# WHAT CAN EVOLVED MINDS KNOW OF GOD? AN ASSESSMENT FROM THE STANDPOINT OF EVOLUTIONARY EPISTEMOLOGY

*by Neil Spurway*

*Abstract.* Humans can only act successfully in the world because many of their mental concepts of that world—for example, three-dimensional space—are objectively valid: hence the approach of evolutionary epistemology (EE). An overall world picture, "Umwelt," is peculiar to each animal species as their sensory functions differ, but the concept of Cause is widespread and fundamental: it leads humans to an idea of God as Cause of creation. But further certain knowledge of God is impossible, theology must be Apophatic: Pseudo-Dionysius and Wordsworth provide examples. The Apostles' Creed is considered from the standpoint of EE: its metaphysical claims are meaningless but the human aspects remain wholly acceptable. Fuller theological pictures will be sustainable only on an "as if" basis. Any more positive theological position is increasingly dangerous, and claims of certainty can never be upheld.

*Keywords:* Apophatic theology; Apostles' Creed; evolutionary epistemology; Konrad Lorenz; Pseudo-Dionysius; Umwelt; William Wordsworth

## What Can We Know?

If we are disposed to appraise our knowledge—or what we think is knowledge—of the world and being, evolutionary biology represents an untypical but challenging standpoint from which to begin. At the most fundamental level of such an approach, we are here, asking the questions—we have survived, and our species is currently doing rather well. (From the viewpoints of many of the other species it is of course doing a lot too well, but that is not the aspect explored here.) I write from the standpoint of a biological scientist, who accepts not only the story of evolution—"descent with modification" as Darwin called it—but also the key mechanism, Darwin's great insight, of inevitable competition and consequent

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Natural Selection among interacting individuals. After living and breathing this viewpoint for more than 60 years, I share absolutely the position vividly enunciated by Theodosius Dobzhansky (1973), that "Nothing in Biology makes sense except in the light of Evolution." Nothing! … Nothing about the physical bodies we see around us, including our own, but nothing about our mental functions either. Nothing about our concepts of the world, our understanding of its mechanisms—our "science"—and our thought-structures—our "philosophy"—makes sense except in the light of Evolution …. and of that Evolution having been governed by Natural Selection. That is the standpoint of this article.

Considering first our senses, the perceptions they give us, and the pictures of the world—the concepts—by which we navigate … the essential point was put, "crudely but graphically," by the eminent American paleontologist, George Gaylord Simpson (1963, 84): "The monkey which did not have a realistic perception of the tree branch he jumped for was soon a dead monkey—and therefore did not become one of our ancestors. … Our perceptions do give true, even though not complete, representations of the outer world because that was and is a biological necessity, built into us by natural selection. If it were not so, we would not be here!"

Actually, it is not now considered that monkeys, in the true sense, were directly on the line of descent that led to us. But a little further back there was a common precursor, and Simpson's comment applies exactly to that precursor. So, let us unpack the argument somewhat further.

First, that early primate's perception embodied several implicit concepts—of basic geometry and three spatial dimensions, of gravity and the risk of falling, and of the branch's solidity and load-bearing strength, to identify a few. Obviously, it also entails sensory functions: in the primate case the key sense is vision—a blind monkey could not risk jumping. But a bat can locate the branch by hearing, not vision, so spatial concepts are formable on the basis of other senses than sight, and the regions of the brain concerned with spatial judgment are reported by neuroanatomists to have wiring patterns in a bat's auditory cortex reminiscent of those in human visual areas; and something similar applies to the part of a mole's brain that responds to touch about the snout. This is a pretty significant finding, indicating the fundamental importance of space perception in the animal kingdom, to which we belong. Consider also the fact that, quite early in secondary school, we learn to plot sequences of events on graph-paper—that is, to represent the passage of time spatially. To represent space in the time-dimension is many times harder, and feels less "natural." Again, in relativistic physics, the time-dimension is fundamentally space-related, but not the converse. Returning to the everyday level, consider how often, in common speech, we use spatial terms metaphorically: *wide* knowledge, *broad* coverage, *heights* of rhetoric, *depth* of insight, and so on. The sense of space, and its interpretation in terms of three dimensions, is fundamental

in both the human animal's, and quite obviously the more advanced nonhuman animal's, understanding of the world.

This opening example drew attention to another biological point, that a single property of the world can often be accessed by different modalities of sensation—and it probably will be if it is important enough. Everyone also recognizes that different animal species may have hugely varying capabilities of a sense they almost all, to an extent, share: with regard to vision, the center-field ("foveal") acuity of every species of hunting bird in daylight, and the ability of all predators to detect movement after dark, are both greatly superior to our own, and to those of almost all other nonpredatory mammals. And a dog's sense of smell to a wide range of molecules is many orders of magnitude more acute than ours. Even more significantly, however, there are many aspects of the physical world that other species can detect by their senses, and use to critical effect, but that we cannot sense at all, and have become aware of only through sophisticated modern instruments. To cite just two examples, it seems that many species of birds, and insects such as bees, make navigational use of light's polarization, and many fish can negotiate confined spaces utilizing electric fields. Of neither of these features do our senses give us any knowledge at all.

It is certainly not the case that every theoretically possible source of information is used by some living organisms, somewhere. But it may well be that every source that is physically feasible and evolutionarily cost-effective is used. As a first, inescapable example, there is a huge range of the electromagnetic spectrum that is not used as an information source by any biological entity using inbuilt, natural means, though humans can access a lot of it by deploying suitably engineered equipment: no electromagnetic wavelength shorter than ultraviolet or longer than the near infrared is utilized for locational information by any animal species—and the infrared's range is extended by only a relatively modest amount further as in indicator of heat. The reasons are basic ones of physical feasibility: the materials available to living organisms, for making such essential imaging components as lenses, cannot handle the ultraviolet or infrared wavelengths. Indeed, the very fact that we can see hills, trees, cars, and cows in front of us is because rock, wood, metal, and the great majority of flesh are opaque to visible light. This immediately indicates that the materials of which living beings are constructed cannot be easily employed in making image-forming systems: the transparent materials present in eyes are exceptional products of what must have been intense selection pressure. But this would be physically quite impossible for wavelengths orders of magnitude shorter than that of blue, where system dimensions as well as materials are crucial. "X-ray eyes" are the stuff of schoolboy fiction only—no animal could possess an X-ray lens. In rare other instances where it might be conceived that a biological system could develop the physical capability of extracting information from the environment, yet none appear to do

so, the cost effectiveness of the capacity would almost certainly be insufficient: "cost effectiveness," that is to say, either of building the necessary structure from chemical elements adequately abundant in food, or/and of meeting the energetic burden of running the system. As the great ethologist, Konrad Lorenz put it: "We have developed 'organs'" only for those aspects of reality of which, in the interests of survival, it was imperative for our species to take account" ([1977] 2004, 7). And likewise, not only humans but all other species.

The last couple of paragraphs have concentrated on the peripheral organs—eyes, ears, and so on—which capture information from the environment. Earlier, when talking about spatial awareness, I alluded passingly to the associated areas of the brain. But much more could be said on that subject. The least sophisticated features, yet sufficient for first rough guides, are simply the surface area, or the volume, of neural tissue given over to processing the information received from each particular modality of sense organ. If we look at the brain of an aardvark—a nocturnal, insect-eating African mammal—we find that its olfactory cortex is immensely developed: "of course," says the evolutionist, "because smell is overwhelmingly the most important sense whereby an aardvark finds its food." Move to pigs, or to moles, and we find that the largest brain area is given over not to smell but to touch on the outside of their unusually large snouts. If we stay with touch, but come back to ourselves, we find that the areas dealing with touch on our finger tips and lips are each larger than that allocated to the whole of the back; this correlates with the fact that, while we are nearly as sensitive to being touched, somewhere on our backs, as to being touched on a finger-tip (in technical terminology, the "thresholds" of sensation do not differ greatly between these two areas), we are many times better at knowing where the touch has been on the finger-tips—"spatial discrimination" is vastly better there than on the back, and the superior discrimination requires greater brain area. Finally, as one more indication of that same broad point, the auditory area is larger in congenitally blind humans than in sighted people.

So, what we can detect in our worldly environment is utterly dependent on the systems we possess, and in principal every species is liable to be different and so to live in a different sensory world. The systems that exist are results of Natural Selection. Each species has organs sensing features of the world relevant to its way of life on the surface of the globe, and sometimes to that of no other species—that one's "Umwelt," as the philosophically inclined Estonian zoologist, Jacob von Uexküll, called it a century ago. Von Uexküll (1928) took pleasure in the example of the sheep tick, which has uniquely high sensitivity to the smell of butyric acid—a molecule prominent in mammalian sweat. After clinging, for what might be many months, to a tall stem of grass, the tick would let go when the smell of butyric acid was strong enough, natural selection thus achieving a

very high probability of its landing on an animal from which it could suck all the blood it could possibly want. The tick's only other known awareness is of the mammalian body temperature of 37°C. It need not, and for all we know may not, be aware of anything other than these two features, to survive and in its own terms flourish. Happily, humans enjoy considerably wider ranges of awareness, yet we cannot know about or understand anything outwith our human Umwelt: not only the sensations we can receive without engineering aid, but the concepts with which we can work, are limited to that Umwelt. (There is perhaps a theoretical possibility that, on an evolutionary timescale, our conceptual capabilities might evolve to take account of long-standing technical developments, but this certainly has not happened yet.) Of our conceptual capabilities prior to any such developments, we have already in this article acknowledged space and time; then must come solidity/liquidity, agency or force, cause and effect, almost surely also life, death, the inanimate …. and no doubt many more. Almost certainly a finite number of formable concepts, nonetheless—a number ultimately limited by the sensory mechanisms we naturally possess.

Of course, we are not born with detailed knowledge of our individual environments, let alone anticipation of the uncountable number of events that will occur in a given lifetime. What is conveyed in our DNA, and is more finely tuned during our early development, is responsiveness to particular forms of regularity in our environments—at first in evolutionary time this will have been entirely the physical environment, in the later stages it must increasingly have been the social one. Yet, where the implications for survival were strong, the mechanism will have been essentially the same—relative or absolute success or unsuccess in the competition to reproduce. An example of the first, physical kind is that nervous systems are not predisposed to judge the leap to a particular branch, but to make spatial judgments generally. An instance of the second, social kind is that the brains of human infants are not adapted to the learning of English in one child and Chinese in another, but in each to the learning of language in the broad. However, the extraordinary speed with which we do learn the language(s) heard all round us in our early years must give the strongest indication to any doubter that the propensity for such learning is, indeed, inborn.

It is crucial to note, however, for the overall argument of this article, that these viable concepts and propensities can, of necessity, refer only to this material world, as accessible to the physicochemical structures that are our sense organs. That accessibility implies that it is a world in principle open to empirical scientific investigation, whether or not the particular aspect under consideration has in fact been so investigated. For the purposes of my title—"What can evolved beings know of God?"—there is a vast exclusion principle. Natural Selection can have no relevance to the validity of notions that purport to refer outside space or time, or

otherwise beyond the realms of physics and chemistry: and such notions can never have been honed by the trial-and-error test of their contribution to survival and flourishing, here below. Or, to be more precise, beliefs about nonphysical entities may, on occasion, have affected people's survival, but it is likely to have been the strength and emotional content of those beliefs, and cannot have been their truth or otherwise, which has actually affected the outcome.

The scientific findings cited in this section and not referenced specifically all stemmed from studies made well before the end of the twentieth century. Anyone wishing to pursue the topics further may be referred to Adrian (1947) and Barlow and Mollon (1982).

## Evolutionary Epistemology

With the last substantive paragraph, I entered squarely into the realm of what has been variously called Darwinian Epistemology, Epistemological Darwinism or, most commonly, Evolutionary Epistemology (EE). Any slight differences between the original uses of these terms are too fine to affect our argument. Epistemology, of course, is the Theory of Knowledge. The ideas involved in EE can be traced back to Charles Darwin himself, who snorts contemptuously in one of his early Notebooks (M.128): "Plato says in Phaedo that our imaginary ideas arise from the pre-existence of the soul, are not derivable from experience. Read monkeys for pre-existence!" (Gruber 1974, 290). Our fundamental, intuitive ideas, he is saying, are not of mysterious, metaphysical, or cosmic origin, as Plato held ….. but nor are they derived from our own early experience, as empiricists like Locke would have had us believe. They result from the molding of our ancestors' minds, over countless generations starting long before *Homo*, to work successfully in this, physicobiological world.

Such an outlook was developed by near-contemporaries of Darwin's, such as Herbert Spencer, reached a peak at the end of the nineteenth century in William James, and was accepted as given by most biologists (such as Simpson, quoted above) from then till it was taken forward by the work of Konrad Lorenz. Lorenz's development of the outlook was elegantly summarized by the New Zealand historian of ideas, Peter Munz, as a development from—and resolution of—a problem in the writings of Immanuel Kant. Kant had held that the fundamental concepts, in terms of which we interpret all experience, are inborn in us as "innate ideas" which we hold *a priori*: they are not products of our individual experience, but instead are the basics in terms of which we interpret all experience. However, critically for Kant, since we can never assess the world without these a priori concepts, we can never know if they are right. But, for Lorenz, that last concern was invalid. As Munz (1993, 143) put it:

> In the early years of the Second World War, when by coincidence he was a professor in Königsberg [where Kant had spent his entire life], Konrad Lorenz used Darwin's idea about the formative role of the past to put the finishing touches to Kant. He argued that Kant's skepticism about what the world is really like was unjustified because the cognitive structure which enables us to know what the world is like had evolved through natural selection. The reason why our minds have this particular, and no other, cognitive structure … must be that we have evolved and not flown in, so to speak, from outer space. Our cognitive structure has been selected by *and, therefore, reflects or represents*, the real world (my italics).

So, what is inborn in the individual has arisen by the accumulated actions of natural selection upon countless generations of ancestors. In technical biophilosophical language, such inborn concepts (or, as we would now say on the basis of rather better genetic understanding, propensities to form concepts) are "… ontogenetically *a priori*, but phylogenetically *a posteriori*"—that is, innate in the individual but experience-based in the species. Lorenz first outlined this viewpoint in an article published in 1941, but the war then ongoing ensured that it went unnoticed in the English-speaking world. Thirty years later he spelt out his whole outlook much more fully in a book published in German as *Die Rückseite des Spiegels* in 1973, and in English as *Behind the Mirror* (1977).

After that book had appeared, ideas derived from it were actively advanced by a number of biologist-philosophers for the next two decades. Key figures in this period were Gerhard Vollmer (1984) and other contributors to Franz Wuketits (1984), Peter Munz (1985, 1993), Michael Ruse (1986), and Henry Plotkin ([1993] 1993). (The term "Evolutionary Epistemology" was also used by Karl Popper (1972) and Donald Campbell (1974) in an important but significantly different way, to which I shall not refer again in this article.) Yet most mainstream philosophers, whose starting points were not biological, took almost no notice of the Darwinian insight during that period, though the prominent American philosopher of mind, Patricia Churchland, admonished them (2002, 245): "Darwin's theory of natural selection has profound epistemological implications …. [Yet] mainstream epistemology, arguably the backbone of the academic discipline of philosophy, continues to do business as if Darwin never happened." As a rough-and-ready check on Churchland's claim, the index of "Epistemology—an anthology," a collection of 43 articles edited by Ernest Sosa and Jaegwon Kim (2000—i.e., close to Churchland's date), has no entries under either "Evolution" or "Natural Selection," and just one under "Darwin." That, however, is a fine and telling article by Hilary Putnam, entitled "Why Reason Can't be Naturalised." Putnam notes that "[EE] assumes, at bottom, a metaphysically 'realist' notion of truth, truth as 'correspondence to the facts,' or something of that kind" (p. 314). I accept this claim, but do not bow to his follow-up judgment that "this notion is incoherent"! Since then, two philosophers of high standing have

acknowledged the existence of EE only to dismiss it on totally spurious grounds. Alvin Plantinga, philosopher-theologian, repeatedly in his writings, but most definitively in 2011, asserts that: "[T]heistic religion gives us reason to expect our cognitive capacities to match the world in such a way as to make modern science possible. Naturalism gives us no reason at all to expect this sort of match; from the point of view of naturalism, it would be an overwhelming piece of cosmic serendipity if there were such a match." (Plantinga 2011, 303). The first sentence is of course correct: theistic belief—provided we assume that the Theos concerned is benevolent—does give us reason to expect our cognitive capacities to match the world. The second sentence, however, is the converse of the truth: in the very significant number of cases where evolutionary flourishing, even survival, depends on our cognitive capacities matching the world, naturalism gives us reasons at least as strong as theism to expect such a match. Intriguingly, another eminent philosopher, though this time one who professes atheism—Thomas Nagel (2012, 27–28)—also fails utterly to see the evolutionary basis for trusting critical concepts. "Mechanisms of belief formation that have selective advantage in the everyday struggle for existence do not warrant our confidence in the construction of theoretical accounts of the world as a whole." Really? I point again to Simpson's arboreal primate.

A small number of modern thinkers, whose approaches are at least partly philosophical, do favor EE, and indeed are beginning to extend its biological foundations in directions outrunning the scope of this article. Particular among these, for the present purpose, is Natalie Gontier (2012) and Gontier and Bradie 2017). Others is Kevin Laland et al. (2015).

Where the majority of philosophers have been reluctant to tread, a number of theologians have been much more open to Darwinian thinking. Edward Farley (1990), Arthur Peacocke (1979), Philip Hefner (1993), John Haught (2000 *et seq.*), Gordon Kaufman (2004), Loyal Rue (2005), Wentzel van Huyssteen (1999, 2006), and Wesley Wildman (2009) are theologians of whom this is true. I shall quote here from van Huyssteen, who has stressed at many points that the implications of evolution for our understanding of knowledge itself—the subject matter of EE—must be most seriously assessed by theologians. Three quotations from his Gifford Lectures (van Huyssteen 2006; page nos. in brackets) document this position: "theology has traditionally virtually ignored the question of the evolution of human cognition (311)." Yet: "… it would be a serious mistake to think that … one could conceive of an epistemology independent of biology (283)." So, "… for theologians the following should be true: if we take the theory of evolution seriously, we should take evolutionary epistemology seriously" (85).

I welcome and wholeheartedly endorse what van Huyssteen says in those quotes, but believe that his own writing just falls short of the most

critical implication of EE. Van Huyssteen recruits EE in considering how God-concepts arose. (His arguments here are close to those of "cognitive scientists of religion" such as Pascal Boyer (2001), David Sloan Wilson (2002), and Justin Barrett (2004), though these authors do not use the term "EE".) But I go further, and ask not only what EE can suggest about how such concepts came into being, but what guidance it can give about whether they may be trusted. Mistaken concepts of the world are many, many times less likely to promote survival and flourishing—to be "adaptive," as the evolutionary biologist puts it—than those that are valid. On the basis of Occam's razor, the scientist's disposition (though not necessarily that of the philosopher) is therefore to accept, unless and until there is significant evidence to the contrary, that the pictures of the world that have survived the challenge of evolution are likely to be valid. But the rightness of concepts that are unrelated to the physical world—in particular, concepts about a noncorporeal God—can have no cash value in terms of our physical flourishing. So, for the Evolutionary Epistemologist, the conclusion must be that most of these cannot be credited with objective validity at all. Of course, religious practices derived from a concept of the Deity may well affect our well-being, but the validity of the concept plays no part in that outcome.

The article immediately preceding that of Putnam in the Susa and Kim (2000), collection, is by Jaegwon Kim himself. It carries the title "What is 'Naturalised Epistemology?'" In his second paragraph (Susa and Kim 2000, 301), Kim comments that, in seeking conditions that can constitute "'criteria' of justified belief," it is necessary that "the conditions be stated without the use of epistemic terms." This seems precisely to characterize the Evolutionary Epistemologist's position that our flourishing with, for example, the concept of three-dimensional space, provides the most powerful warrant imaginable for that concept being correct, even though biological terms like "flourishing" and "adaptive advantage" have nothing in common with philosophical terms like "epistemic validity" and "truth."

There is one underlying and very fundamental concept of the working of the world that is not only compatible with and readily embraced by EE but figures strongly in it: this is the concept of causation. Causation is integral to our "folk physics," to our ongoing comprehension of the world—and that of at least moderately advanced animals too. My wife and I delight in owning a deliciously handsome, and charmingly good-natured dog, but have to concede that he is not particularly bright. Yet even he is making generalizations, and extrapolating from them, many times each day: his whole behavior-scheme is based on what Francis Bacon and David Hume called "Induction"—recognizing patterns in what happens in the world, and tacitly assuming that the patterns will repeat themselves. Furthermore, a particular form of induction is to deduce, "*Post hoc, ergo propter hoc*"—that events that regularly follow others are caused

by those others. There is no logical justification for induction of any form, let alone the "post hoc, propter hoc" belief, but it is clearly inbuilt in our dog, as it is in his owners. And experiments with higher primates, gorillas, orangutangs and chimpanzees (de Waal 1998, 2006), along with less formal impressions of marine mammals such as porpoises and dolphins, demonstrate equally clearly the same propensities toward both induction, and the concept of cause. Why are they present? Because they have, very much more often than not, worked—contributed to survival—and so believing in their validity has been evolutionarily highly advantageous. It has become inbuilt, not logically but biologically.

Let us hold this recognition in our minds for a while: I shall argue later that it is of immense theological, as well as biological, importance.

## Bricks into Buildings

At this point, I must try to clarify the level of complexity at which proponents of EE contend that natural selection acts. Mathematics provides an instructive case. There are several theories about the origins of mathematics, but for Evolutionists its basics are physical-world realities, the arithmetic and geometry of what we can see, touch and manipulate: mathematics is therefore "embodied"—grounded in bodily experiences of the world (Lakoff and Núñez 2000). And the grounding begins remarkably early, such that infants under six months can distinguish two from one and three (Dehaene 1997; see also Dehaene and Brannon 2011).

Number, the elementary processes of addition, subtraction, and perhaps multiplication and division too; also the basic components of that broad, spatial awareness shown by Simpson's "monkey," and the associated recognitions of elementary geometry. Those are the levels at which it is proposed that natural selection operates. No-one suggests that it operates directly at the level of sophisticated theories. Yet wild flights of mathematical imagination may, decades or even centuries after they were first enunciated, provide extraordinary, and previously unexpected, insights into physical reality. Einstein's use of Riemannian geometry in General Relativity theory is a well-known example. Some 60 years after Bernhard Riemann, Albert Einstein found that the pure mathematician's airy, non-Euclidean speculations embodied important truths about the real, physical world.

In a prestigious lecture, the eminent theoretical physicist, Eugene Wigner (1960), dwelt on "the unreasonable effectiveness of mathematics" in making predictions about the physical world. But it is not unreasonable at all if mathematical thinking is a product of evolution! Inverting Wigner's argument, what stronger evidence could there be that, at root, even Riemann's remote pattern of thinking was nature-based? Obviously, his majestically complex theoretical edifice was not directly subject to natural selection: but it was constructed from basic mathematical bricks, and

those bricks are among the concepts directly tested by evolutionary mechanisms.

And so it is for any other form of sophisticated thinking—including philosophy and theology. Elite thinkers may create vast edifices on the basis of evolution-tested concepts: yet these concepts remain the building blocks—the "bricks" with which the edifices are built. So, the edifices cannot escape their earth-bound origins: they can never meaningfully address any claimed extra-physical reality, "beyond" space and time.

### Evolutionary/Darwinian Epistemology and Theological Propositions

From the standpoint of EE, the concepts most conducive to survival and reproduction in the natural world are the most trustworthy; exactly as in Simpson's example, of the "monkey's" spatial judgment, if the sensory mechanisms that an early tree-dweller utilized, and the conceptual understanding resulting, were not both highly reliable, successors of that early primate, such as *Homo sapiens*, would not be here. By radical contrast, concepts unrelated to survival have not been similarly honed. In particular, nonphysical existence, though almost universally assumed in unsophisticated theological thinking (such as presented in most Sunday-school classes or Evangelical meetings!), is a totally hollow concept—physicality is in the very meaning of the word "exist."

Looking back to the quotation from Lorenz, about the organs we have developed, it seems inescapable that not only our physical but our mental "organs"—our capacities to undertake particular forms of mental process and formulate particular kinds of concept—have been selected by their contributions to our ancestors' survival and reproduction. Thus, in instances where survival is directly affected, not only perception but also conception must be pretty accurate.

- If we were wrong in our spatial judgments, swinging between branches or leaping over chasms, we would either fall, probably fatally, or be likely to concuss ourselves against the far side.
- If we were wrong in our conceptions of other animals, we would be prone on the one hand to attempt to cook logs or even rocks as food, on the other to try and cuddle tigers or mate with gorillas.
- Further physicochemical concepts would be just as critically tested in our avoidance of very hot or very cold things, and of mechanically unstable, putrefying, or otherwise hazardous objects or environments.
- More abstract, yet arguably more fundamental than any of these particular property-awarenesses are the concepts, considered above, of generalization/induction and of cause. As Hume insisted, neither of

these mental processes can be logically justified; nevertheless, they are essential psychologically, and to our adaptedness to the world.

- Subtler, social interactions, from an inhibition against striking or biting everyone we meet to dispositions toward cooperation, altruism, sensitivity to others' feelings, and even love, would in the longer run be just as critical.

If it were possible to set up a calculus of credibility, the social concepts that have guided us would surely all score over 50% and the physical ones close—often limitingly close—to 100%, on the basis of their essentiality to our survival. And the origin of them all?—Biological selection, survival of the fittest to reproduce. No other mechanism is evident or needed.

In everyday thought, and that of the great majority of philosophers, the truth of a concept is a property entirely independent of its contribution to its holder's survival and flourishing in the natural world. To the radical evolutionist, however, this distinction is unsound. Taking as a paradigm case the concept of three-dimensional space, which has been adduced repeatedly in this article, only if the concept has a high degree of validity will it contribute to survival: holding a significantly inaccurate space-concept would quickly prove fatal. The same is true of many of the other concepts just mentioned—concepts of temperature, of many mechanical properties, of healthy condition versus sickness or putrefaction, or of the behavioral characteristics of many animals, could equally often be of life-or-death significance. Indeed, a cogent case can be made for equating survival value with trustworthiness and hence validity: on this thinking, concepts honed in the furnace of Natural Selection over the length of evolutionary time *must* be valid, while those not so honed can call upon no objective support.

Thus, from an evolutionary standpoint, concepts purporting to address immaterial entities or events outside time and space can command no credence. Consequently, almost all Evolutionary Epistemologists who express a view about theology are either agnostics or atheists. But for me this is going too far. First, as an uncontentious starting point, myths we tell ourselves may be challenging, inspiring, or illuminating, and in each such way beneficial, without conveying objective truth. Second, values, moral and aesthetic, can arguably have their own reality as routes to God. We can look upon them as having divine significance—displaying truths about the world that traditional, simplistic (Richard-Dawkins-type) science cannot encompass (Ellis 2014). Finally, however—and to my mind the most important EE-compatible theological concept—I return to the concept of cause, which henceforth I shall write with a capital C. From Aristotle, via his near re-incarnation in Aquinas, to a large number of contemporary thinkers, the concept of First (or Fundamental) Cause was the essence of the philosophical idea of Deity.And the attempts of such

brilliant physicists and cosmologists as Steven Hawking to persuade us that their equations, describing fluctuations of quantum wave functions in a vacuum, can bring the universe into being without a Cause, seem to me like sleight of mathematical or verbal hand: surely they are just describing how the First Cause manifests itself, within their frames of reference?

Sleight of mathematical hand apart, it suits most minds to think of the Big Bang concept as highly compatible with there having been an initial Cause. And the other name for that First Cause is, surely, God—infinitely dangerous, more explosive than dynamite, though that concept is? Pope Pius XII certainly claimed, in 1951, this Cause-God equivalence, though others have castigated this and similar claims as an unscientific (or philosophically mistaken) merger of ideas. Causation within this world is certainly *not* a mechanistic model of the postulated causation *of* this world. All it can model is the logical requirement that *there must have been a Cause*: ideas of the nature of that Cause have to involve a mathematical theory of the beginnings of space, time, and matter. George Lemaitre, the initiator of the earliest model, "The hypothesis of the primitive atom," despite being an ordained Catholic priest, is said to have declined for nearly three decades to become President of the Pontifical Academy of Sciences, preferring to keep his science separate from his faith. But there is an intriguing, and poignant, counter-story. In the middle of the twentieth century, the comparably great cosmologist, Fred Hoyle, who argued for a universe of infinite duration, maintained in a steady state by the continuous creation of hydrogen atoms, openly admitted that he was encouraged to propose this model because of his atheist disposition: he shared the feeling that the Big Bang story had powerful evocations of Genesis, and he, in diametric contrast to Pius XII, was uncomfortable with that. Indeed, it was he who coined the very term "Big Bang," as what is widely assumed to have been a derogatory dismissal of Lemaitre's hypothesis. Yet, apparently unhappy at the reception of his own views (which probably had most to do with his blunt, often rude, manner) Hoyle resigned his Plumian Professorship and other Cambridge posts in 1972–1973, leaving himself financially insecure and out of the scientific mainstream. Thinkers who are theologically more subtle than Hoyle can happily embrace the idea of God sustaining a universe eternally, but that is not the currently received cosmological model—though "currently received" by no means equates to "certainly proved," for many assumptions, not all convincingly consistent with each other, underlie that model. But the Big Bang, as a consequence of God's majestically creative act, is an account to which any of us may cleave in 2021, if we are so inclined.

Beyond this, the evolutionary critique, as I have presented it, insists that we can make no positive statements about God, or a world "external" to ours—a Heaven—in which Divinity is purported to exist. But let us be absolutely clear: we cannot make any negative statements either! I have

contended that there must have been a Cause (or continue to be an ongoing Cause). Beyond that, we little human beings, entirely enclosed within what has been caused (otherwise known as "Creation") can say nothing. We cannot step outside, and look in. Or if that terminology is too simplistically geometrical, we must strenuously avoid thinking in terms of a "flat plain" (Prof. Sarah Coakley's term) upon which God acts at the same level as a physical cause. If a theistic picture is to be held in conjunction with a physical one, it must surely be along the lines of Aquinas's "double agency," the divine spirit operating in parallel with physical mechanisms but on a different plane, accessible not to science but to the prayers and worship of believers? On that radically different plane it will be possible to sense that God is "closer [to us] than breathing, nearer than hands and feet" (Alfred Lord Tennyson, *The Higher Pantheism*). Such a picture does not offer itself readily to the evolutionary thinker, but can be recruited by one who is impelled by personal experience to uphold a spiritual sensibility alongside the evolutionary one. Otherwise, going back to the terminology of the early centuries after Christ, I judge the *Via apophatica* to be the only way of thinking theologically, in the face of the scientific and evolutionary critique.

## Apophatic Thinking

Only a few apophatic positions are adopted in the Bible. The classic example is Moses' encounter with God in cloud on Sinai (Exodus 24, 12–18), enthusiastically discussed by the fifth-century visionary, Pseudo-Dionysius. Consider this wonderful passage addressed to his disciple Timothy, in *The Mystical Theology* (Rorem 1993, 189):

> The good cause of all is both eloquent and taciturn, indeed wordless. It has neither word nor act of understanding, since it is on a plane above all this, and it is made manifest only to those who … leave behind them every divine light, every voice, every word from heaven, and who plunge into the darkness where, as scripture proclaims, there dwells One who is beyond all things. It is not for nothing that the blessed Moses is commanded to submit first to purification and then to depart from those who have not undergone this … When every purification is complete, he hears the many-voiced trumpets. He sees the many lights, pure and with rays streaming abundantly. Then, standing apart from the crowds and accompanied by chosen priests, he pushes ahead to the summit of the divine ascents. And yet he does not meet God himself, but contemplates, not him who is invisible, but rather where he dwells.

Or, in a more modern and much terser statement: "Whereof one cannot speak, thereof one must be silent" (Wittgenstein 1922, §7).

That applies with redoubled force if we entrap ourselves in the "third-party observer" way of thinking about God—as if a journalist had been posted to watch events. Only an observer so positioned could validly have

written the early chapters of Genesis. Sufficient to consider the phrases: "And God said … God made … God created," as we read throughout Genesis 1. That old theological language represents an absolutely impossible human position. Actually (assuming we are at ease with God-language itself), we have to recognize that we are embedded in that God's creation, interacting with Deity as organs within the created body of the Universe—the "Being," of which God is the "Ground," to use the terminology of Paul Tillich (1952, 153–56). Our own being is utterly embodied within creation, in no way able to stand outside, even in imagination, and assess what is happening, or ever did happen. Our viewpoint is entirely circular, and in that sense radically incomplete. I cannot shake free of Shakespeare's perception, put into the mouth of Hamlet: "I could be bounded in a nutshell, and think myself a king of infinite space." In the plot of the play, those words refer only to the politics of a small country. But there was surely a deeper point, at by no means the very back of the playwright's mind?

Given our limited vision, utterances of deeper sense, of creed-free faith, are arguably the truest religious utterances of all. The best-known English-language example of this must be the ode written by the young-adult William Wordsworth in 1798 to his beloved sister:

Above Tintern Abbey

I have learned
To look on nature, not as in the hour
Of thoughtless youth; but hearing oftentimes
The still, sad music of humanity,
Nor harsh nor grating, though of ample power
To chasten and subdue.

And I have felt
A presence that disturbs me with the joy
Of elevated thoughts; a sense sublime
Of something far more deeply interfused,
Whose dwelling is the light of setting suns,
And the round ocean and the living air,
And the blue sky, and in the mind of man:
  A motion and a spirit that impels
  All thinking things, all objects of all thought,
  And rolls through all things.

This is surely the religious spirit through and through? Not creedal, not theological—and not the adolescent's pulsating physical joy of the first three lines, as he ran through coppices and leapt over streams—but a deeper, more elusive sensibility. Yet here, in only half-tamed countryside, he feels: "A motion and a spirit that impels/All thinking things, all objects of all thought,/And rolls through all things."

I know no stronger representation of the Impenetrable Holy, what Rudolph Otto (1958) termed the "Numinous Other" ….. "the feeling that remains where concepts fail." This we can espouse, from inside our nutshell, while committing no solecisms against the grammar of our being—while uttering no impossible propositions, which could only have meaning if we were looking in from the outside on God's interactions with the world—no totally impossible distortions of any humanly meaningful epistemology.

For further expression of a similar sensibility, let us return to Pseudo-Dionysius, speaking to Timothy:

> My friend, my advice to you as you look for a sight of the mysterious things, is to leave behind you everything perceived and understood, everything perceptible and understandable … and, with your understanding laid aside, to strive upward as much as you can toward union with him who is beyond all being and knowledge. By an undivided and absolute abandonment of yourself and everything, shedding all and freed from all, you will be uplifted to the ray of the divine shadow that is above everything that is.
>
> This means, I presume, that the holiest and highest of the things perceived with the eye of the body or the mind are but the rationale that presupposes all that lies below the Transcendent One. Through them, however, his unimaginable presence is shown, walking the heights of those holy places to which the mind at least can rise. But then Moses breaks free of them, away from what sees and is seen, and he plunges into the truly mysterious darkness of unknowing. Here, renouncing all that the mind may conceive, wrapped entirely in the intangible and the invisible, he belongs entirely to him who is beyond everything. Here, being neither oneself nor someone else, one is supremely united to the completely unknown God by an inactivity of all knowledge, and knows beyond the mind by knowing nothing. (Rorem 1993, 185, 193)

## The Apostles' Creed

Contrasting everyday religion with that majestic paeon of unknowing, let us look at the Apostles' Creed through the eyes of a sympathetic Evolutionary Epistemologist. To avoid denominational preference, I use the 1988 version of the creed by the English Language Liturgical Consultation.

> I believe in God the Father almighty, creator of heaven and earth.

I see this as happily compatible with EE, flexibly interpreted. From this standpoint, "Father" is a pleasing, nonliteral image, attributable simply to the fact that our theological origins were in one of the most patriarchal of all societies, Judaism; if an earlier, Earth-Mother stage had been embedded in the language, the word would of course be "Mother." The common feature of the two images is parenthood. Supplementing either, "Creator" conveys the essential concept of an act performed—or being continuously

performed. The fundamental idea these terms embody is that of cause, which I emphasized earlier as a fundamental concept within EE. Recapping, EE embraces the concept of cause within the physical world; we can know nothing specific about a Cause outwith that world, but we can, and I contend must, conceive the logical need for it. In traditional, religious terms, therefore, the Father/Mother/Creator can be deduced as logically necessary, though no knowledge of "Him"/"Her" is possible for us beyond the recognition of "His"/"Her" creative act. In the words of the late Herbert McCabe: "To invoke God is not to clear up a puzzle, but to draw attention to a mystery." And, as John Cottingham argues, quoting that sentence of McCabe's, in a book recently edited by Fiona Ellis (2018, 25–26); "To be religious is in a certain way to embrace that mystery, with hope and perhaps with joy, but certainly not to regard it as dissolved by an ingenious explanatory hypothesis called theism."

The next creedal sentence is: "I believe in Jesus Christ, God's only Son, our Lord." Jesus, the man in history, is vividly embraced by those for whom the Gospel stories carry conviction. Christ, as the Judaic Messiah, is an incontrovertible historical allusion; by contrast, the metaphysical implications of the name "Christ" as part Deity, part human, and of Christological debates such as those of the fourth century—which figure extensively in the creeds that came after that of the Apostles—cannot be meaningful. And "Son" of God, though a pleasing image, is without literal meaning for the EE practitioner.

"Who was conceived by the Holy Spirit, born of the Virgin Mary, suffered under Pontius Pilate." I doubt if any Evolutionary Epistemologists would accept that Mary was a virgin, so they need not consider the putative role of the Holy Spirit, but Mary's role as mother of Jesus, and the suffering under Pilate, are both fully acceptable as history.

"Was crucified, died, and was buried; he descended to the dead,/On the third day he rose again; he ascended into heaven,/he is seated at the right hand of the Father,/and he will come to judge the living and the dead." The abode of the dead, and heaven, cannot be places, but might with generosity be interpreted as implying mental states, of negativity and torment on the one hand and of satisfaction and fulfilment on the other. Jesus's rising from the dead cannot be literal, but recently dead people who were much loved or very powerful personalities—and Jesus was both!—are not infrequently sensed by the recently bereaved as present again. "Right hand" can obviously have no literal meaning. As to judging the living and the dead, again I find it impossible to consider this literally. Rather, surely, it is a warning that satisfaction in life depends critically on how one has lived it?

"I believe in the Holy Spirit,/the holy catholic Church,/the communion of saints the forgiveness of sins,/the resurrection of the body,/and the life everlasting." The modern, naturalistic thinker may be aware of a sense of

the divine presence and be happy to recognize that as the Holy Spirit. Such a thinker will obviously recognize the existence of the Church as a physical and social fact, though without the metaphysical underpinning implied by the creed. Rather similarly with the communion of the saints, and forgiveness of sins—psychological, though not metaphysical truths. The last two lines, however, are in a different category. Perhaps not strictly EE, but the deep-seated naturalism of which EE is an expression, can have no truck with bodily resurrection, whether for an individual or for the majority of humankind—and the concept would be doubly inappropriate if it depended on their having held while here-below to a certain pattern of belief, and membership of a particular faith community. Life everlasting, taken frontally, is obviously in the same case, redoubled, but perhaps it is capable of allegorical interpretation that has beauty and inspiration to it, albeit destroyed by any attempt at literalism; rather, embodying a general sense that the pattern of each human life, the sum of its actions in the world, matters. To what or Whom it matters can be answered in part as "the totality of other human beings," but can also be referred to the First Cause with which/whom the creed began.

Thus far, in keeping with my perspective as an evolutionary scientist, I have held firmly to the stance that *Homo sapiens* can logically trust only those positions that have promoted its survival and flourishing here-below. This is a position of rigorous parsimony in the search for truth. Or rather, since "Truth" and "Falsehood" are not so much nouns, as "true" and "false" are adjectives—searching, searing adjectives—let me rephrase that clause as "search for ideas, beliefs and concepts that are true."

I have argued that our situation, as evolved beings, radically limits our criteria for the assessment of knowing. Only statements made entirely from within this physical world, and tested by the standards of validity that imply survival-promotion there, can carry meaning here-below. Of religious propositions, those recognizing the reality of a First Cause are perfectly acceptable, but we delude ourselves if we claim on evolutionary grounds any knowledge *of* that Cause—or the wishes, the moral dictates, that Cause may have for us. Yet, uncomfortable though it must be for the dyed-in-the-wool Naturalist, it would be grossly improper not to acknowledge the totality of this ignorance. We cannot, from within our understanding of the Universe, our human Umwelt, exclude the possibility that the First Cause permits us revelation of its Divine Mind. It is not a logical impossibility, and an individual's existential judgment that he/she has received such a revelation—found it, perhaps, in a particular scripture, the teachings of a particular religious grouping, or even the sight of a particular sunset—cannot be automatically ruled out by any preconceived rules of credibility. Nor can the sense of profound vision, enlightenment, and attendant joy, stemming from such a purported revelation, be gainsaid by any objective criteria. And these senses of enlightenment and joy are the

foundation of all the good which religion, at its best can do—replete as it then is with spiritual vision, moral insight, and endless ad hominem challenge.

## Purported Revelations

However, immediately we contemplate the huge diversity of different purported revelations that have been, and are continually being, proclaimed among humankind, the utmost caution is called for. If a mind is Divine, it must surely be consistent? Ten thousand purported revelations cannot all be valid revelations. If we feel obliged to open ourselves to the possibility of revelation the most logical stance will be to attempt to construct, by a lifetime's study supported by spiritual discipline and prayer, a synthesis of all the purported revelations. That would be an infinitely worthy, but overwhelmingly difficult and never-completable pilgrimage. The alternative, of electing to commit to a particular formulation, as having been the Cause's revelation to us, is hugely hazardous. The only way of doing it, with appropriate humility, in the vast perspective of the evolutionary standpoint, is to recognize that any choice we make will be circumstantial, the product of an immense conglomeration of accidents in our own history. Cleaving to it, any more strongly than that, is fraught with dangers. Look back at the endless burnings of martyrs, the appalling Crusades, the Inquisition, the 30 years' war …. and on to Northern Ireland's troubles, 9/11, Daesh, the Rohingya massacres, Jihadi terrorism: the endless black tales of murderous hatred that humanity has accumulated, in the name of so-called "religion." The most superficial glance at history demonstrates inescapably that confidence in dogma—Christian, Muslim, Hindu …. any dogma—is hugely dangerous, while actual certainty must surely be recognized as downright evil? If you feel you *have* to commit yourself to one faith, one sect, one position, for the purposes of going forward, I pray you do it only provisionally, with fear and trembling—only on a "let's proceed as if" basis, never the arrogant, inflexible certitude of "I know, and I am right." If, against all wisdom, you cannot hold back from the latter stance, "Enter these enchanted woods, you who dare" (Meredith [1883] 1912, 192).

## Post-Script on the Scientific Concepts Implied Above

This article has given its account of evolution wholly in terms compatible with the so-called "Modern Synthesis"—the viewpoint on evolutionary mechanisms first established in the 1930s by Ronald Fisher, Julian Huxley, Sewell Wright, and co-thinkers. In this there was assumed to be a 1:1 causal influence of the gene upon the morphology and/or the behavior of the resulting animal, but there was no action in the other direction, of the animal's life experience upon its genes and their expression. Mainstream

biological thinking has developed substantially further in recent years, particularly under the label The Extended Evolutionary Synthesis (EES, Laland et al. 2015). Key features of EES are individual ("ontogenetic") plasticity in response to environment, and behavioral niche construction: classic instances of the latter are the spider's web and the beaver's dam, but nothing in nonhuman biology comes near the massive niche that is the human city. Furthermore, EES recognizes that these phenomena are liable to play back upon gene expression.

If EE ever reaches the sophistication of quantitative modeling, such recent subtleties will have to be embraced within an argument such as mine. But EE is not yet near that stage, so I propose that the kind of qualitative account offered in this article represents in principle the necessary ideas. And the *leitmotif* of the article, that Natural Selection always has the final say, whatever the nature of the variations with which it is presented, is not challenged by any of the post-1930s thinking enunciated up till now.

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