homo erectus	900 cc	*c.* 1.8 million years ago
Homo sapiens	1350 cc	*c.* 250,000 years ago

Source: Sarmiento *et al.* 2007.

Natural selection may have chosen the genetic changes that caused this expansion because they gave our adventurous evolutionary ancestors important advantages, such as expanded memory and the executive functions, such as planning and problem solving. These ancestors were moving into environments in which they had little or no experience; so it was essential to remember the details of this new world, including the predators and natural catastrophes they faced, as well as how to respond to them. Moreover, the fruit and vegetables they ate were no longer plentifully available, as in the rain forest. So they had to remember where and when they could gather them and plan to do so. Ex-

panded memory and the ability to plan were also essential for the scavenging, and later hunting, which complemented their fruit and vegetable gathering (*e.g.*, Everett 2017).

In the second shift, the larger, more complex brain produced a 'storytelling' *umwelt* (subjective, constructed perceptual world), which I will explain in detail in the next section. For now, it is enough to note that, as early as *Homo erectus*, this larger brain created its perceptual world by mixing sense impressions with memory and structuring the results according to their expectations (Laughlin *et al.* 1990). As a result, what humans and proto-humans perceive is not the full world-as-it-is, but models of that world that *show them what they unconsciously assume they need to survive* (Gefter 2016). The result is the impression that they – and we – are walking through a 'living movie' in which they can identify a variety of 'storylines'.

Experiencing the world in perceptual story-like models provided a critical advantage. With expanded memory and some executive functions, our ancestors, starting with *Homo erectus*, would have been able to transform new experiences into story-lines that would further enable them to plan how to respond to current experiences, based on different past experiences. That is, they may have been able to invent new story-lines, creating possible futures as the world around them shifted. These are abilities that the Great Apes, living in their familiar, abundant environments *did not need*. As a result, the Great Apes needed only 'episodic' memory, the ability to remember specific events (Donald 1991). For *Homo erectus*, however, this ability to create new story-lines proved essential, especially when those ancestors moved across the various environments of Eurasia.

The third shift involves the transformation from the mostly solitary life of the Great Apes to the intensely social life of *Homo erectus*. As Jonathan Turner and his associates (2018) point out, many of the changes contributing to the larger brains of our ancestors were also preparing the way for our intense sociality, as with the evolution of such social emotions as shame and guilt. Again, I will discuss this later in more length. What is important here is that being human requires a far higher level of group cooperation *to survive*. No longer protected by the lush foliage of the rain forest, *Homo erectus* had to seek safety in numbers, as well as with technology, likely including fire (Wrangham 2009; Everett 2017). As they found ways to build on the changes that encouraged sociality, they would be able to scavenge for and hunt large animals in teams. Ultimately, this sociality would combine with their storytelling *umwelt* to prepare the way for human culture, the 'as-if' world (Rappaport 1999) that we live in and continually reconstruct.

From this perspective, religion, along with its sisters' philosophy and science, would integrate the behaviors driven by these three shifts so that *Homo*

sapiens could adapt to the widest variety of life challenges – living in tropical jungles, icy plains, and everything between them. In this way, we can see religion, *conceptually*, as part of the process of adaptation driven by natural selection. Religion, then, along with philosophy and science, form *the complex system of thoughts, practices, and interactions that any group of people use to address the fundamental challenges of being human*. In the pages that follow, I will explore this description in terms of three issues:

• how the brain structure of our evolutionary ancestors drove them to create myth, the stories that explained the forces that surrounded and sometimes overwhelmed them;

• how those ancestors would incorporate myths and the rituals that would enable them to evolve from highly individualistic Great Apes to intensely social animals; and

• how the combination of these adaptations enabled the species to adapt to increased social complexity, moving the ability to live in bands of 20 to cities of 20 million.

I will conclude with some thoughts on the advantages of this interpretation.

'Knowing' to Survive

The first challenge religion evolved to address is: how does any species perceive what it must to survive in a complex, constantly changing world? After all, the world-as-it-is, the world that we can only model in perception, is overwhelmingly abundant. We, *Homo sapiens*, for example, can see only a small fraction of all light waves, and our senses of smell and hearing are far duller than those of dogs. Moreover, no living thing is able to sense more than a tiny sliver of that world, a 'tiny subset of the real patterns in the world of any agent' (Dennett 2017: 128; see also Laughlin and d'Aquili 1974). How then do species evolve so that they know what they must to survive?

Current evolutionary thought suggests that, in the process of evolution, the forces of natural selection choose for mechanisms that enable members of any species to experience the information they need (Hoffmeyer 2008). Jacob von Uexküll (2010 [1934]) called the result an animal's *umwelt*, its inner, subjective world. A bat's *umwelt* consists largely of the reflection of sound; a dog's, mostly of smell. *Homo sapiens* evolved sophisticated brain structures that automatically reduce the world spinning around them to a meaningful order by *translating what happens around us into coherent story-like models* that give us the impression of walking through a living 'movie' (Laughlin *et al.* 1990; Gazzaniga 2011).

As I am using the word, any 'story' collapses a fictional *or* real world of events and details into a coherent structure, a model of the world-as-it-is, with which people can make meaning (Boje 2001). That is how people use the word

when they ask a friend to give them the 'real story' or a TV news personality tells us to stay tuned for the 'whole story'. This process of creating 'make-sense' stories, as neurobiologist Michael Gazzaniga (2011: 80) calls them, is also the way human brains, *at an unconscious level*, construct models of the world and make them conscious. Faced with an unfamiliar experience, the brain integrates a mélange of sense impression and memory, examines it all in light of the mental models in which we encode our meaning structures, creates a series of possible explanatory stories for any event, and settles on the one that seems most likely to help us survive (see also Ramachandran 2011).

Every such story must answer three questions (Laughlin and d'Aquili 1974): 1) What is happening right now?; 2) What must I do to respond to it?; and 3) Why did that happen? The brain processes the first two in the amygdala instantaneously. Whether confronted with a lion on the savannahs of Kenya or a child darting out into traffic, our brains immediately answer those two questions. The resulting stories enable us to choose to fight or run away from the lion, or to stop for the child. Unless they are *very* lucky, people whose models cannot answer these questions successfully are less likely to survive.

The brain processes the third question a fraction of a second later in the neo-cortex. As anyone's who has ever had a three-year-old knows, the 'why' question has a special urgency. The human mind *demands* a meaning structure with which to explain what is happening. To build that structure, the human mind constructs a set of 'mental models' that define the way the world is supposed to be and others are supposed to act. The coherence of these models comes from the symbolic order that religion often embodies; the world can make sense because everything is symbolically consistent. This structure is so vital that people who cannot fit events into their personal models of the world will feel disturbingly anxious (Laughlin *et al.* 1990). The vote for Brexit in the UK and the elections of both Barak Obama and Donald Trump in the US demonstrate how profound that anxiety can be. After all, if my model of the world cannot explain national events that can overwhelm me, how much can I trust my mental models, *which I must trust to survive*?

For me, religion begins with this need to explain events, specifically those that can overwhelm people, either physically or emotionally, as they emerge from powerful, invisible forces (Hayden 2003). Such events range from the birth or early death of a child to war and famine or the experience of 'feeling one with the universe'. Myth fulfills this human need, as the question 'Why did this happen?' seems to translate into two others: What is this wonderful yet frightening world of which I feel part? And how should I behave in order to thrive, or at least survive, in the face of such overwhelming forces? In this way, these potentially overwhelming events call for Gazzaniga's 'make-sense' stories, which become myth.

From this evolutionary point of view, myth examines these questions for a specific society facing specific challenges. The forces that create these challenges are often invisible and more powerful than the people experiencing them. Ultimately, as with 'Why do we have to die?' they may be impossible to answer definitively. So myth answers them with the poetic metaphor of an 'other', transcendent world. Some talked about the spirits of ancestors; others, many gods, the One God, or an even more abstract concepts such as Hinduism's Brahman or the *Dao* (the Way) of Chinese religion. Myth, then, enables humans to remember and reinterpret the 'important past' as they work to meet the challenges of the impersonal forces of the world *today* (Assmann 2011).

As I noted, philosophy and science are religion's sisters. My speculation is that, to answer the question, 'What's happening?' early humans would observe and work to understand their environments, often by counting repeated events – creating the beginnings of science and mathematics. Philosophy would then arise as those people began discussing how they should respond to events in their environments. Religion presented important events poetically, describing a metaphoric 'other' world, which represented the powerful forces any group must confront, as well as how to deal with them. It seems likely that these ways of dealing with powerful impersonal forces all emerged together. By the time of the earliest religions we know about, these three ways of knowing the world appear integrated. As a result, the Egyptian philosophy of *ma'at* – the right order of the cosmos and society – and the sciences of astronomy and engineering are integrated into Ancient Egyptian religion (Assmann 2001), just as a variety of philosophies and the science that would make China the technological wonder of the post-Axial Age world (Schwartz 1985; Graham 1989; Temple 2007). It would only be with Axial Age Greece, and then more intensely with Modernity, that religion, philosophy, and science would be differentiated.

One difficulty with much current literature on religion is its literalism. That is, thinkers assume religion's transcendent world is 'supernatural' (*e.g.*, Dennett 2007), or 'counterfactual' (Atran 2002). Yes, many, perhaps most, people who practice their religions do seem to think of their transcendent world as a 'real' place beyond the everyday world. Perhaps, they always have. But the assumption that religious texts should be interpreted literally took hold throughout society largely with the rise of modern science and Protestantism (Harrison 1998). Social scientists, however, have a responsibility to dig deeper, and to remember, for example, that, before Modernity, the Catholic Church generally treated the Bible allegorically. Even more to the point, the forces any religion's transcendent world represents are *very real parts of the natural world*. As a result, I examine it as a 'world of impersonal forces', rather than a 'supernatural world'. This, I think, is what Joseph Campbell (1969) means when he ex-

plains that we pervert myth when we interpret it literally. *Myth is not a literal rendering of an 'other' world; rather it is made up of metaphoric explanatory stories about life here and now* (see also Rue 2005).

Many literalists disagree. Dennett (2007), for example writes myth off as the result of an overactive desire to find agents that explain frightening events. This desire to identify agents is a result of the structure the human brain, as Boyer (2001) explains in more detail. But that is only one element, and not the most important, in a far more complex phenomenon. Neuroscientist Andrew Newberg has worked extensively scanning the brain's responses to religious and spiritual experience. As a result, he has located several brain circuits associated with processing stories about such supernatural agents, including circuits that help human beings identify 'God as an object that exists in the world'; allow them to 'experience God's presence'; assign 'emotional meaning' to the concept of God; and create the impression of 'frightening, authoritative, and punishing God' (Newberg and Waldman 2010: 43). For whatever reason, the ability to think in terms of such agents seems to have been so important that natural selection chose for genetic mutations that made experiencing them a human universal.

To see just how important those agents can be, consider the example of Ancient Egyptian mythology. By the time Ancient Egypt was unified, *c.* 3000 BCE, the lands surrounding the Nile River had been desert for more than two millennia. *The agricultural abundance that enabled its people to survive depended on the annual flood of the Nile and the cycle of rebirth that it made possible*. If my perspective is accurate, then Egyptian religion should be a symbolic meditation on the mystery of this rebirth and the meaning of the abundance it provided, punctuated by periods of drought or flood. As classicist Susan Brind Morrow (2015: 272) notes, this is not what much of current interpretation of Egyptian myth holds. Rather, the Pyramid Text, the first existing 'religious' text, dated *c.* 2323 BCE, is often interpreted literally as 'a primitive text about African animals as monsters and gods'. For Morrow, this traditional interpretation is a misunderstanding that treats hieroglyphics, an Egyptian word that literally means 'mysterious', as prose rather than poetry.

She continues that a more accurate reading, the reading I am arguing for, treats this text as poetry examining questions such as, 'What is life on earth, how does it relate to time and the interrelationship of all things, what is death, what survives death?' (*Ibid.*: 13). Note that these are philosophical questions. From this point of view, Egyptian mythology struggles with the fundamental challenges of human life. In Egypt, we would expect stories reflecting the concern with the cycle of birth, growth, death, and resurrection so important to Egyptian agriculture. One such myth is the story of Seth's murder and dismemberment of his father Osiris and his battle with his brother Horus, as Horus

avenges his father's murder and Osiris is reborn. Here, we have not only an examination of resurrection, but also of the battle between the forces of order (good) and chaos (evil). Additionally, it was used as a justification for Egypt's pharaoh and the power structure he represented (see Assmann 2001). Ultimately, Morrow (*Ibid.*: 191) concludes, 'Resurrection is not a mystery. It is the fundamental nature of life on earth. Death precedes life. The only thing that is lost is the ephemeral human personality'.

In this way, myth provides the social *umwelt* that humans need, both individually and in groups. For one thing, it offers an explanation for the annual rebirth of vegetation, on which the society depended, grounded in a story about the transcendent world. For another, it articulates the symbolic order through which Egyptians came to understand the world. For instance, Egyptian mythology explains the Sun's daily journey across the sky as the story of the Sun god Ra's daily journey and trip to the underworld, from which he would return the following morning. Compare this story's emphasis on rebirth with that of Greek mythology – where Apollo, the symbol of knowledge, rides his chariot across the sky, illuminating the world – or of the Western explanation – where the daily revolution of the Earth reflects the workings of the Laws of Nature. In all three cases, these explanatory stories enable individuals to collapse the chaotic field of possible meaning in the world into a coherent constructed, symbolic world, which they need to survive (Laughlin and d'Aquili 1974). [For a fuller examination of the human need for this sort of symbolic order, see anthropologist Terrence Deacon's *The Symbolic Species* (1997).] Socially, this shared symbolic *umwelt* – the understanding of *the way the world should be ordered* – provides the logic that lets people know what to pay attention to and to ignore, as well as how to put together their experiences in a way that makes sense, creating shared group meaning.

It is important to remember that the *umwelt* of any living thing – whether the sonic *umwelt* of a bat or the cultural *umwelt* of Ancient Egypt – is a matter of *survival*. However, the fact that humans depend on their story-like *umwelten* to survive creates two problems. First, it means that any challenge to a group's symbolic order may be experienced as an attack on members' survival. Current political battles over such questions, as whether abortion should be legal, often seem experienced as an attack on the worldview of group members. To criticize my position is to question whether the symbolic order I survive with is true. Second, if the conditions of any group of people change enough, the *umwelt* that enabled its members to survive can blind them to those new conditions: the *umwelt* that saves you today can kill you tomorrow. Call it the *Umwelt* Paradox. Enabling a group to transform its social *umwelt* is one of the key functions of religious mythology, and, also, of philosophy and science (Baskin and Bondarenko 2014).

When societies go through disruptive change, their old ways of living and governing society break down. If the society is to continue thriving, its mythic stories must be rewritten (*e.g.*, Wallace 1966; Baskin and Bondarenko 2014). This is the *Umwelt* Paradox writ large. Let us take the case of China. From about 200 BCE to at least 1500 CE, it was the wealthiest, most civilized, most technologically advanced state in the world. So, when Europeans started appearing around 1500, the Chinese were unimpressed. Their social *umwelt* had created a model that convinced them that these dirty, uncivilized people were no different from the many other subordinate peoples who had always collapsed in the face of their superiority. Only this time, they were wrong, victims of the *Umwelt* Paradox. By 1800, they were becoming colonial subjects of the Western powers. Today, the Chinese have transformed their social *umwelt* and returned as one of the world's great powers. But to do that, they had first to recreate their symbolic order.

The power of religion – the reason that it is universal to human groups – lies in these many functions it fills. Consider some of the functions we have looked at. A myth enables us to create a symbolic order, which, in turn, allows us to construct the coherent images of the world that help us survive; that order also allows people in groups to communicate with shared meaning and to create a shared identity. And myths make it possible for humans to fulfill anthropologist Jan Assmann's (2003: 10) dictum: 'We are what we remember'. As a result, we can create a shared past and memory of our collective triumphs, as well as the disasters that might lie ahead, and how we overcame and, in the future, can overcome them.

These few functions might well be enough to explain why religion is such an important part of being human. But it is just the beginning. At the same time our evolutionary ancestors were learning to live in new environments, they also had to learn to meet another survival challenge – to live as social animals.

The Puzzle of Social Order

Julian Huxley (1966) called the resulting survival strategy the 'ritualization of behavior'. It seems to have emerged over the last 150 million years as some animals became more and more dependent on cooperation to survive. These 'social animals' range from ants and bees to cockatoos, wolves, and chimpanzees. They often rear their young cooperatively, live with several generations in permanent settings, hunt and defend the group together, and rely on group learning. Social animals can have complex societies, with defined roles and hierarchy. As a result, they need ways to communicate complex messages quickly and effectively, as well as to commit to the demands of their hierarchies (d'Aquili *et al.* 1979).

Some of this behavior, which ethologists call 'fixed action patterns', is mostly a matter of genetic programming (Huxley 1966), for example the mating ritual. A butterfly, called the silverwashed fritillary, has a seven-step ritual: the male begins with a first signal, and the female makes a countersignal, through seven steps (d'Aquili *et al.* 1979). This 'ritual' is fixed in the butterfly's genes. However, with the emergence of sophisticated brains in birds and mammals, much ritualized behavior became learned. A good example is the songs birds in some species sing to signal they are members of a specific group.

The more complex the social group is, the more important these ritualized behaviors become. Many mammals, wolves for instance, have highly complex group dynamics. Wolves within a pack can have different temperaments and roles; they cooperate in hunting and have social hierarchies. So, they need ways to communicate complex messages. In one ritualized pattern, the leader parades a bone in front of the pack, then drops it so the rest of the pack can inspect, and then ignore it (*Ibid.*).

As a result, social animals are able to communicate complex messages – 'I am your leader/follower' or 'I am approaching you not to hurt you but to negotiate sex'. They also enable group members to commit to the social hierarchy, as with wolves. And Robin Dunbar (1966) discusses primate grooming as a behavioral way of communicating to build trust.[2]

When our evolutionary ancestors were still Great Apes in the East African rain forests, they were social animals, but needed much less sophisticated communication and group coherence than humans. Great Apes, as well as chimpanzees and bonobos are far more individualistic animals with looser social structures. However, once our ancestors came down from the trees and started their wanderings on the savannah, they had to depend on each other for survival (*e.g.*, Dunbar 2016). Not surprisingly, then, natural selection would favor genetic changes that enhanced and rewarded tighter social structures. As a result, natural selection chose for a wider 'palette' of emotions, including powerful social emotions such as guilt and shame, starting about 3 million years ago; according to Turner *et al.* (2018: 2), this sort of change became the 'biologically-based propensities for human reliance on religion'. They suggest that even the tightly-knit nuclear family may have developed partly as a result of changes in the brain: the septum, associated with sexual pleasure, doubled in size from the Great Apes to humans, enabling a much more intense relationship between partners. And, so, at the same time that storytelling brains developed, our ancestors' biology was also beginning to encourage tighter social structures.

[2] For a fuller discussion of the pre-human origins of such 'ritual' behavior, see d'Aquili *et al.* 1979.

In this way, the individualistic Great Apes could evolve toward being intensely social *Homo sapiens*. In current literature on religion, this issue is indirectly discussed in the Great Altruism Debate. Dawkins (1996: 381) refers to it as 'that perennial problem, the evolution of "altruistic" behavior in individuals' (see also Boyer 2001; Johnson 2016; Boehm 2012). In evolution, some writers argue, survival always comes first, favoring the 'selfish'. Yet, human society demands cooperation, especially in today's large societies where most people do not know each other. How, then, can essentially selfish people be brought to cooperate and even act in ways that risk their own well-being for others, as New York City's first-responders did during the events of 9/11? One element may be religion's all-seeing, punishing divine powers (*e.g.*, Norenzayan 2015; Johnson 2016). More fundamentally, however, as Turner and his co-authors detail, the conditions our evolutionary ancestors faced as they left the rain forests demanded highly social behavior, and natural selection chose for those genetic adaptations that would transform individualistic Great Apes into highly social humans.

By the emergence of *Homo erectus*, about 1.8 million years ago, it seems possible that our ancestors were explaining the powerful impersonal forces that surrounded them with some sort of 'proto-religious' ceremonial rituals (Donald 1991), a form of ritualized behavior. Such rituals would have been very different from what we think of as religion. After all, the symbolic coherence that is central to human culture probably did not develop before 70,000 years ago (Fagan 2010). *Homo erectus* may have had language. The majority position is that they did not (*e.g.*, Deacon 1999; Fagan 2004). However, a linguist Daniel Everett (2017) recently argued that language developed with *Homo erectus*, which would have allowed them to tell explanatory stories. Even if they did have language, such 'stories' would have been very different from what we now consider myth. Still, as Donald points out, it would also have been possible to tell those stories with ritualized behavior – dance, mime, and imitation. These early religious rituals, with or without language, would have enabled them to tell some sort of stories about the often-terrifying impersonal forces they faced as they migrated across Eurasia. Those rituals would evolve into the rituals humans have practiced for tens of thousands of years, fulfilling a number of functions.[3]

First of all, because humans need symbolically ordered, meaningful *umwelten*, ritualized activity enables groups to remember that order by ritually recreating that shared *umwelten* repeatedly. That is, ritual helps us remember who we are. This function has become increasingly critical over the last 10–12 thousand years, as what Benedict Anderson (2006) calls 'imaginary com-

[3] For a fuller discussion, see Rappaport 1999; Seligman *et al.* 2008.

munities' have grown in population from a few hundred to more than a billion, in nations such as China and India. Before that time, humans lived mostly in small hunter-gatherer bands. By 5,000 years ago, Uruk in Mesopotamia was a city of 40,000, with extremes of wealth and poverty, a variety of social roles, and fixed hierarchy (Modelski 2003).

Survival in this brave new world of agriculture and cities would require very different behaviors from that of hunter-gatherer bands (van Schaik and Michel 2016). To adapt to these mismatches, people seem to have negotiated increasingly complex mythic stories about the world of impersonal forces. These stories would not only explain the new social world, but also justify its constructed conventional 'as-if' worlds (Rappaport 1999), so unlike that of hunter-gatherer bands. Ritual enabled them both to remember and maintain that order; as Rappaport (*Ibid.*: 137) puts it, 'the existence, acceptance, and morality of conventions are joined together indissolubly in rituals'.

These rituals also educate the young on the nature of their symbolic, 'as-if' world. Many elements of children's play end up being practice for the behaviors and roles they learn in those rituals (Seligman *et al.* 2008). This should hardly be surprising. Human beings can only create and share meaning by learning the symbolic order they have in common (Rappaport 1999). That is, children have a *biological imperative* to learn their society's order. Play enough at the behaviors and roles coded into these rituals, and they become second nature. Through *physical recreation* of our social stories, every child learns to remember and live by a variation on the *umwelt* shared in their societies.

Rituals also enable group members to communicate historically important memories, such as action plans for previously experienced disasters, periodic famines or floods for instance (*Ibid.*). In pre-literate societies, preserving such action plans would have required oral mythic stories, enacted in ritual. This sort of ritual is also valuable in literate cultures, as in the Jewish ritual of the Pesach *sedar*. The *sedar* ceremony is an annual discussion of the exodus from Egypt, which God commands in *Exodus* 13:8, during which participants are encouraged to experience the story *as if they were actually leaving Egypt*. I do not think it is mere coincidence that this ritual has been enacted through much of Jewish history. It became a yearly rehearsal for the next cycle of being valued strangers in a strange land, becoming oppressed, and leaving, repeated, for example, in England and Russia, Spain and Germany.

When explanatory stories and ritual come together in religion, they provide a way for people in their societies to remember and enact their symbolic orders, to commit to their groups and pass on knowledge of it. And when their worlds change so much that the old symbolic orders no longer work, religion provides

the tools that enable members of those societies to evolve new survival strategies and resolve the *Umwelt* Paradox (see Wallace 1966).

Resolving the Cultural *Umwelt* Paradox

From one perspective (see Baskin and Bondarenko 2014), human history seems to contain three periods when long-stable social structures were overwhelmed by growing population and new technologies – the Agricultural Revolution (*c.* 11,000 to 5,000 years ago), the Axial Age (*c.* 800–200 BCE), and Modernity (*c.* 1500 CE to present). The first one occurred when the end of the Ice Age and agriculture made increasingly larger communities possible, and human communities jumped from 20-person bands to cities of 40,000. The result would be the early states of the pre-Axial period, such as Ancient Egypt, Sumeria, or Shang China. The second one occurred as cities grew to populations of 100,000; iron weapons and widespread use of horses made warfare far more devastating; and the spread of writing became a driver of social change. The result would be the bureaucratic empires, such as the Chinese dynasties or Islamic empires. The third one occurred after the Mongols created the first Eurasian world system; the gun and other mechanical weapons again made warfare far deadlier; and the printing press made mass literacy possible. Modernity, then, can be seen as humanity's response to the beginnings of globalization. The result is still unfolding (see Fig. 1).

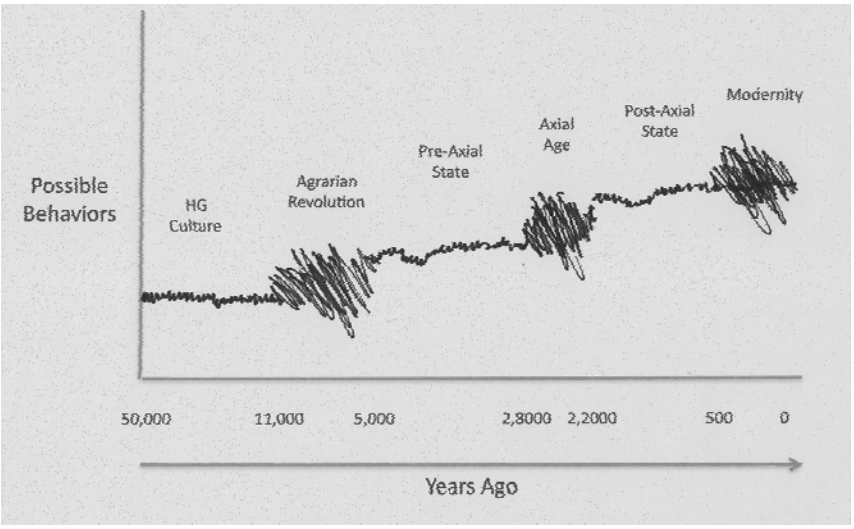

Fig. 1. Evolution of Human Culture

Source: Baskin and Bondarenko 2014.

Of course, writing did not emerge until the pre-axial state. So we can only guess at the nature of religion in the Agrarian Revolution. But the transformation process in Greece and Israel, India and China during the Axial Age and throughout Modernity is very much the same, and the renegotiation of mythic stories and the rituals that expressed them seems to have been central in driving these transformations, as several thinkers have noted (Wallace 1966; Yinger 1970; Assmann 2011). These were periods of crisis. In all these cases of cultural transformation, the pressures of social change overwhelmed long-established styles of government, resulting in devastating wars with far more advanced technologies for killing. The chaos and terror these wars caused plunged all these societies into a reevaluation. Whether we look to the Peloponnesian Wars in Greece, the Warring States Period in China, or the Thirty Years War in Central Europe, people in these societies were overwhelmed by the type of force that drove the emergence of new religions. As a result, they asked the questions the human brain is structured to answer: What is happening? What should we do? Why is this happening to us?

As Assmann (2011: 59) notes, myth gives us the stories 'one tells in order to give direction to oneself and the world'. So, for societies in crisis, this function of myth (and religion) demands that people reevaluate their mythologies. That process begins with the restatement of the old mythology, which Assmann calls 'foundational texts'. In China, those texts examined the time of peace during the Western Zhou Dynasty (*c.* 100–771 BCE) (Schwartz 1985); in Greece, the epics of Homer explored an earlier time of conflict. In early Modernity, these would be stories that combined the Christian emphasis on seeking God's salvation with the restless spirit of the German tribes that had conquered the Western Roman Empire, most notably the stories of the Quest for the Holy Grail (Spengler 1932).

As the society enacted these texts, its people experienced consequences that would be fed back into the myth-creation process (see Yinger 1970: 89). In China, that would result in experiments in government – at first, as many as 170 small kingdoms in the Spring-and-Autumn Period (772–481 BCE) and almost constant war; in Greece, it resulted in hundreds of *poleis*, city-states, and the Persian Wars in 490 and 480 BCE. In Modernity, the mythology of spiritual quest in the world would have a double result: on the one hand, Protestant Reformation reflected the quest of the individual for salvation; on the other, many leading thinkers would pursue the quest to read God's Second Book, Nature, as they were increasingly exposed to earlier scientific thought from Ancient Greece, China, India and Islam (Baskin and Bondarenko 2014).

Assmann's next phase of this process is establishing a canon for the emerging social *umwelt*, which reflected what enacting the foundational texts had

helped people learn. In China, this canon included the classic texts from Zhou times, such as the *I Ching* (*Book of Changes*) and the works that reflected the thought of philosophers such as Confucius, *The Analects*, and Laotzi, *The Dao De Ching* (*The Book of the Way and Integrity*). In Greece, that cannon included both philosophy, from Thales of Miletus to Plato, and the Greek tragedies of the 5th century BCE. The Greek experience would begin the split of religion from philosophy and science that would intensify in Modernity. Modernity's scientific cannon emerged from explorations of Kepler, Galileo, and Newton, and the philosophy of Francis Bacon and Descartes, led by such works as Descartes' *Meditations* and Newton's *Principia* (*e.g.*, Gillespie 2009; Kuhn 1962).

As these social *umwelten* shaped their societies more and more, the behavior suggested in their canonical texts would create another round of feedback, which would result in Assmann's third phase of this process, commentary. In China, this phase witnessed a large body of writings that include reinterpretation of the ideas of Confucius, Laotzi, and others. These ideas played out in the last century of the Axial Age and through the post-axial period, continually bringing China's philosophical religion in line with changes in society (*e.g.*, Schwartz 1985). In Greece, the philosophy and science at the heart of its social *umwelt* would be reinterpreted in commentary, first, by Aristotle in the 4th century CE and, later, by a variety of thinkers, including Ptolemy in Alexandria during the 2nd century CE. During the early post-axial period, this social *umwelt* would have evolved into the Hellenism that Alexander's conquests spread across the Mediterranean world, eventually shaping the Roman Empire and Christianity.

In many ways, Modernity is one long commentary on the scientific *umwelt* canonized in the work of Descartes and Newton. That commentary extended beyond the growing body of knowledge in such fields as physics, chemistry, and biology. It would stand at the heart of Capitalism and set the stage for Nationalism. The issues the world faces today – from the danger of nuclear proliferation to extensive pollution and climate change – all seem grounded in the modern social *umwelt* (Bondarenko and Baskin 2017). Ironically, the advance of modern science has undermined its basic assumptions and created another scientific revolution that appears to be leading thinkers back to many of the ideas associated with the philosophical religions of India and China (*e.g.*, Pagels 1988; Laughlin 2005; Kauffman 2008; Smolin 2013). This 'religious' thought appears in the work of theoretical physicist Amit Goswami (1993), quantum physicist David Bohm (1980), and Kauffman's (2008) identification of radical creativity with the sacred.

Could the emerging scientific paradigm offer the social *umwelt* our world needs for globalization, just as the monotheism and Chinese religion that came out of the Axial Age did for the bureaucratic empires of the post-Axial period?

Could the mysteries of Quantum Mechanics and the dynamic processes demonstrated in Complexity Theory enable our children to remember the world in a way that will allow them to address the apparently insoluble questions of the early 21st century? These are the sorts of questions that my evolutionary approach to religion provokes.

Concluding Thoughts

Religion, then, *along with science and philosophy*, forms *the complex system of thoughts, practices, and interactions that any group of people uses to address the fundamental challenges of being human*. In this way, religion and its sisters enable groups of people to define what they must remember and prepare them to meet what has not happened yet; it gives every society its most powerful stories and brings their members together as coherent groups, sometimes willing to give their lives for each other; it offers spiritual paths, protection from the fear of a world that can overwhelm them, and the tools to dominate and manipulate whole societies.

My hope is that this interpretation of religion has implications that go beyond the academic community. As the readers of this journal know, we live in a world that is in transition between an old world of nation states, each with their own social *umwelt*, and a far more globalized world. Today, most people use their social *umwelten* to define those with different *umwelten* as Others. How can our societies encourage people to experience the otherness of those who do not share their *umwelten* as brothers and sisters, rather than enemies? I would like to think that the ideas I have presented may help us get one step closer to answering that question.

Ultimately, religion is universal to human societies because we *are* all brothers and sisters – the large-brained primates who survive by cooperating so intensely. And today, we face several challenges that could quite literally overwhelm us – from nuclear holocaust to another mass extinction – unless we can work together as a global community. Perhaps, beginning with some of the ideas I have presented, we can move toward a global *umwelt* that can put science, religion, and philosophy together again, in a way that enables us to respect our local differences while working for our common good.

Some people will say that Human Nature simply will not allow this to happen. They may be right. We all do cling to our models of the world. And, yet, I have to wonder, what would happen if we could talk with some hunter-gatherers who lived 40,000 years ago and tell them that people are now living in communities of 10 million. Wouldn't they say something to the effect that Human Nature just won't allow that to happen? Faced with a threat to our survival, we, humans, have done apparently impossible things over and over. Per-

haps, what we need is a religion that will enable us to remember that we achieve those impossible things. After all, we are what we remember.

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