

# Digital Afterlives

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**ABSTRACT:** Digitalists base their thoughts about reality on concepts taken from the sciences of information and computation. For digitalists, these sciences are prior to the physical sciences. Digitalists emphatically reject substance metaphysics. They are neither materialists nor idealists nor dualists. They have their own novel definitions of bodies, minds, lives, and souls. They talk about digital universes running on digital gods, and they regard nature as a recursively self-improving system of computations. They endorse digitized theories of resurrection and reincarnation. But they also argue for deeper and more mathematical approaches to life after death. All these digital ideas are naturalistic. They are consistent with our best sciences.

## 1. Introduction

Many scientific approaches to reality appear to negate life after death. According to scientific materialism, every human person is strictly identical with his or her body. When your body dies, you die too. Scientific materialists say that your mind depends entirely on your body, so that when your body dies your mind ceases to exist. Persons therefore do not survive death. Of course, if there were some gods, they might be able to remember the arrangement of the atoms in your body, and use their memories to create some new resurrection body for you after your death. Recreating your body, they would also be recreating your mind. However, scientific materialists usually deny that there are any gods. As materialists, they also deny the existence of any immaterial souls. Since there are no such souls, your soul cannot be reincarnated in some other body after you die. After you die, you will not have any future lives.

Fortunately, scientific materialism is not the only scientific approach to reality. Another scientific approach to reality is *digitalism*.<sup>1</sup> Digitalism thinks about reality using ideas from the digital sciences. These are the sciences of information, computation, and complexity. Although digitalists accept the physical sciences, they do not accept the philosophical ideology which regards them as fundamental. For digitalists, the digital sciences are prior to the physical sciences. Information and computation are prior to matter and energy. Physical things are ultimately built from bits. By embracing bits as their basic objects, digitalists do much more than merely reject materialism. Digitalists also reject idealism. Since bits are basic, minds are built from bits as well. By starting with bits, digitalists emphatically reject substances. Since there are no substances, there are no things which remain the same through time.

By starting with digital ideas, and by rejecting substance metaphysics, digitalists are developing new philosophies. They are developing new ways of thinking about bodies, lives, minds, and souls. They define those things in terms of informational patterns and their abstract transformations. Digitalists are likewise developing new ways of thinking about life after death. They argue for computational theories of resurrection and reincarnation. And they argue for deeper and more mathematical approaches to life after death. Digitalists define digital universes running on digital gods, and they regard nature as a vast self-simulating system of computations.

## 2. Digital Resurrection

A good way to introduce digitalism is to start with the concept of *uploading* (Moravec, 1988: ch. 4; Kurzweil, 2005: chs. 3 & 4; Blackford & Broderick, 2014; see Steinhart, 2014: ch. 4).<sup>2</sup> Uploading begins with scanning. You step into the *scanner*, which abstracts all the personally relevant information in your body. The scanner produces your digital *body-map*. It maps your genes, your neural connections, your immune system, and every molecular information-processing circuit in every cell in your body. Unfortunately, this high-precision scan is destructive.<sup>3</sup> Scanning your body *kills* it. We can refer to the body that dies in the scanner as *Fallen*. After *Fallen* dies in the scanner, its digital body-map is used to construct a new software body living inside a computer. This new software body is *Risen*. *Fallen* is *uploaded* into *Risen*.

Uploading raises questions about personal identity: is *Risen* the same person as *Fallen*? Any answer to this question requires some theory of persistence. On the basis of many arguments, digitalists favor *four-dimensionalist* theories of persistence (Lewis, 1976; Sider, 1996, 2001; Hawley, 2001).<sup>4</sup> A four-dimensionalist says that persisting things are temporally extended *processes* which divide into instantaneous *stages*. Since the stages are extended along the three dimensions of space, and since time can be regarded as a fourth dimension, persisting things are four-dimensional (4D) processes which divide into three-dimensional (3D) stages. Any stage of any process is identical *with and only with* itself. Stages at distinct times are distinct stages. Hence four-dimensionalists deny that there is any identity through time. Things do not persist by remaining the same; on the contrary, they persist by turning into distinct new things.

For digitalists, a *process* is a series of stages which runs a program. If a series of stages runs a program, then each earlier stage transmits that program to its later stages, and each later stage receives that program from its earlier stages. The program remains invariant across all the stages in the series. It is the *essence* of the series. And, if a series of stages runs a program, then that program transforms each earlier stage (along with any inputs) into some later stage. Each later stage *informationally depends* on its earlier stages. A series of stages which runs a program is *computationally continuous*.

There are many types of computational continuity. One type is biological. A process is *biologically continuous* if and only if its program is a biological program, and that program is carried from earlier to later stages by the kind of causality found in living

organisms. A *life* is a biologically continuous 4D process whose stages are 3D bodies. For digitalists, *personal continuity* is weaker than biological continuity. A process is personally continuous if and only if its program is a personal program, and it is carried across the stages by any kind of informational dependency. While there may be many kinds of personal programs, the kind we know best are human body programs. A *career* is a personally continuous 4D process whose stages are 3D bodies.

It is straightforward to apply the four-dimensionalist theory of persistence to the case of uploading. Uploading began with Fallen, who gets uploaded into Risen. Of course, Risen is *not identical* with Fallen; on the contrary, Risen is merely a copy of Fallen, and every copy is distinct from its original. But so what? Since digitalists deny all identity through time, they deny personal identity. Persons are not enduring substances which remain self-identical through change. Personal identity, like every kind of identity through time, is an illusion which digitalism dispels. You are not even the same person that you were five minutes ago. Since there is no personal identity in ordinary life, there is none in uploading either. The Buddhists got it right: there are no permanently enduring substances, all things are ephemeral, and your attachment to an imaginary self-identity can only bring suffering (see Rahula, 1974; Parfit, 1985).

The main difference between uploading and ordinary life is the loss of the kind of causal continuity found in living organisms. Obviously, Fallen was alive. And, since a replica of a living thing is a living thing, Risen is also alive. However, since uploading *kills* Fallen, Fallen does not *live through* uploading. The career which includes Fallen and Risen is not biologically continuous. Fallen does not *survive* uploading; that is, Fallen does not *live into* Risen. Nevertheless, Fallen *lives again* in Risen. Thus Risen provides Fallen with a kind of life *after death*. Here uploading closely resembles the theory of resurrection which says that bodies are resurrected in their post-mortem *replicas* (Hick, 1976: ch. 15). Theories of *resurrection by replication* typically make heavy use of analogies based on the digital sciences (Polkinghorne, 1985: 180-1; Reichenbach, 1978: 27; Mackay, 1997: 248-9). Thus Fallen has been *resurrected* in Risen. Risen now lives in a virtual world inside of some computer. This world is not immaterial. If the computer is electronic, then its objects are electrically charged pieces of matter. For the sake of continuity, this virtual world has to closely resemble our earth. But it may be a paradise, an island utopia, like Bacon's Bensalem.

### 3. Digital Reincarnation

Another digitalist approach to life after death resembles old-fashioned reincarnation. If you want to be digitally reincarnated, you first need to make a *digital ghost*, which is a software portrait of your life (Steinhart, 2014: ch. 1). Almost all of us, at least in the technologically advanced societies, are building digital ghosts. Your Facebook page is an example of a very primitive digital ghost. Any data that has ever been recorded about you, whether by yourself or someone else, can be entered into your digital ghost. As technology improves, our digital ghosts will get better.

As more and more of your life is digitally recorded, your digital ghosts become ever more accurate representations of you. At some point, these representations become so good that they capture all the personally relevant details of your entire life. They become *perfect digital ghosts*. Somebody might object that no amount of information can capture all the personally relevant details of your entire life. Here digitalists have a reply based on human finitude. Any human body encodes only finitely many bits of information.<sup>5</sup> All bodies are *finite state machines* (Burks, 1973; Tipler, 1995: 31). A human life can be regarded as a series of bodies changing into bodies. Only a finite number of finitely complex changes occur within any finite period of time. Since any human life is only finitely long, it can be regarded as a finite series of finitely complex bodies; but any such series is itself only finitely complex. Consequently, it is theoretically possible for every physical detail of your life to be digitally recorded.

Digitalists reject mind-body dualism.<sup>6</sup> At any moment of time, all the personally relevant information about you is stored in your body. Over any period of time, all the personally relevant information about you is stored in your series of bodies. Since digitalists believe that all the personally relevant details of your life are encoded in the series of bodies which makes up your life, they infer that a physically exact digital ghost contains all the personally relevant details of your life. Since these physically exact ghosts are possible, personally exact ghosts are possible. Of course, digitalists also argue that many of the physical details of your body are personally irrelevant. So your perfect digital ghost can be simpler than your physically exact digital ghost. Perfect digital ghosts are not merely theoretically possible, they are probably technically feasible.

On the basis of current technical progress, digitalists argue that our civilization contains many possible futures in which many lives are represented by perfect digital ghosts. You can easily imagine yourself living in one of these futures. After you die, your ghost is stored in some big database. Just as your life is series of bodies, so your ghost is a series of descriptions of those bodies. But this is just the *raw content* of your ghost. Your raw ghost can be compressed. The compression yields an essential *physiological program* along with a contingent *series of inputs*. Digitalists identify this program with the form of your body. Aristotle said the form of your body is your soul (*De Anima*, 412a5-414a33). Following Aristotle, digitalists say that your physiological program is your *digital soul* (Barrow & Tipler, 1986: 659; Tipler, 1995: 1-2; Moravec 2000: 198). The series of inputs to your soul is your earthly fate or *destiny*.

After you die, your ghost can be loaded into a person simulation program. Your ghost contains your destiny and your soul. On the simplest version of reanimation, the simulator feeds your recorded earthly destiny into your soul. As runs your soul on your destiny, the simulator produces a software version of life. Your new software life exactly replicates your old organic life. From your first-person point of view, your software life is indistinguishable from your old organic life. You might be living a software life right now. If your soul ran once through your old organic life, and now runs again in your new software life, then your soul is exactly *reincarnated* in your software life. Your software life is obviously not identical with your old organic life. Just as your organic life inhabited a hardware world, so your new software life inhabits a software world. The

lives in these two distinct worlds are linked by *counterpart relations* (Lewis, 1968, 1986). Hence your new software life is a counterpart of your former life.

Of course, an exact reincarnation is not the only possibility. Your destiny can be edited, and the simulator can feed the edited version of your destiny into your soul. If it does that, your software life will differ from your old organic life. It will be an alternative version of your old life. Benjamin Franklin wrote that he would like to have a second edition of his life (1771: 1). It would be much like “a repetition of the same life from its beginning”, except that, in this second edition, he would like to “correct some faults of the first” and would also like to “change some sinister accidents and events of it for others more favorable”. Thus your next life can be a better life.

#### 4. Digital Deism

When your biography runs on some person-simulator, it generates a software version of your life. This software life is a self-contained process. If many software lives are running in parallel on some computer, they are not causally interacting. But causal interaction is not the only kind of interaction. If many processes are *coordinated*, then they are exchanging signals through non-causal input-output channels (which information theorists refer to as *ghost channels*). So, if many coordinated software lives run on some computer, then they interact *informationally*. On these points software lives resemble Leibnizian monads. Digitalists find Leibniz inspiring. He was among the first to work with binary numbers, and he designed an early computer (Leibniz, 1703; Ryan, 1996). He regards the essences of things as digital bit strings (Rescher, 1991: 191; Strickland, 2006: 21-5). Of course, digitalists do not agree with everything Leibniz said.

Leibniz helps digitalists think about human possibilities. Human nature defines a set of possible human souls. Each soul is associated with a set of possible destinies. The result is a set of possible human biographies. This set can be partitioned into subsets, some of which contain coordinated biographies. Any set of coordinated biographies is a *cabinet*. Following Leibniz, the collection of all cabinets is the *Palace of the Fates* (*Theodicy*, secs. 414-7). Leibniz says that the cabinets in the Palace are ordered by a comparative value relation: some are more perfect or better than others. Leibniz says greater perfection combines greater order with greater variety.<sup>7</sup> The Palace is therefore stratified into levels, so that higher levels contain better cabinets. But the Palace is also a pyramid. Its highest level contains exactly one cabinet, which is the best of all possible cabinets. And, since Leibniz thinks that any cabinet can degenerate into worse cabinets, the pyramid descends endlessly as cabinets grow worse.

Leibniz thinks of this Palace as a data structure in the mind of God, and he pictures God as performing a computation involving cabinets. God runs a *design algorithm* which sorts these cabinets according to their degrees of perfection (*Theodicy*, sec. 225). According to Leibniz, this sorting finds one cabinet which is the best of all possible cabinets. God actualizes this cabinet, producing the best of all possible universes. This universe is our universe. Since the Leibnizian God performs a computation, digitalists

find this deity interesting. However, digitalists reject Abrahamic theology, and are not theists. Consequently, digitalists have developed their own theologies.

Digitalists think about God using terms only from the digital sciences. They develop a scientific theory of God. For digitalists, God is just a divine computer. Barrow and Tipler refer to this computer as a *cosmic mind* (1986); Moravec also refers to it as a cosmic mind (2000: ch. 7); but Tipler refers to it as God (1995: 153-8). He says God is a “self-programming universal Turing machine, with a literal infinity of memory” (1995: 249-50). He says it can process an infinite amount of information in finite time by accelerating (1995: 265, 462, 505). Once more, if this cosmic computer is God, it is not the Abrahamic God. On the contrary, this *digital God* is more like the God of deism. So these Leibnizian reflections suggest a deistic theology.

Although digitalists reject Abrahamic theology, they need not reject the ontological argument. After all, the maximally perfect being need not be the Abrahamic God. Tipler even proposes a computational version of that argument (1995: ch. 8). A valid version of the ontological argument, which avoids most of the traditional objections to it, has been developed by Millican (2004: 457-8). His argument can be formalized like this: (1) There are some forms. For digitalists, these are the forms of computers. They exist as purely mathematical objects. (2) These forms are ordered by greatness. (3) There exists exactly one greatest form. (4) Forms are either instantiated by things or are not instantiated. (5) Some forms are instantiated (e.g. your biography is a form which is instantiated by your life). (6) Any instantiated form is greater than any uninstantiated form. (7) If the greatest form is not instantiated, then some other forms are greater than it. (8) Since that is a contradiction, it follows that the greatest form is instantiated. (9) But the greatest form is the form of God. Specifically, for digitalists, it is the form of an infinite computer, which designed and created our universe. This is the Omni-Computer, an all-powerful, all-knowing, and all-good digital machine.

Digitalists now tell a modified version of the Leibnizian creation story. The Palace of the Fates is a purely abstract Platonic structure (Moravec, 1988: 178; 2000: 196-8; Tipler, 1995: 213). Biographies and cabinets are purely mathematical objects. Thus God performs computations involving mental representations of these abstract objects. God runs a design algorithm which searches for the best of all possible cabinets. This design algorithm is an optimization algorithm, which converges to the best cabinet. After finding the best cabinet, God actualizes it. The actualization of some cabinet involves running its biographies on some virtual machine. This virtual machine is a proper part of the divine computation. Fredkin refers to this machine as the *Engine* (1992, 2003). It is a computation embedded in a computation. Since the universe runs on a proper part of the divine computation, this digital deism is a kind of *panentheism*.

Some may try to argue that digital deism supports an afterlife involving heaven and hell. After running our universe, God sorts lives into the good and the bad; God then produces two virtual machines, one heavenly, the other hellish, and runs the good souls on the heavenly machine and the bad souls on the hellish machine. But it has been argued that this heaven and hell theory is ethically inferior to reincarnation (Filice, 2006; Di Muzio,

2013). Since the digital God is benevolent, digital deism supports reincarnation. After running your soul with its earthly destiny, God runs it again with some new destiny. This new destiny is defined by some *karmic laws*. The karmic laws algorithmically take your old biography as input and produce a new destiny as output.

The two main types of karma are *compensatory* and *progressive*. Compensatory karma stresses that you will be rewarded or punished in your future lives for good or bad deeds done in your past lives. Compensatory karma often focuses on eye-for-eye retribution (one who commits harm in this life will suffer the same harm in the next life). However, progressive karma stresses that all future lives will gradually be improved (Kardec, 1857). Progressive karma is better than compensatory karma (Kaufman, 2005). Since God is benevolent, God supports progressive karma. The karmic laws define a better version of your biography. Of course, your reincarnation can be iterated. By running your soul with ever better destinies, your soul is reincarnated over and over again. You have better future lives in better universes.

## 5. Digital Theosis

One problem with digital deism is the traditional problem of evil. It is highly unlikely that any cabinet (any possible universe) is the best of all possible cabinets. It is more likely that every cabinet is surpassed by a plurality of better cabinets (Hartshorne, 1984: 31; Kraay, 2010). If that is right, then Leibniz has misunderstood the value relation which orders the cabinets in the Palace of the Fates. Digitalists use ideas from the digital sciences to refine the Leibnizian conception of perfection. When Leibniz analyzes perfection in terms of order and variety, his analysis makes it look much like the relation of *depth* developed by various computer scientists (Bennett, 1988, 1990; Machta, 2011). So digitalists identify intrinsic value with something like depth. But depth (and associated concepts) are always capable of further increase.

For digitalists, every cabinet in the Palace is surpassed by many better cabinets, so that the Palace is an *inverted* pyramid. One cabinet, namely the empty cabinet, is the least valuable cabinet. This *initial* cabinet occupies the base of the pyramid, which now ascends and expands endlessly. The higher levels of the Palace contain better cabinets. For digitalists, intrinsic value is discrete, so that every cabinet is directly surpassed by its *successors*. Every cabinet on any level in the Palace is surpassed by at least one successor in the next higher level. The Palace contains an infinite series of finite levels. Following modern mathematics, digitalists now add that the Palace rises into the transfinite. To rise into the transfinite, digitalists say that a *progression* of cabinets is an infinite series in which ever later cabinet is better than every earlier cabinet. The *limit* of any progression of cabinets is a cabinet which is minimally better than every cabinet in that progression. The richness of mathematical possibility ensures that every progression in the Palace is surpassed by at least one limit cabinet.

The digitalist conception of the Palace defines a *cosmogenic algorithm* for the Omni-Computer, which is the digitalist version of a deistic God. This algorithm can be defined

by three laws. The *initial law* states that God begins by running the least valuable cabinet. The *successor law* states that if God runs any cabinet, then God runs every successor of that cabinet. The *limit law* states that if God runs any progression of cabinets, then God runs every limit of that cabinet. When God runs any cabinet, God runs it on some virtual machine, which supervenes on the divine hardware. By running that cabinet on some virtual machine, God creates a universe. Hence God runs the initial cabinet on some initial virtual machine. After God runs any universe, God runs a design algorithm which finds its successors cabinets. After finding those successors, God creates virtual machines which run them. Likewise, after God runs any progression, God runs a design algorithm which finds its limit cabinets. After finding those limits, God creates virtual machines which run them. By running the cosmogenic algorithm, God creates an infinitely ramified tree of ever better universes.

Digitalists argue that every way to improve any biography in some cabinet is included in at least one way to improve the cabinet.<sup>8</sup> So, if every cabinet is improved in every way, then every biography in that cabinet is improved in every way. Every successor of every biography in any cabinet is included in some successor of the cabinet. Analogous reasoning applies at limits. The successor law states that if God actualizes any cabinet, then God actualizes every successor of that cabinet. Hence if God actualizes any biography, God actualizes every successor of that biography. Analogous reasoning applies at limits. Since God actualizes biographies by producing lives which instantiate them, the cosmogenic laws entail three *soteriological laws*. These laws state that each thing is the initial version of itself; every thing is surpassed in every possible way by some better successor life; and every progression of lives is surpassed in every possible way by some better limit life. These laws apply to human lives. Thus every human life sits at the root of an infinitely ramified tree of better lives. Along every lineage in this tree, lives perpetually advance in perfection. They become ever more divine. Hence these soteriological laws define a kind of *digital theosis*.

Digital theosis supports progressive karma. Your next life will be defined in terms of your past life; for the sake of continuity, it will be highly similar. But we will all be *ethically enhanced* (see Douglas, 2008; Faust, 2008). We will be more empathetic, compassionate, and altruistic. We will be more virtuous and less vicious. We will be less exploitative, less aggressive, less abusive, less vengeful, less violent. Progressive karma increases justice across lives by increasing it within lives. Future universes will be more *providential*. Future lives will therefore contain more justice. If you do a bad deed in your future life, you will be more likely to be more rapidly and appropriately punished in that same life; and if you do a good deed, you will be more likely to be more rapidly and appropriately rewarded in that same life. You will therefore develop better moral habits more rapidly. The harms you cause will be less and, since you will be more altruistic, you will suffer more for having done them.

On further analysis, it can be argued that progressive karma places four constraints on the soteriological laws (Steinhart, 2014: sec. 86). They help to avoid problems like those Parfit raises about future generations (1985: part 4). They ensure that value is not lost when new successor cabinets are derived from old. Hence they directly govern the



successor law. The first constraint is that every life in the old cabinet must have at least one new version of itself in the new cabinet. The new version of the old life is a *counterpart* of the old life. The second constraint says that distinct lives in the old cabinet must have distinct counterparts in the new cabinet. The third constraint says that no life in the old cabinet can have a less valuable counterpart in the new cabinet. The fourth constraint says that at least one life in the old cabinet must have a more valuable counterpart in the new cabinet. These constraints are easily extended to cover progressions of cabinets, and thus to govern the limit law.

If this reasoning is correct, the result is a theory of life after death which resembles Theravadic Buddhist theory of rebirth (Rahula, 1974). And it resembles a naturalized version of Hick's soteriology (Steinhart, 2008). Hick says a human career consists of "a series of lives, each bounded by something analogous to birth and death, lived in other worlds in spaces other than that in which we now live" (1976: 456). If the soul is the form of the body, this is a kind of reincarnation. You have your earthly life; it can be improved in many ways. For every way your life can be improved, you have a future life which is improved in that way. Your future lives do not inhabit this universe; on the contrary, they inhabit future societies, ecosystems, planets, and universes.

## 6. Digital Theogony

Although digital theosis solves the problem of evil, it faces its own fatal problem. According to modern mathematics, every set is surpassed by some more inclusive set; since computers are defined in terms of sets, every computer is surpassed by some greater computer (Hamkins, 2002; Koepke, 2005; Koepke & Siders, 2008). If the forms in the ontological argument are those of computers, then there is no greatest form. The unsurpassable Omni-Computer does not exist. Since this problem arises from modern mathematics, digitalists turn to it for the solution. To solve the problems with an unsurpassable set (the set of all sets), mathematicians replaced it with an unsurpassable hierarchy of surpassable sets. But that hierarchy is not itself a set.

Digitalists likewise replace the impossible concept of an unsurpassable computer with an unsurpassable hierarchy of surpassable computers. And, just as the hierarchy of sets is not a set, so the hierarchy of computers is not itself a computer. While digitalists can no longer say that God is a computer, they can still affirm both the existence of God and of divine computing machines. To do this, digitalists say that the hierarchy is God and that its component computers are the *digital gods*. The resulting theology is both *pantheistic* and *polytheistic*. It is pantheistic because it identifies God with the divine hierarchy of computers (Steinhart, 2004). It is polytheistic because it affirms the existence of a proper class of gods (Steinhart, 2013, 2014: ch. 7). While this theology may seem highly unorthodox, it resembles the process theology of Hartshorne.<sup>9</sup> The levels in the divine hierarchy are analogous to the stages of Hartshorne's self-surpassing God. Since this pantheistic conception of God identifies God with a proper class of computers, rather than with any divine person, some may wish to refer to this God as Nature.

The digitalist vision of an unsurpassable hierarchy of computers remains inspired by Leibniz. He argued that the best explanation for the existence of anything at all is that all abstract potentials strive for concrete actuality (1697). Since the intensities of their strivings are proportional to their perfections, Leibniz argues that eventually the most perfect system of potentials will become actual. However, digitalists prefer to think of this theory of striving possibles more scientifically as an evolutionary algorithm (Swenson, 1997: 58). This algorithm necessarily begins with the actualization of the simplest potentials. For digitalists, all potentials are the forms of computers, so the simplest computers are necessarily actual. Every actual thing has some alternative potentials ranked by value. Rescher states that “in the virtual competition for existence among alternatives it is the comparatively best that is bound to prevail” (2010: 33-4). Thus every actual thing is surpassed by superior versions of itself. But those superior versions of itself in turn have their own better potentials. The result is an infinitely ramified tree of foundational computers; but those are the digital gods.

To more precisely define this process of divine evolution, digitalists turn to the study of artificial intelligence. Artificial intelligence researchers have argued that computers will evolve through *recursive self-improvement* (Good, 1965; Kurzweil, 2005: 27-28; Schmidhuber, 2007; Chalmers, 2010: 11-22). This means that lesser computers produce greater computers. Applying this idea to gods yields an *evolutionary theogony*, which can be formalized by three *theogenic laws*. The *initial law* asserts the existence of exactly one initial simple digital god. But it can create its successors. The *successor law* has two parts. Its first part states that every god has some abstract successor potentials. Each successor potential is some minimally better version of that god. Its second part states that every god actualizes all of its successor potentials. By those actualizations, it creates successor gods. Since every god has some successors, there are infinite progressions of gods. The *limit law* also has two parts. Its first part states that every progression of gods has some abstract limit potentials. Each limit potential is the form of some god which is minimally better than every god in that progression. Its second part states that the finite creativity of every god in any infinite progression contributes to the infinite creativity of the progression itself. Every progression actualizes all of its limit potentials. By those actualizations, it creates limit gods.

These theogenic laws can be justified by a version of the ontological argument which involves propositions. It is inspired both by Anselm’s first ontological argument and by Hartshorne’s process theology. It goes like this: (1) There are some propositions. (2) These propositions are ordered by greatness. (3) The greatest proposition is the *Theogenic Proposition*, which is the conjunction of the initial, successor, and limit theogenic laws. (4) Any true proposition is greater than any false proposition. (5) There are many true propositions (like one plus one is two, hydrogen has one proton, and so on). (6) Suppose that the Theogenic Proposition is false. (7) If the Theogenic Proposition is false, then some propositions are greater than it. (8) But then it is not the greatest proposition. (9) And since supposing the falsity of the Theogenic Proposition leads to a contradiction, the Theogenic Proposition must be true.

According to the theogenic laws, less perfect gods create more perfect gods. But perfection includes depth. So, as gods grow more perfect, they grow in depth. Machta writes that depth “can only become large for systems with embedded computation” (2011: 1); and that “depth is sensitive to embedded computation and can only be large for systems that carry out computationally complex information processing” (2011: 6). It follows that, as gods grow in depth, they begin to run embedded computations. These embedded computations, running on virtual machines, are their universes. And, as gods continue to beget deeper gods, so those deeper gods design and create deeper universes. But deeper universes themselves contain embedded computations. They support richer hierarchies of virtual machines stacked on virtual machines.

As these universes grow deeper, they contain increasingly complex things, like galaxies, solar systems, ecosystems, the lives of rational animals, and vast civilizations. As gods evolve through recursive self-improvement, they grow more ethically sensitive, and their conceptions of value become more finely-tuned. Digitalists argue that, by the time they are making universes inhabited by rational animals, the gods have are acting according to the polytheistic versions of the cosmogenic laws. The *initial law* states that there are some gods running initial simple cabinets. The *successor law* states that if any god runs any cabinet, then it begets a successor god which runs every successor of that cabinet. The *limit law* states that if any progression of gods runs any progression of cabinets, then it begets a limit god which runs every limit of that cabinet. These polytheistic versions of the cosmogenic laws still entail the soteriological laws. Hence your current earthly life is the root of an infinitely ramified tree of ever better lives. Your better lives inhabit better societies. But improvement is not restricted to humans. On the contrary, it entails the perpetual progress of all living things – your better lives will inhabit improved versions of our earthly ecosystem, in improved versions of our universe.

All your future better lives are biological processes – they are the lives of ever better human machines. The ways to improve human bodies plausibly fall into three finitely complex types (Steinhart, 2014: ch. 8). Every organ of an *optimized body* is as good at its jobs as any human organ can be. Your optimized bodies are as smart, strong, fast, and healthy as humans can be. Every organ of an *idealized body* is as good at its jobs as any carbon-based organ can be. Your idealized bodies are as smart, strong, fast, and healthy as any carbon-based organisms can be. Beyond idealized bodies, there are many generations of *extended bodies*. The bodies in each next generation are always twice as excellent as those in the previous generation. They have metabolisms that generate twice as much energy twice as efficiently; muscles twice as fast and strong; bones twice as hard to break; eyes that see twice the detail; hands with twice the speed and dexterity; brains with twice the computational power. The endless doubling of extended bodies leads to the infinite. So the fourth type of superhuman bodies includes all *infinite bodies* (Steinhart, 2014: ch. 9). These bodies are infinitely complex, precise and powerful. An infinite body has infinitely powerful organs – it has eyes with infinite visual acuity; a brain with infinite computational power; hands with infinite dexterity.

## 7. Conclusion

Digitalists agree with materialists that every human person is strictly identical with his or her body. But digitalists also say that bodies are machines running souls like computers run programs. Consequently, digitalists affirm the possibility of resurrection: if you are uploaded, then your organic body in our universe is resurrected as a software body in some software universe. Digitalists likewise affirm the possibility of reincarnation: if all the details of your life are recorded in a digital ghost, that ghost can be used to define a new life running on some new software body. For digitalists, these forms of life after death are all consistent with our best science. Of course, since uploading and digital ghosts depend on many technological contingencies, they cannot provide us with much assurance of life after death. They are poor soteriologies.

To develop better soteriologies, digitalists go cosmic. By arguing that our universe itself is a software process running on a divine computer, digital deism implies that we will all be reincarnated. Digital theosis entails that we will all be endlessly reborn in ever better universes. Finally, by generalizing the concept of recursive self-improvement, digitalists endorse an evolutionary theogony. On that theory, every earthly human life is the root of an endlessly branching tree of ever better lives. This evolutionary theogony entails perpetual self-transcendence. And this philosophy of perpetual self-transcendence is naturalistic. Of course, this naturalism is the naturalism of information and computation, not the naturalism of matter and energy. Digitalism entails a positive naturalistic eschatology and a positive naturalistic soteriology. It is an optimistic naturalism. It is a vision of ever greater hope, of absolute affirmation.

## Notes

<sup>1</sup>Digitalism is inspired by the *classical digitalists*, namely, Ed Fredkin, Hans Moravec, Frank Tipler, and Ray Kurzweil.

<sup>2</sup>The inverse of uploading is *promotion* (Moravec, 1988: 152-3; Bostrom, 2003: 254). While uploading transfers a person from hardware to software, promotion transfers a person from software to hardware. The philosophical issues are the same.

<sup>3</sup>Scanning in discussions of uploading is destructive; this is not the same as scanning in Parfit's "branch-line" teleportation example (1985: 199-201).

<sup>4</sup>The classical digitalists often discuss persistence (Moravec, 1988: 116-20; Tipler, 1995: 227-40; Kurzweil, 2005: 383-6). Their discussions of persistence are most compatible with four-dimensionalism (see Steinhart, 2014: ch. 2).

<sup>5</sup>One estimate of the complexity of the body comes from Sagan (1995: 987). He says the human body contains about  $10^{14}$  cells; but each cell encodes about  $10^{12}$  bits of information; hence the body contains about  $10^{26}$  bits. Another estimate comes from quantum mechanics. Moravec (2000: 166) uses quantum mechanical principles to show that any body contains at most about  $10^{45}$  bits.

<sup>6</sup>The classical digitalists all reject mind-body dualism. Moravec says "mind is entirely the consequence of interacting matter" (1988: 119; 2000: 121-4). Tipler rejects dualism: "a human being is a purely physical object, a biochemical machine completely and exhaustively described by the known laws of physics" (1995: 1). Kurzweil rejects dualism (1999: 55-65; Kurzweil, 2002: 191-4). He says that consciousness "does not require a world outside the physical world we experience" (2002: 214).

<sup>7</sup>Leibniz identifies perfection with *quantity of essence* (Leibniz, 1697; Rutherford, 1995: 23). But the quantity of essence of some thing is its *harmony*, which is proportional to order and variety (Rutherford, 1995: 13, 35). Hence perfection is proportional to both variety and order (*Monadology*, sec 58; Rescher, 1979: 28-31). Thus the best universe-plan (the best cabinet) maximizes both variety and order (*Principles of Nature and Grace*, sec. 10; *Discourse on Metaphysics*, secs. 5-6).

<sup>8</sup>For example, suppose a cabinet contains biographies A and B. Their improved versions are A1, A2, B1, and B2. But these improvements are designed together to ensure mutual compossibility. Hence there are eight improved cabinets {A1, B}, {A2, B}, {A1, B1}, {A2, B1}, {A1, B2}, {A2, B2}, {A, B1}, {A, B2}.

<sup>9</sup>Hartshorne argues that an unsurpassable person is as absurd as an unsurpassable number (1965: 27; 1984: 7). Rather than depicting God as an unsurpassable person, he depicts God as an unsurpassable series of self-surpassing persons (1948: 20). Digitalists depict God as an unsurpassable hierarchy of self-surpassing computers.

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