Dawkinsian Metaphysics

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ABSTRACT: A little digging reveals an intriguing metaphysics in the texts of Richard Dawkins. Since universes are complex, the Dawkinsian account of complexity entails that they evolved. An extensive study of the Dawkinsian texts supports a titanic interpretation of cosmic evolution. The titans resemble asexually reproducing and recursively self-upgrading computers. As titans evolve, they run increasingly complex universes. Dawkinsian metaphysics supports an intriguing new type of evolutionary lifestyle, which includes nontheistic religious and spiritual practices. These new practices are already socially challenging the theistic religions.

1. Introduction

As one of the New Atheists, Richard Dawkins argues against the existence of God. The *God Hypothesis* asserts that "there exists a superhuman, supernatural intelligence who deliberately designed and created the universe and everything in it, including us" (2008: 52; hereafter *GD*). Dawkins argues that the God Hypothesis is false. His reasoning has provoked many theistic rebuttals (Richmond, 2007; Ganssle, 2008; Craig, 2009; Wielenberg, 2009). However, by focusing on God, both theists and atheists have failed to see that Dawkins outlines a deep and unusual metaphysical system. Much of this *Dawkinsian metaphysics* can be picked up directly from his texts. But some of it needs to be filled in by inference and systematization. That work is done here.

Dawkinsian metaphysics begins with an account of complexity, an account which applies to all concrete things. This account implies that universes, like organisms, are produced by an evolutionary process. Simple universes evolve into more complex universes. But they do so through reproduction, heredity, variation, and selection. Moreover, since the Dawkinsian account of complexity is essentially digital, universes evolve through computational mechanisms. Hence there exists a phylogenetic tree of ultimate computing machines. These machines are referred to here as the *titans*. The first titan is "the simple basis for a self-bootstrapping crane which eventually raised the world as we know it into its present complex existence" (GD 184-5). Titans evolve through recursive self-improvement. They make increasingly complex universes, much like spiders weave their webs, birds build their nests, and beavers build their dams.

Dawkins explicitly refers to himself as a deeply religious person (GD ch. 1). To those who equate religion with theism, this declaration may seem absurd. Yet Dawkins has much to say about religion. And what he says indicates that we ought to work to replace the old theistic religions with new naturalistic religions. The Dawkinsian metaphysics supports a rich *religious naturalism* (Goodenough, 1998; Crosby, 2002; Raymo, 2008; Stone, 2008). It grounds a system of spiritual practices. Since they are naturalistic, these practices involve no worship. But they do involve expressions of gratitude for the past, serenity in the present, and hope for the future. They are embraced

by ever-larger social groups. It is possible to see a future in which Abrahamic theism is replaced by a religious naturalism grounded in something like Dawkinsian metaphysics.

2. Biological Cranes

Dawkins presents a combinatorial theory of complexity (Dawkins, 1986: 1-6; hereafter *BW*). The complexity of any thing of any type is defined in terms of its *permutations*. A permutation of some thing is any way of rearranging its parts. The complexity of any thing of any type is the number of permutations of that thing divided by the number of permutations that preserve the type. The complexity of any type is the average complexity of all its instances. All the types associated with life are highly complex. On this account, complexity is proportional to rareness in the logical space of possibilities (BW 6-9; Dawkins, 1996: 75; hereafter *CMI*). Simple things are common while complex things are rare. Hence complex things need to be explained (BW 1).

One hypothesis says that complex things are produced by *chance*. But this explanation is refuted by their rarity. Any *lottery* which randomly selected an arrangement would almost certainly not make a complex thing. If some random winds blow atoms together, they will almost certainly not produce life (CMI 75). So, complex things are not likely to occur by chance (BW 7-9; CMI 77-9; GD 144-7). They need another explanation. Another hypothesis says they are *designed*. But Dawkins argues that design implies an impossible regress (CMI 77; GD 136-8; 146). When we are confronted with a complex thing, Dawkins says that "Darwinism teaches us to be wary of the easy assumption that design is the only alternative to chance, and teaches us to seek out graded ramps of slowly increasing complexity" (GD 139). Dawkins refers to this gradual accumulation of complexity as *climbing Mount Improbable* and he argues that only natural selection can do that climbing (GD 147) All the complexity on earth "comes from natural selection: the process which, as far as we know, is the only process ultimately capable of generating complexity out of simplicity" (GD 180).

Dawkins offers an evolutionary explanation for complex living things (BW 14, 43; GD 147). It begins with simple organisms which, since they are probable, do exist by chance. There are some ways they can change. Some of these changes are simple enough to occur by chance. And some of these simple changes increase complexity. But as complexity increases, selective pressures tend to prevent it from decreasing (CMI 133-6). So there are some genealogical sequences of organisms which start out simple and which gradually accumulate complexity. These sequences are *cranes* in which organisms lift themselves up to higher levels of complexity. Since the simple starting organisms are highly probable, and each simple change is highly probable, these cranes are highly probable. Hence "the whole sequence of cumulative steps constitutes anything but a chance process" (BW 43). It is able to produce a complex end-product which is too improbable to come into existence by chance (BW 43).

Evolution involves four ingredients (CMI 88). The first ingredient is *reproduction*. Things must be able to produce new things of the same type. But reproduction is not sufficient: bush fires reproduce but do not evolve (CMI 88). The second ingredient is *heredity*. Offspring must resemble their parents more than other things of the same type; they must be highly similar copies of their parents. The third ingredient is *variation*.

Offspring cannot always be exact copies of their parents. The fourth ingredient is *selection*. Selection non-randomly filters out unfit variations. Fitness often (but not always) corresponds to an increase in complexity. Hence evolution accumulates complexity according to Dennett's *Principle of Accumulation of Design*. That principle states that "since each new designed thing that appears must have a large design investment in its etiology somewhere, the cheapest hypothesis will always be that the design is largely copied from earlier designs, which are copied from earlier designs, and so forth" (1995: 72). Therefore cranes can climb Mount Improbable.

3. Cosmic Cranes

Our universe is filled with cranes: physics teaches us that all complex atoms are produced by cranes; chemistry reveals that all complex molecules are produced by cranes (Garrod et al. 2008); biology shows that all complex organisms are produced by cranes; the study of technology shows that all complex artifacts are produced by cranes (Basalla, 1988; Temkin & Eldredge, 2007). By induction, all complex things in our universe are made by cranes. Further generalization of the inductive argument for cranes justifies the thesis that *all concrete complexity* comes from cranes. It justifies the *Evolutionary Principle*, which states that if any thing is complex, then it has been generated by some crane that started out simple and climbed up through all lower levels of complexity.

Although the Evolutionary Principle gains support from observation, it also gains support from at least one important mathematical theory of complexity (Bennett, 1988, 1990). For Bennett, complexity is *logical depth,* and the logical depth of any thing is the amount of computational work needed to produce the structure of that thing. Logical depth obeys a *slow-growth law*, which states that logically deep things cannot easily be produced by chance. Logically deep things result from long processes in which depth slowly accumulates. Machta writes that "depth is sensitive to embedded computation and can only be large for systems that carry out computationally complex information processing" (2011: 037111-6). If complexity is depth, then the Evolutionary Principle entails that things gain complexity by containing computations fractally nested in computations. They contain cranes fractally nested in cranes.

Both inductive and mathematical arguments justify the generality of the Evolutionary Principle. So, if there are any complex universes, they too have been produced by cranes. An examination of cosmic possibility shows that complex universes do exist. Possible universes are like books in an abstract Platonic library or museum. Dawkins refers to the Museum of All Possible Animals (CMI ch. 6). But there is a similar Museum of All Possible Universes. Leibniz referred to it as the *Palace of the Fates* (*Theodicy*, secs. 414-7); however, for a Dawkinsian naturalist, this museum is purely mathematical, and does not exist in the mind of God. Cellular automata are perhaps the simplest universes. Many studies on cosmic complexity involve life-like cellular automata (Poundstone, 1985). While there are over 242,000 possible rules for life-like cellular automata, only a few dozen contain complex patterns (Eppstein, 2010). Among all these, only Conway's *game of life* is known to permit Turing-universal patterns (Rendell, 2001). It is widely believed that, in the Museum of All Possible Universes, abstract cosmic patterns finely tuned for life are vanishingly rare (Leslie, 1989).

Two arguments say our universe is complex. The first goes like this: The equations found in our fundamental physical theories, such as quantum mechanics and relativity, involve some very complex mathematics; but anything whose basic nature is governed by complex mathematics is itself complex; therefore, our universe is complex. The second argument runs this way: Our universe is inhabited by many complex things; but any whole containing many complex parts is itself complex; therefore, our universe is complex. Our universe contains many cranes nested in cranes: technological cranes run inside biological cranes; biological cranes run inside physical cranes. Accepting these arguments, it is reasonable to conclude that our universe is extremely complex. Although it seems likely that our universe is only finitely complex, its complexity may be infinite. Either way, its extreme complexity demands an explanation.

Since universes like ours are complex, they are improbable. Hence they are not likely to have occurred by either chance or design. The only remaining explanation is that they are produced by cosmic cranes. Dawkins says our universe was brought into being by a crane: "the very least that any honest quest for truth must have in setting out to explain such monstrosities of improbability as a rainforest, a coral reef, or a universe is a crane" (GD 185). He says we need "a cosmological crane to stand alongside Darwin's biological one" (GD 185). He says that "maybe the elusive crane that cosmologists seek will be a version of Darwin's idea itself" (GD 185). But he allows that the cosmic crane need not be natural selection (GD 185). Nevertheless, it will be some process which starts out simple and gradually accumulates complexity. It is assumed hereafter that Dawkins is committed to some cosmic crane. If that is right, then Dawkinsian metaphysics rules out craneless pluralities of independent actual universes. It rules out the plenums discussed by Lewis (1986) or Tegmark (2008).

4. Physical Explanations for our Universe

On Dawkinsian principles, our universe was by produced by some cosmic crane. This crane contains at least one series of increasingly complex universes. Some power transforms the earlier universes in any cosmic crane into later universes. Either that power lies within the universes or outside of them. However, outside of those universes, there are no powers at all. So each universe has the power to produce its later universes. Universes therefore resemble self-reproducing organisms. This *biological analogy* is very old (Plato, *Timaeus*, 30b-31b; Cicero, *On the Nature of the Gods,* Bk. 2; Hume, 1779: part 7; Vidal, 2010). The biological analogy motivates cosmic evolution like this: (1) Much as organisms beget organisms, so universes beget universes. (2) Much as complex organisms evolve from simpler organisms, so complex universes evolve from simpler universes. (3) Hence our universe evolved from simpler universes.

Since the biological analogy is too abstract to do any explanatory work, it needs to be given some precise physical content. One way to supply that content comes from the theory of *Chaotic Eternal Inflation* (Linde, 1986, 1994). Dawkins mentions this theory (GD 185). It states that universes reproduce asexually by budding. More precisely, universes resemble balloons that expand through energetic inflation. Sometimes these universes inflate very rapidly. When that happens, they produce offspring universes. Thus "one inflationary universe sprouts other inflationary bubbles, which in turn produce

other inflationary bubbles" (1994: 54). The result is a "chain reaction, producing a fractallike pattern of universes" (1994: 54). Hence we live in a *self-reproducing universe*. When universes reproduce, their offspring have variant laws. So there is heredity with variation. Our universe "grows, fluctuates and eternally reproduces itself in all possible forms, as if adjusting itself for all possible types of life that it can support" (1994: 55). As universes beget enormous numbers of variant offspring, it becomes increasingly likely that complex universes like ours exist. Nevertheless, Chaotic Eternal Inflation does not involve selection. It isn't a crane. If cranes really are needed to produce complex things, then Chaotic Eternal Inflation won't work. It will just wander randomly and eternally on the vast flat plains of cosmic simplicity.

Another way to provide precise physical content for the biological analogy comes from the *Fecund Universe Hypothesis* (Smolin, 1992, 1997). It is discussed by Dawkins (GD 175). On this hypothesis, universes reproduce asexually via black holes. When a black hole collapses in some parent universe, that collapse begets an offspring universe. This begetting somewhat resembles biological budding: universes reproduce like yeast or hydras. While the offspring inherit most of the lawful structure of their parents, some of that structure is mutated. Hence there is heredity with variation. Variations whose laws encourage black hole production will have more offspring. So, as cosmic reproduction goes on, the cosmic generations will become increasingly populated by universes whose laws are ever more finely tuned to create black holes. As it turns out, universes that are more finely tuned to create black holes are also more finely tuned for the internal evolution of complex life. Consequently, as cosmic reproduction goes on, nature will be increasingly populated by universes finely tuned for life. This is a very weak kind of selection. The Fecund Universe Hypothesis is barely a crane at all. Once more, if cranes really are required for complexity, this hypothesis probably won't work.

Both Chaotic Eternal Inflation and the Fecund Universe Hypothesis look like evolutionary cosmologies. But they both face a deep Dawkinsian objection: (1) The machinery behind these physical cosmologies is highly complex. (2) But any complex machinery demands an explanation. (3) The best explanation for any complex machinery is that there is some crane which has brought it into being. This crane began with some simple machinery, which it lifted up to the heights on some cosmological Mount Improbable. (4) Therefore, even if one of these physical theories is true, it depends on some deeper crane. Analogous remarks apply to any *merely physical theory* which aims to account for our complex universe. Merely physical theories of our universe *already presuppose* highly complex physical structures (such as richly structured space-times, energetic quantum fields, string theory landscapes, etc.). Every merely physical theory involves unexplained complexity which requires some deeper crane.

Another way to see the difficulty with all merely physical theories involves the distinction between cosmic *bubbles* and cosmic *foams*. Merely physical theories (like the Fecund Universe Hypothesis or Chaotic Eternal Inflation) may very well explain the *complex bubble* in which we find ourselves. But they fail to explain the *complex foam* which contains our bubble. *Metaphysical theories*, which must be ultimate, aim to explain the foam. The distinction between merely physical theories and metaphysical theories is nicely illustrated by the conflict between Krauss (2012) and Albert (2012). Krauss said he had explained why there is something rather than nothing. But Albert replied that he had merely explained why there are quantum fields with particles rather

than quantum fields without particles. Krauss failed to explain why there are any quantum fields at all. Any Dawkinsian metaphysics aims to explain all complex physical structures (including all quantum fields, particles or not). It aims to explain our universe using some ultimate crane which began with simplicity.

5. The Naturalized Cosmological Argument

Since the cosmic crane is ultimate, it cannot depend on any deeper crane. It must be as simple as possible; it must start from some simple first cause. The theologians tell Dawkins that "There must have been a first cause of everything, and we might as well give it the name God" (GD 184). Quite remarkably, Dawkins replies like this: "Yes, I said, but it must have been simple and therefore, whatever else we call it, God is not an appropriate name" (GD 184). This Dawkinsian first cause is not the complex designer of our universe (Dawkins, 1996: 77; hereafter *CMI*). And the first cause cannot have the other religiously significant properties that Abrahamic theists attribute to their God (CMI 77; GD 101). Dawkins says that "The first cause that we seek must have been the simple basis for a self-bootstrapping crane which eventually raised the world as we know it into its present complex existence" (GD 184-5; see GD 101).

The existence of the Dawkinsian first cause is justified by a naturalistic version of the Thomistic Argument from Change (the Second Way). The *Naturalistic Argument from Change* now runs like this: (1) Our universe is complex. (2) If any thing is complex, then the Evolutionary Principle says it has been generated by some process that started out simple and climbed up through all lower levels of complexity. (3) Therefore, our universe has been generated by some cosmic process that starts out simple and climbed up through all the lower levels of cosmic complexity. (4) Since this cosmic process starts out simple, it starts out with some nonempty set of simple universes. (5) Hence these simple *root universes* exist. (6) Since cosmic complexity increases during this process, it is an evolutionary process. Cosmic evolution resembles other evolutionary processes, such as the evolution of atomic, molecular, biological, or technical complexity. (7) When Dawkins discusses cosmic evolution, he prefers to think of it in biological terms (GD 98-9, 184-9). Hence this biological analogy is accepted here. According to this biological analogy, every universe resembles an organism. (8) So the process of cosmic evolution starts out with some set of simple self-reproducing universes.

A cosmic crane starts with some simple universes. If Dawkinsian principles are correct, these are produced by chance. Dawkins says it is probable that there exists some multiverse in which each universe "is simple in its fundamental laws" (GD 176). Since each universe is simple, we are "not postulating anything highly improbable" (GD 176). Perhaps the simple universes in this multiverse were actualized by chance. But what does that mean in a cosmic context? Since the cosmic crane is ultimate, it rules out any lottery. Prior to the simple universes, there does not exist any machinery which randomly selects universes from some abstract Platonic library. But if there are no lotteries, then what does chance mean? Perhaps it means that every merely possible universe has some *self-probability* of being actual. The simplest universes have self-probabilities of one while all others have self-probabilities of zero. So, the simplest universes exist by tossing a coin with both sides heads. Hence they exist by necessity.

These Dawkinsian ideas are backed up by a naturalistic version of the Thomistic Argument from Contingency and Necessity (the Third Way). This is a naturalized version of the Leibnizian Cosmological Argument (1697). To say that a thing is *contingent* means that it depends on something else for its actuality. Its self-probability is zero; its probability of actuality is conditional. To say that a thing is *necessary* means that it does not depend on anything else for its actuality. Its self-probability is one. The argument now runs like this: (1) Every complex universe is a contingent thing. (2) Every contingent thing has an explanation. (3) The explanation for any contingent thing lies in some other thing. (4) Every set of contingent things is a contingent thing. (5) Let the *pleroma* be the set of all contingent things. (6) The pleroma is a contingent thing. (7) The pleroma has an explanation. (8) The explanation for any set of things is not a member of the set. (9) The explanation for the pleroma is not a member of the pleroma. (10) If any thing is not a member of the pleroma, then it is not contingent. (11) The explanation for the pleroma is not contingent. (12) If something is not contingent, then it is necessary. (13) The explanation for the pleroma lies in some set of necessary things. (14) But these necessary things are necessary universes.

6. The Arguments for the World Tree

The crane which produces our universe has the structure of a *phylogenetic network*, in which the nodes are universes and the branches are reproductive relations. Any phylogenetic network is a directed acyclic graph, in which there are no loops. No universe can be an ancestor of itself. According to the Naturalistic Argument from Change, the cosmic network starts with at least one simple root. So this evolutionary approach to cosmic complexity differs from any merely physical approaches (like the Fecund Universe Hypothesis). Phylogenetic networks are cosmic cranes. But such networks can have many forms. They can have many roots or only one root. Every root universe is necessary, while the others are contingent. Phylogenetic networks can include only *sexual reproduction* (so that one offspring node can have many parents); or they can include only *asexual reproduction* (so that one offspring node can have only one parent); or they can include both sexual and asexual reproduction. If a phylogenetic network has only one root and permits only asexual reproduction, then it is a *phylogenetic tree*. It is arguable that cosmic evolution produces a phylogenetic tree.

It is arguable that there exists a single root universe. The *Argument for the Unique Ancestor* goes like this: (1) Suppose there are many *apparent root universes*. (2) If there are many apparent roots, then they all share some common reproductive functionality. Each apparent root adds its own distinctive content to this common functionality. (3) But this distinctive content is some additional complexity. (4) Hence the common functionality is simpler than that of any apparent root. (5) Consequently, it is possible that there exists some *real root universe* which embodies only this simpler common functionality. Every apparent root is an offspring of this real root. (6) The Naturalized Cosmological Argument justifies the existence of this real root. It is the simplest of all possible universes. Since Dawkins proposed that everything derives from a *single* first cause (GD 184), Dawkinsian metaphysics affirms that there is one root universe. This unique root universe is the *Dawkinsian first cause*. This initial universe is *Alpha*, the

ancestor of all things. Thus Alpha is the ground of all things. Alpha is the basis for the self-bootstrapping crane which brings all things into being. It should be noted that if this argument is unsound, so that there are many root universes, the remaining reasoning still goes through. It just applies to many cosmic trees rather than one.

It is arguable that universes reproduce asexually. The *Argument against Cosmic Sex* goes like this: (1) Universes by definition are causally closed. (2) Causal closure means that one universe cannot cause any effects *inside of* another universe. (3) Causal closure also means that many universes cannot act together as a common or joint cause of some other thing. (4) The only ways for universes to mate with each other involve either *overlap* or *entanglement*. (5) If some plurality of parent universes mates via overlap, then at least one parent universe causes effects inside of at least one other parent universe. (6) But causal closure rules out overlap. (7) If some plurality of parent universes mates via entanglement, then they act together as a joint or common cause of their offspring. (8) But causal closure rules out entanglement. (9) Since these are the only ways universes can mate with each other, they do not mate with each other. On the contrary, each parent universe acts alone in producing its offspring universes. Since each parent universe acts alone, universes do not reproduce sexually. They do not mate with each other. On the contrary, Dawkinsian metaphysics affirms that universes reproduce asexually. It thus affirms that the phylogenetic network of universes is a world tree. The phylogenetic tree of earthly life can be used to metaphorically represent the world tree.

It may be objected that any kind of cosmic reproduction involves a causal relation among universes. However, when a parent creates its offspring, it merely causes that offspring universe to exist. The parent does not cause any effects *inside of* its offspring. And the parent does not causally join with any other universe to make its offspring. So solitary cosmic reproduction does not violate causal closure. Of course, since universes reproduce, they must contain some reproductive machinery. They must contain some reproductive organs. For the Fecund Universe Hypothesis, these were black holes. But they may be other structures. There are several ways universes can reproduce asexually. They may reproduce by fission, budding, or parthenogenesis. According to Smolin or Linde, they reproduce by budding. Perhaps surprisingly, the ban on cosmic mating does not entirely rule out cosmic sex. Universes can be *hermaphrodites*. Their sexual organs may run highly complex sexual reproductive algorithms. They may run cosmic versions of the colony-reproduction strategies used by eusocial insects.

All universes reproduce asexually. Hence cosmic reproduction begins when some parent universe generates all possible minimal variants of its own definition. Its definition is analogous to the genome of an organism. So, cosmic reproduction begins when some parent universe generates a set of embryonic genomes. These genomes enter into cosmic embryos, which now compete with each other for actuality. As they struggle for actuality, only the fittest survive. But fitness is greater complexity. Hence the only surviving embryos are those more complex than their parent. The parent universe gives birth to these more complex embryos. They become actual universes.

7. Self-Reproducing Cosmic Machines

Biological evolution involves reproduction, heredity, variation, and selection. It involves memories of past success (CMI 326). Organisms store these memories in their genes. Dawkins frequently appeals to computational ideas in his discussions of biology (BW chs. 3, 4, & 5). He says "If you want to understand life . . . think about information technology" (BW 112). Organisms store and process information. The genetic codes in any organism are *programs*. As he watches tree seeds falling from the sky, Dawkins says "it's raining programs; it's raining tree-growing, fluff-spreading, algorithms. This is not a metaphor, it is the plain truth" (BW 111). Every cell runs its genetic program both to live and to reproduce. But genetic programs are *digital* (BW 112, 115). Dawkins says "Only a digital genetic system is capable of sustaining Darwinism" (1995: 19). Every cell contains a digital computer implemented in its chemistry.

On these points, cosmic evolution resembles biological evolution. Cosmic evolution involves reproduction, heredity, variation, and selection. Universes reproduce. Parent universes make offspring which are highly similar copies. Since they make these highly similar copies, every universe stores a self-description. Just as organisms store their self-descriptions in their biological genotypes, so universes store their self-descriptions in their cosmic genotypes. Since evolution requires digital coding, cosmic genotypes are digital programs. As it reproduces, any universe produces mutations of its cosmic genotype. They are descriptions of other possible universes. And cosmic evolution involves selection. But the selectors are the parent universes. Every parent universe filters its variants to find the ones which will produce more complex universes. Any thing which has those powers can store and process information. But things which can store and process information contain *computers*. Therefore, any universe contains a *cosmic computer* which stores and processes its self-description.

Of course, the empirical study of our universe does not reveal any cosmic computer. So, if such a computer exists, it is not directly observable. If the directly observable things in any universe are *phenomenal*, then the cosmic computer is *noumenal*. Although this distinction is most famously associated with Kant, it does not belong to him. It can be developed in new ways. According to Dawkinsian metaphysics, every universe has some noumenal hardware which runs its phenomenal physics. The noumenal hardware is a cosmic computer which stores a cosmic program. It uses this cosmic program to generate the physics of the universe. And it uses it for self-reproduction. Universes therefore resemble eukaryotic cells: just as any eukaryotic cell consists of a cytoplasmic shell wrapped around a nuclear core, so every universe consists of a *phenomenal shell* wrapped around a *noumenal core*. The noumenal core of every universe is its *titan*. Titans are the hardware kernels of universes; they are cosmic computers.

According to the earlier Naturalized Cosmological Argument, cosmic evolution begins with the initial universe Alpha. Since there are universes besides Alpha, it must contain at least all the machinery needed for cosmic self-reproduction. However, since Alpha is the simplest possible universe, it does not contain any other machinery. Alpha has no physical content. The phenomenal shell of Alpha is empty, so that it is identical with its noumenal core. Alpha is the simplest of all possible titans. To reproduce, Alpha runs the simplest program for titanic self-reproduction. Dawkins refers to reproduction programs as *TRIPs* (CMI 276-81). A TRIP is a "Total Reproduction of Instructions Program". So Alpha runs the initial TRIP. Since this initial TRIP is inherited by all

other titans, it contains the essential logic of titanic self-reproduction. Although this essential logic may be elaborated in many ways, it must always be preserved.

Since titanic evolution is the foundation of all other evolutionary processes, the essential logic of titanic self-reproduction must be maximally successful. Hence the essential logic of titanic self-reproduction can be developed by making a series of choices. Each choice must maximize titanic success. Either (A) Alpha produces no other titans or (B) it produces some. Either (A) not all of its offspring are more complex or (B) all of its offspring are more complex. Either (A) the increases in complexity are more than minimal or (B) the increases in complexity are minimal. Either (A) it produces not all possible minimally more complex versions of itself or (B) it produces all possible minimally more complex versions of itself. On each choice, option (B) maximizes titanic success. If we refer to the minimally more complex versions of any titan as its *upgrades*, then Alpha produces a description of every upgrade of itself. Of course, these are just descriptions. They are not titans. So, after producing these titanic descriptions, Alpha causes them to actually exist. Alpha creates her offspring.

Perhaps titanic creation parallels biological creation. Dawkins says every biological TRIP runs on a self-replicating robot (CMI 278-82). The robot controls machinery for constructing cells out of their raw materials. If the cellular computer is made of DNA, the cellular robot is made of RNA, protein, and other molecules. Perhaps every titanic computer controls a titanic robot. This robot constructs new titans out of external raw materials. But why are any such materials needed? Since titans are ontologically basic, they are not made out of any prior stuff. Alpha has the power to create its offspring out of its own purely internal resources. Alpha actually exists, and its actuality is all the power it needs to create its offspring. The descriptions of the upgrades of Alpha are its potentials. When actuality flows from some thing into its potentials, those potentials in turn become actual. Actuality is an *ontological energy*. As it flows from Alpha into its potentials, they become actual titans. Since titanic evolution is maximally successful, every offspring of every titan inherits this power from its mother.

8. The Evolution of Titanic Machines

All titanic offspring inherit the programming of their mother. They inherit their maternal TRIPs. However, as they become more complex, they elaborate this programming. Programs resemble genomes; just as genomes are composed of genes, so programs are composed of subprograms. As the reproductive programs of titans become more complex, they acquire *surplus genetic structure*. This surplus structure does not directly participate in titanic reproduction; it resembles the genetic structure which produces an organic phenotype. These excess phenotype-building genes are somatic genes. But the phenotypes of titans are their universes. So these somatic genes are programs for making physical things. When a titan runs some somatic gene, a physical thing comes into being; the execution of the program generates the history of the thing. After producing their phenotypes, titans reproduce. The iteration of this logic produces an endlessly ramified tree of ever more complex titans. More complex titans have more complex somatic gene systems; they run more complex physical universes.

Every titan contains somatic genes for its basic physical entities. For example, if its universe is a cellular automaton, then it contains a gene for every spatial point. This gene is the program running at that point (like the program running at each point in the game of life). When the titan runs these basic somatic genes, all physical things in its universe come into being. Every titan stands to its physical universe as hardware to software. Just as hardware substrates support software processes, so titans support their physical universes. This is a computational account of physics. Computational accounts of physics have been advocated by many physicists (Deutsch, 1985; Zeilinger, 1999; Fredkin, 2003; t'Hooft, 2012). They have also been advocated by many computer scientists (Schmidhuber, 1997; Wolfram, 2002). Although computational accounts of physics are far from certain, they are scientifically plausible.

Besides its somatic genes for its basic physical entities, a titan may contain other somatic genes. These define higher-level software objects (physical things) which run on top of lower-level software objects. For example, in the game of life, the activity patterns of the points support many higher-level objects. They support blocks, blinkers, gliders, and machines. There is a higher-level software object for every algorithmically compressible pattern of lower-level activity. Each higher-level object is associated with a gene which becomes activated by the lower-level activity. So, when some points in the game of life make a glider, a glider-gene becomes activated. A titanic genome contains a somatic gene for every physical thing in its universe. These somatic genes are the essences or natures of physical things. They are the *forms* of physical things. They are Aristotelian *in re* universals which point to Platonic *ante rem* universals.

If these ideas are correct, then all the physical processes in our universe are running on some noumenal computer. Hence we are living in a computer simulation. Dawkins accepts this possibility (GD 98). He requires only that the simulators evolved. He says "They probably owe their existence to a (perhaps unfamiliar) version of Darwinian evolution: some sort of cumulatively ratcheting 'crane'" (GD 98-9). Titanic evolution defines that cumulatively ratcheting crane. Titanic evolution is the cosmic crane most strongly supported by the Dawkinsian texts. He says that biological evolution is a massively parallel distributed computation (CMI 72, 326). But the process of cosmic evolution is also a massively parallel distributed computation.

9. The Evolution of Titanic Value

Complexity is traditionally associated with value. This association was displayed in the classical *great chain of being* (Lovejoy, 1936). The great chain sorts things into degrees of perfection. Things get their perfections from their natures. Thus Anselm says the nature of a human is more perfect than that of a horse; but the nature of a horse is more perfect than that of a tree (*Monologion*, ch. 4). Since the natures of things are intrinsic to them, the perfection of any thing is its *intrinsic value*. But the degrees of perfection in the great chain look like degrees of complexity. Humans are more complex than horses; horses are more complex than trees. So more perfect things are more complex. But this suggests that the complexity of any thing is its intrinsic value.

These classical ideas were further developed by Leibniz. He reasoned that the perfection of any thing is its quantity of essence; quantity of essence is harmony;

harmony combines both order and variety (Leibniz, 1697; Rescher, 1979: 28-31; Rutherford, 1995: 13-35). Since the combination of order and variety is complexity, it follows that the perfection of any thing is its complexity. But Leibnizian perfection is intrinsic. Once more, the complexity of any thing is its intrinsic value. Many contemporary writers also identify intrinsic value with the complexity historically accumulated by evolutionary processes (see Rolston, 1988; Dworkin, 1993: ch. 3; Dennett, 1995: 511-13).

Dawkins also associates complexity with intrinsic value. He presents Darwinian evolution as having two stages. The first stage, which is mutation, is random and rarely leads to improvements (CMI 80-5). He says "Natural selection, the second stage in the Darwinian process, is a non-random force, pushing towards improvement" (CMI 85). Among the wolves, as among all organisms, selection prefers "the fleetest of foot, the canniest of wit, the sharpest of sense and tooth" (CMI 86). Selection prefers the elite genes (CMI 86). Dawkins describes the evolution of the eye as climbing steadily upwards on Mount Improbable (CMI 163). He says "Going upwards means mutating, one small step at a time, and only accepting mutations that improve optical performance" (CMI 86). Improvement climbs Mount Improbable; but height on the mountain is complexity; so, for Dawkins, greater complexity is greater intrinsic value.

On the basis of these associations, Dawkinsian metaphysics identifies complexity with intrinsic value. Since complexity is intrinsic value, titanic evolution can be stated in terms of intrinsic value. By selecting its upgrades for actualization, every titan selects more intrinsically valuable versions of itself. Titanic evolution increases intrinsic value. Titanic evolution is *evolution by axiological selection*. The titans are optimizers. They evolve through *recursive self-improvement:* they get better and better at making their offspring better and better (Good, 1965; Kurzweil, 2005: 27-28; Schmidhuber, 2007; Chalmers, 2010: 11-22). Since it is always rational to select the best and reject the rest, titanic evolution is also *evolution by rational selection*. The titans are rational optimizers. But this implies that titans are intrinsically *benevolent*.

If complexity is intrinsic value, then titanic reproduction resembles the Leibnizian *doctrine of the striving possibles* (Leibniz, 1697; Blumenfeld, 1981; Rescher, 1991: 171-5). Leibniz argued that all possibilities strive for actuality. The intensities of their strivings are proportional to their degrees of perfection. Among any set of competing possibles, only the strivings of the most perfect succeed. Thus Rescher states that "in the virtual competition for existence among alternatives it is the comparatively best that is bound to prevail" (2010: 33-4). The doctrine of the striving possibles describes an abstract evolutionary algorithm (Swenson, 1997: 58). The possibles resemble genomes; the struggle for actuality resembles the struggle for survival; and the victory of the most perfect possibles resembles the survival of the fittest genomes.

On the theory of titans developed here, every titan *strives* to produce every better version of itself. By striving to produce every better version of itself, every titan strives to *surpass* itself. All titanic power is the power of *self-surpassing*. Since every titan does surpass itself in every way, this power is effective. Every titan inherits this power from its parent; hence this titanic power originates in Alpha. The power of self-surpassing is the essential titanic power. It is the power which generates every titan; it generates every universe running on every titan; it generates every thing running in every universe. Since

this power generates all concrete beings, it is an ontological energy. It is the power of being-itself. It flows like sap through the veins in the titanic tree.

10. An Optimal Titanic Reproduction Algorithm

The titanic tree starts with Alpha as its unique root. It grows as titans produce their offspring. As they do, they grow more complex; they run increasingly complex internal reproductive algorithms. Since complexity is intrinsic value, these algorithms become optimized. As titans gain complexity, they get better and better at finding all and only their improvements. As they improve themselves, they improve their universes. As they improve their universes, they improve the things in those universes. Although there are many strategies for improving sets of things, they all converge to *Pareto optimality:* no thing in the set is made worse; at least one thing in the set is made better.

All titanic reproduction algorithms involve replication, mutation, and selection. But these can be combined in various ways. For the sake of illustration, a Pareto optimal algorithm for titanic reproduction is given here. Since this algorithm is presented at a high level of declarative abstraction, it can be procedurally realized in many ways. Since Dawkins talks about evolution as a parallel distributed computation (CMI 72, 326), the algorithm is presented in a parallel distributed form. It has four phases. These are the mutation phase, the genetic competition phase, the combinatorial phase, and the embryonic competition phase. As titans grow more complex, these phases involve solving harder and harder problems. They involve increasingly difficult searches. This titanic algorithm focuses on the things in the universe running on the titan. Titans generate these physical things when they run programs; but those programs are genes.

The first phase of titanic reproduction is the *mutation phase*. During this phase, each thing produces a set of variants of its generative program. Since that program is a titanic gene, these are mutant genes. Since these mutant genes are reproductively active parts of titanic genomes, they are *gametes*. Each gamete has some intrinsic value. Its value is less than, equal to, or greater than the value of its parent gene. The second phase of titanic reproduction is the *genetic competition*. During this phase, the gametes of any gene now compete against each other. Any gamete which is less valuable than its parent gene receives no protection from its parent; any gamete which is equal or more valuable than its parent receives protection. The unprotected gametes die while the protected gametes survive. So all the worse mutants are filtered out during this competitive phase. The surviving gametes are all at least as valuable as their parents.

The third phase of titanic reproduction is the *combinatorial phase*. After competing with each other, the surviving gametes swim into the titanic womb. The womb mixes all these gametes together. As these gametes mix, they interact. On the one hand, if two gametes cannot fit together, then they are *incompossible* and they *repel* each other. On the one hand, if two gametes can fit together, then they are *compossible* and they *attract* each other. If any gamete is attracted to many other gametes, it splits into copies. As they are sorted by these attractive and repulsive forces, gametes become bound together into *embryos*. To see how embryos form, consider some parent titan whose universe contains three things. These are defined by the genes A, B, and C. Each makes three better gametes. The better gametes of A are A_1, A_2, and A_3; those of B are B_1, B_2, and B_3;

and those of C are C_1, C_2, and C_3. If the gametes with the same numbers attract, while those with different numbers repel, then they cohere into three embryos. These are the embryo $\{A_1, B_1, C_1\}$; the embryo $\{A_2, B_2, C_2\}$; and the embryo $\{A_3, B_3, C_3\}$.

The fourth phase of titanic reproduction is the *embryonic competition*. During this phase, the embryos now compete against each other. During this competition, they all attack each other. Any embryo which is no more valuable than its parent genotype receives no protection from its parent; any embryo which is more valuable than its parent receives protection. The unprotected embryos die while the protected embryos survive. So all the equal embryos are filtered out during this competitive phase. Every surviving embryos is more valuable than its parents genotype on at least one gene. The parent titan gives birth to these surviving embryos; they mature into new titans.

11. Evolution of Titanic Intelligence

As biological lineages on earth become more complex, they develop increasingly complex internal information-processing abilities. Bacteria use simple genetic networks to store and process information, networks which have small degrees of intelligence. As single-celled organisms evolve into multi-cellular organisms, their genetic networks become more intelligent. As complexities increase, organisms develop specialized cellular networks for processing information. They develop nervous systems and brains. As biological complexity increases, intelligence increases. The biological analogy entails that titans evolve in the same way. As they grow in complexity, titans become more intelligent. Their titanic minds rise through all the levels of mental power. Since they evolve in their own ways, the biological analogy does not entail that the titanic minds precisely resemble those of earthly organisms. They are alien minds. Nevertheless, all biological minds have common problems which they must solve.

As earthly organisms become more intelligent, they often become designers. Designers emerge on many evolutionary lineages on earth. Spiders design their webs; insects design their hives; birds design nests and bowers; beavers design dams and lodges; chimpanzees design tools and nests; humans design technologies. Dawkins says design is not cumulative (GD 169). But he is wrong. Technological evolution *is* cumulative (Basalla, 1988; Temkin & Eldredge, 2007; Brey, 2008). More complex artifacts evolve through technical cranes. Dawkinsian metaphysics does not follow Dawkins when he makes mistakes; on the contrary, it corrects them. The biological analogy entails that, as titans become more intelligent, they too become designers. Titanic minds *represent* the solutions to their reproductive problems as ideal abstract goals. They *discover* the solutions to those problems by running *design algorithms*.

On the basis of studies of the evolution of technologies, it is plausible to say that a design algorithm is an evolutionary algorithm directed towards an abstract functional goal (a device that can tell time, fly, or compute). Design is *goal-directed evolution*. Once the goal is defined, the design process proceeds towards it through *blind variation and selective retention* (Dennett, 2004; Simonton, 2010). Dawkins developed a goal-directed evolutionary algorithm (BW 46-50). His weasel program *designed* the sentence "Methinks it is like a weasel". Goal-directed evolution occurs naturally. During *affinity maturation*, the human immune system designs antibodies to precisely fit targeted

antigens. More intelligent designers use more powerful optimization algorithms to reduce the size of the space of possibilities. They use intelligence to make their searches more efficient. Dawkinsian metaphysics incorporates the idea that intelligent design involves goal-directed evolution and search optimization. Hence titanic designers use goal-directed evolution and search optimization to solve their problems.

Human have use intelligent evolutionary algorithms to design universes. When Conway designed the game of life, his goal was to "to find a simple set of rules that would lead to a system able to simulate a universal computer" (Khovanova, 2012). Conway and his associates moved towards this goal mostly through blind variation and selective retention. But they also used intelligent reasoning to drastically reduce the search space by ruling out enormous classes of defective rule sets. Goal-directed genetic algorithms have been used to breed complex cellular automata (Lohn & Reggia, 1997). Thus Dawkinsian metaphysics allows titans to intelligently design their universes. As they become more complex, titanic minds evolve intelligent evolutionary algorithms to increase the efficiencies of their searches for solutions to their reproductive problems. For example, they may use *swarm intelligence* to solve their problems. Thus titanic minds may resemble the *hive minds* of the eusocial insects. The eusocial insects design and create intricate structures in which they live and reproduce. Titanic hive minds may be surrounded by their universes as termites by their mounds. But this biological metaphor points to mathematically sophisticated evolutionary logic.

12. The Naturalized Design Arguments

Although he rejects the hypothesis that our universe was designed by a supernatural intellect, Dawkins does not reject the hypothesis that our universe was designed (GD 186). He merely insists that all intelligent designers are products of natural evolutionary processes: "any creative intelligence, of sufficient complexity to design anything, comes into existence only as the end product of an extended process of gradual evolution" (GD 52). Dawkins does not qualify his claim: it is a general and universal claim about intelligent things: "Entities that are complex enough to be intelligent are products of an evolutionary process" (GD 98). So, *if* our universe has a designer, *then* "it will most certainly not be a designer who just popped into existence, or who always existed" (GD 186). Dawkins therefore writes that *if* "our universe was designed," *then* "the designer himself must be the end product of some kind of cumulative escalator or crane, perhaps a version of Darwinism in another universe" (GD 186).

The Dawkinsian account of the evolution of complexity motivates a *Natural Cosmic Design Argument*. It parallels the old theistic cosmic design arguments (Hume, 1779: 53; Leslie, 1989). It is a design argument which Dawkins can embrace. It runs like this: (1) Our universe has certain special features. (2) Because they are special, these features require an explanation. (3) The best explanation for these special features is that our universe was produced by an intelligent designer-creator. (4) So, by inference to the best explanation, our universe was produced by an intelligent designer-creator. (5) This intelligent designer-creator is the titan which ran the previous universe. This *Mother Titan* is a descendent of the original titan Alpha. She gains her power, intelligence, and

benevolence through a natural evolutionary process. Our universe runs on an offspring of the Mother Titan, and will in turn produce its own offspring.

An organic design argument reasons from the complexity of life to some intelligent designer of living things. However, the correct explanation for the complexity of life is evolutionary. So, if living things were intelligently designed by the Mother Titan, then at most she designed a program for the evolution of life. She resembles a human engineer who designed a program in which artificial organisms evolve. Dawkins refers to several evolution simulators (BW ch. 3; CMI chs. 2 & 6). Other evolution simulators include the *Tierra* system (Ray, 1992); the *Avida* system (Ofria & Wilke, 2004); the *Framsticks* system (Komosinski & Ulatowski, 2009); and the *Aevol* system (Batut et al., 2013). Although these programs were intelligently designed, the organisms which evolved in them were not. Still, it does not seem likely that any explicitly coded evolutionary software is running on earth. While biological evolution is algorithmic (Dennett, 1995), that algorithm is not explicitly coded like artificial life algorithms.

If the Mother Titan designed organisms, then at most she ensured that the lawful structure of our universe makes biological evolution highly probable. She finely tuned the laws of our universe for the evolution of life. One plausible way to do this involves careful attention to entropy. On this way, the Mother Titan ensured three things. First, she ensured that our universe would start in an extremely low entropy state. Second, she ensured that its basic laws entailed a *maximum entropy production principle* (Martyusheve & Seleznev, 2006; Swenson, 2006). That principle states that physical systems strive to maximize their entropy production rates. It states that if some system can produce entropy faster, then it almost certainly will. Third, she ensured that ordered flow produces entropy faster than disordered flow. These features make it almost certain that complexity will emerge in our universe wherever it can. And they make it highly probable that life will emerge in our universe wherever it can.

13. The Laws of Titanic Reproduction

If the reasoning so far is right, then titanic evolution starts with two natural laws. The *initial law* states that there exists some simple initial titan Alpha. The *successor law* states that every titan produces at least one offspring. These two laws abstractly describe titanic reproduction. The initial titan produces offspring in the first generation; they produce offspring in the second generation; and so it goes. The result is an endlessly ramified titanic tree. Of course, if there are many initial titans, the result will be a forest of these titanic trees. As titans grow more complex, their universes accumulate physical structure. They develop times, spaces, forces, material things. They grow according to Dennett's Principle of Accumulation of Design (1995: 72). Their laws become ever more finely tuned for the evolution of internal physical complexity.

On every lineage, the titans ascend without end through all the finite levels of computational complexity. Of course, finite computational complexity may not be sufficient for the physics of our universe. It may be that our universe cannot run on any finitely complex titan. And even if our universe is only finitely complex, other possible universes are infinitely complex. Fortunately, titanic evolution can be extended into the transfinite using standard mathematical techniques. A *progression* is a series of titans

which begins with the initial titan and proceeds through all successor titans. Every progression is infinitely long. Now the *limit law* of titans has two parts. Its first part states that every progression defines at least one potential upgrades. Its second part states that every progression actualizes every potential upgrade. When any potential upgrade of any progression is actualized, the result is an infinitely complex *limit titan* which runs an infinitely complex *limit universe*. Progressions of titans can run through all consistently definable ordinals recognized by transfinite set theory.

As progressions of titans evolve, they rise through all mathematically definable levels of computational complexity. Computer scientists have defined a vast hierarchy of computing machines. This hierarchy begins with finite state machines. Finite state machines are surpassed by Turing machines. But Turing machines are surpassed by Giunti machines (Giunti, 1997). These are surpassed by accelerating Turing machines (Copeland, 1998). These are surpassed by machines operating on transfinite ordinals (Hamkins, 2002; Koepke, 2005, 2006; Koepke & Siders, 2008). They are also surpassed by continuous computers (Moore, 1996; Blum et al., 1998). The hierarchy of ever more powerful computers parallels the constructible hierarchy of pure sets. It is doubtful that any universe can be defined which exceeds such constructability. If that is right, then computability covers all possible physicalities.

The titanic tree rises up through every finite level of complexity. However, this does not entail that every possible titan is actual. On the contrary, it is far more likely that some possible titans are never actualized. These eternally unactualized titanic possibilities are not accessible by iteration of the titanic reproductive algorithms. They are like the points in a depression or crater on Mount Improbable (CMI 217-22). The flow of actuality always goes around such depressing possibilities and never enters them. If some titans are never actualized, some possible universes are never actualized.

14. The Evolution of Natural Gods

As titans gain complexity, they grow more powerful, intelligent, and benevolent. But those attributes traditionally constitute *divinity*. So, as titans grow in complexity, they become more like gods. But Dawkins argues that they are not gods. This argument starts with aliens. Dawkins writes that "there are very probably alien civilizations that are superhuman, to the point of being god-like in ways that exceed anything a theologian could possibly imagine" (GD 98). These aliens would have technologies that would seem supernatural to us (GD 98). These aliens would "be to us like gods" (GD 98). However, these aliens would not *be* gods (GD 98). Dawkins says the "crucial difference between gods and god-like extraterrestrials lies not in their properties but in their provenance" (GD 98). For Dawkins, gods cannot evolve (GD 98). Since the titans evolved, they are not gods. But this argument is very weak.

To see the weakness in this Dawkinsian argument, consider the old pagan gods. They reproduced both sexually and asexually (Ymir and Zeus reproduced asexually). The old pagan theogonies contain many elements of evolution. Or consider the deity of process theology. The process deity is a series of ever improving stages. Since lineages of titans increase in value, those lineages resemble the process deity. And process theology may support genealogies of self-reproducing gods. Hartshorne argues for a series of

universes, each generated by its own god. Thus gods are like Phoenixes; as each mother god dies, her children are born out of her ashes. Since divine evolution is not impossible, gods are not essentially supernatural. Dawkins says "I am calling only *supernatural* gods delusional" (GD 36, his italics; see GD 41). Dawkinsian metaphysics excludes the supernatural gods of all religions. It excludes all deities which did not evolve. But Dawkinsian metaphysics permits natural gods which did evolve.

Perhaps the titans are like evolved deistic gods. Much of the Dawkinsian description of the deistic God applies to the Mother Titan. She is an extraordinary mathematician and physicist (GD 59). She is "a hyper-engineer who set up the laws and constants of the universe, fine-tuned them with exquisite precision and foreknowledge, detonated what we would now call the hot big bang" (GD 59). After that, the Mother Titan is irrelevant to our universe and our lives. She "does not answer prayers, is not interested in sins or confessions, does not read our thoughts and does not intervene with capricious miracles" (GD 40). And the titan on which our universe runs (an offspring of the Mother Titan) also resembles a deistic God. However, Dawkins regards the deistic God as supernatural (GD 39). But the titans resemble *evolved* deistic gods; such gods are natural.

Dawkins observes that many atheistic scientists use the term "God" (GD 34). When he discusses this use, he focuses on Einstein. Dawkins points out that Einstein thought of God in Spinozistic terms. He quotes Einstein as saying "I believe in Spinoza's God who reveals himself in the orderly harmony of what exists" (GD 39). The titans very closely resemble Spinozistic gods. As the Spinozistic God was the ground of the physicality of our universe (Bennett, 1984; Viljanen, 2007), so the titans are the grounds of physicality for their universes. Dawkinsian metaphysics supports a *Dawkinsian theology*. The gods of this theology are the titans. They are natural gods, produced by divine evolution. So Dawkinsian theology combines elements of Spinozism, deism, and process theology. It is polytheistic: there are many gods, but no God. Every god is surpassed by greater gods. Like the Epicurean gods, these natural gods have no special concern for humans. Hence it would be absurd to worship them. They do not answer prayers.

15. Dawkinsian Religion and Spirituality

Dawkins argues that supernatural religions are evil (GD chs. 8 & 9). And he dislikes the term *religion* because it traditionally refers to supernatural religions (GD 33, 35, 40). However, Dawkins also contrasts supernatural religions with *Einsteinian religions* (GD 34-40). Einsteinian religions are naturalistic. While affirming that the term *religion* is problematic, Dawkins allows that he is religious in the Einsteinian sense (GD 40). At the very least, Dawkinsian metaphysics permits naturalistic religions (GD 40-1). But it may go further, by encouraging us to develop and practice them.

An argument can be given, based on Dawkinsian principles, that we ought to develop and practice naturalistic religions. It is undeniable that we have moral obligations: we ought to work to replace the false and evil with the true and good. Since there are no supernatural gods, our moral obligations are not grounded in them (GD chs. 6 & 7). Our moral obligations are grounded in nature. According to Dawkinsian metaphysics, they are grounded in evolution. Hence Dawkinsian metaphysics entails that we ought to strive to replace the false and evil with the true and good. Since all supernatural religions are

false and evil, we ought to work to replace them (GD ch. 10). And since religions are human cultural universals (GD 194), it is likely that they can only be replaced by other religions. So Dawkinsian metaphysics entails that we ought to replace the false and evil supernatural religions with true and good naturalistic religions.

A religion based on Dawkinsian metaphysics is a *Dawkinsian religion*. It includes "a quasi-mystical response to nature and the universe" (GD 32). It likewise includes the religious naturalism of writers like Ursula Goodenough (GD 34). This *religious naturalism* involves responding to the complexity of the universe with emotions like *awe*, *wonder*, and *reverence*. A Dawkinsian religion includes a robust concept of the *sacred* (Dawkins, 2004). A Dawkinsian religion also includes *giving thanks*. Dawkins says that we ought to be grateful for our existence (Bishop, 2010; Colledge, 2013). Since we owe our existence to the titans, we can give thanks to them. But it makes no sense to express this thanks through prayers or songs. Like Epicurean gods, the titans do not respond to human acts. We give thanks to the titans by doing good deeds, which aim at the salvation of our ecosystem and humanity. We pay it back by paying it forwards. Gratitude points to the past. But Dawkinsian religion can also provide hope for the future.

Dawkinsian metaphysics supports a religious interpretation of *Burning Man* (Pike, 2005; Gilmore, 2010). Burning Man is an annual arts festival in the Black Rock Desert in Nevada at the beginning of September. Burning Man is an oasis of high complexity in a vast wasteland of uniform simplicity. Thus Burning Man resembles the earth, which is an oasis of high complexity in a vast interstellar wasteland. Burning Man involves a large wooden image of an anonymous male human. Prior to the festival, the Man is constructed. After several days of festivities, the Man is burned. The Man is often lit with a fire kindled by the rays of the sun. Here the sun symbolizes the ontological energy which animates Alpha and drives the evolution of complexity. The Man resembles a Phoenix: he is built; he is burned; he is built again. The Man symbolizes every titan. The universe running on any titan resembles the arts festival running around the Man. But the Man has no face; he is an anonymous god, belonging to no tribe at all. Thus naturalists don't *bow down* to their gods; on the contrary, they *burn* them.

Since Dawkinsian metaphysics implies that nature resembles a vast biological enterprise, it should come as no surprise that it supports a theory of life after death. It supports a naturalistic soteriology. Although organisms die, copies of their genes survive. The insulin gene has been replicating itself for over three billion years. So this model of life after death is inspired by the Dawkinsian notion of the *selfish gene* (Dawkins, 1976). It is arguable that every human body runs a biological program. If the *soul* is the form of the body, then that program is the soul (*De Anima,* 412a5-414a33; Barrow & Tipler, 1986: 659; Moravec 2000: 198). Human body-programs (souls) are titanic genes. So human souls get copied from universe to universe. When your soul runs in the next universe, it will generate your next life. This is a naturalized version of the replication theory of resurrection (Hick, 1976: chs. 15, 20; Steinhart, 2014). It resembles certain Buddhist theories of rebirth (Rahula, 1974). Of course, as souls get copied, they also become complexified. They increase in their intrinsic values. Hence your future lives will be improved versions of your present life.

Dawkinsian metaphysics can serve as the basis for *spiritual naturalism*. Spiritual naturalists perform *spiritual practices*. These include practices like *meditation* (Harris, 2014); mental exercises adopted from the *Stoics* (Irving, 2009); *taking entheogens*

(Griffiths et al., 2006); performing *ecstatic dances* (Sylvan, 2005); and so on. These spiritual practices aim to reliably produce *spiritual experiences*. After all, naturalists can and do have spiritual experiences (Comte-Sponville, 2006: ch. 3). Dawkinsian metaphysics provides a naturalistic framework for the interpretation of those experiences. During their spiritual experiences, people often become acutely aware of a profound energy flowing through all things. But this energy is just the ontological power which springs from Alpha as the root of all things. It is a natural way of thinking about *spirit*. During their spiritual experiences, people often report that all things are interconnected. Since all things exist in a titanic tree with a single root, they are interconnected through their ancestry in Alpha. They are all ontological cousins. During their spiritual experiences, people often report that all things are unified. Since all things are descendents of Alpha, and they inherit their essences from Alpha, they all share the same ultimate essence. They are unified by this shared essence.

16. Conclusion

Although Dawkins is rarely thought of as doing metaphysics, his texts support a rich metaphysical system. Dawkinsian metaphysics has no room for God. Since Dawkinsian metaphysics rejects God, it rejects all the religions founded on God. It rejects the three great Abrahamic monotheisms which have dominated the West for centuries. Since it rejects those religions, and since those religions have dominated the West for so long, it may seem like Dawkinsian metaphysics is essentially irreligious. It is not. On the contrary, Dawkinsian metaphysics supports a deeply religious way of life. It supports a rich system of religious and spiritual practices. Since these practices are nontheistic and naturalistic, they do not look like traditional Western religious or spiritual practices. At least in the West, most of these practices are relatively new. And they are slowly but steadily gaining popularity. Many possible futures contain religious ecosystems in which the dominant species are based on Dawkinsian metaphysics. Religions also evolve. As they evolve, they may leave the old theistic religions far behind.

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