Spirit

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ABSTRACT: Many religions and religious philosophies say that ultimate reality is a kind of primal energy (such as *qi*, *mana*, *manitou*, *teotl*, *pneuma*, and so on). This energy is often described as a vital power animating living things, as a spiritual force directing the organization of matter, or as a divine creative power which generates all things. By refuting older conceptions of primal energy, modern science opens the door to new and more precise conceptions. Primal energy is referred to here as spirit. But spirit is a natural power. A naturalistic theory of spirit is developed using ideas from information theory and thermodynamics, such as the maximum entropy production principle. Spirit drives the evolution of complexity at all levels of existence.

KEYWORDS: spirit, energy, information theory, thermodynamics, striving possibles, ontological argument.

1. Introduction

Many religions and religious philosophies say that ultimate reality is a kind of *primal energy*.[1] This energy is often described as a vital power animating living things, as a force which drives evolution through phases of ever greater complexity, or as a divine creative power which generates all things. Sometimes this energy is identified with God: despite our personifications, God is really an impersonal power or force.[2] More often it is defined without reference to any divine persons. Although terms like power, force, and energy obviously appear in physics, the ultimacy of the primal energy implies that it is not strictly physical. The mundane physical energies described by standard scientific theories are manifestations of primal energy. To distinguish it from physical energy, it is sometimes referred to as *subtle* energy or *spiritual* energy.[3]

But modern science appears to deny all these energy concepts. It does not recognize any ancient energy concepts. It rejects Daoist *qi*, Stoic *pneuma*, Aztec *teotl*, and so on. It does not recognize the spiritual energies of the New Thought religions; it rejects all New Age subtle energies. It recognizes no divine creative power, no driving forces behind evolution, no vital energies animating living things. Scientific skeptics correctly argue that spiritual energies play no roles in our best scientific theories (Stenger, 2001). And the very idea of spiritual energy is incoherent (Caroll, 2003). Spiritual energy has never been presented as part of a mathematically precise theory which permits its measurement in terms like joules or electron-volts. Thus spiritual energy does not exist.

Scientific naturalists are right to reject the traditional conceptions of spiritual energy. Nevertheless, the denial of those traditional conceptions does not imply that every version of the concept of spiritual energy has been refuted. The concept of spiritual energy, so pervasive across times and places, may very well be incorporated into precise

scientific theorizing. A naturalistic theory of spiritual energy will be developed here. To avoid confusing physical connotations, phrases involving the term *energy* (such as primal, subtle, or spiritual energy) are just replaced with the term *spirit*. The term *spirit* has a long history in the West, and it has often been used in naturalistic ways.[4] So a naturalistic theory of spirit will be developed here. It is an account of spirit which can be accepted by *spiritual naturalists*. It supported by our best science. It will be developed through the critical examination of five hypotheses about spirit.

2. Spirit is a Natural Force

Since spirit is traditionally thought of as a life force, the *first hypothesis* about spirit simply asserts that *spirit is a vital force*. On this view, it resembles *pneuma*, *prana*, or *qi*. It resembles Bergson's *elan vital* or Reich's *orgone energy*. However, modern science does not recognize anything like those vital forces. So this first hypothesis is rejected: spirit is not a vital force. But this rejection requires some careful qualification. Although modern science does not include any vital forces, modern biologists do talk about *evolutionary forces* (Sober, 1984; Stephens, 2004; Filler, 2009). These forces act on gene frequencies; they drive populations to move around on adaptive landscapes. They include selection, mutation, drift, and migration. These forces are not physically basic; on the contrary, they are *derivative forces*. They emerge from interactions governed by more basic forces. They are emergent causal powers.

Since spirit is traditionally thought of as a life force, and since biologists do talk about evolutionary forces, spiritual naturalists look for spirit in evolution. Life on earth began with the simplest self-reproducing cells. From those simple cells, life has evolved over time through increasingly complex forms. The *arrow of complexity hypothesis* asserts that the complexities of the most complex organisms tend to increase with time (Bedau, 1998: 145).[5] If this is right, then biological evolution exhibits a *tendency* to increasing complexity. Life tends to flow uphill in landscapes where height is complexity. Since increasing complexity goes with increasing order, this biological tendency appears to violate the second law of thermodynamics (which states that all physical systems tend towards increasing disorder, that is, increasing entropy). Since this tendency appears to violate the second law, it needs some explanation.

These considerations motivate the *second hypothesis* about spirit: spirit is a directing force which drives life to evolve to higher levels of complexity.[6] The *Naïve Biological Argument* aims to justify this second hypothesis. It goes like this: (1) Biological evolution exhibits an arrow of complexity. (2) This biological arrow requires an explanation. (3) The best explanation for it is that there exists some *directing force* which drives living systems to gain complexity. This force pushes living systems from lower to higher complexities. It strives to decrease disorder and increase order. It strives to decrease the entropies of living systems. (4) This directing force is spirit. Spirit acts along with the other evolutionary forces. Since spirit produces minds through biological evolution, it is deeper than any mental force. It has no intelligence; it is not consciousness. But this naïve argument for spirit suffers from a fatal problem.

The fatal problem with the Naïve Biological Argument concerns its scope. After all, life evolved from non-living chemical systems. The first living cells evolved from

prebiotic systems of self-interacting complex molecules like nucleic acids and proteins. Systems of self-replicating RNA molecules are driven by evolutionary forces (Lincoln & Joyce, 2009). But prebiotic systems involving complex molecules evolved from simpler chemical systems involving simpler molecules. Perhaps they evolved from simple autocatalytic networks (Kauffman, 1995). This continuity seems to imply that some directing force was already at work in these non-living dissipative systems (Prigogine & Stengers, 1984). Spirit is deeper than any merely biological force. Working in non-living dissipative systems, spirit drives their evolution towards life.

Biological evolution depends on chemical evolution. It depends on the evolution of molecular complexity. But complex molecules involve complex atoms. Those atoms already evolved from simpler atoms. They were produced in the cores of stars, which fused simpler atomic nuclei together into more complex atomic nuclei. Hence spirit is deeper than any merely chemical directing force. Spirit was already at work in the processes of atomic evolution. Spirit drives the evolution of atomic complexity by driving the processes of atomic fusion in the cores of stars. If it exists at all, spirit is a force at work in the deepest depths of physics. It is some kind of physically directing force. Spirit is at work in the Big Bang. It drives radiant energy to condense into matter; then it drives matter to self-organize into increasingly complex forms.

These considerations lead to a *third hypothesis* about spirit: spirit is a force which drives all physical systems in our universe from lesser complexity to greater complexity. On this view, *spirit is an extropic force* which *appears* to violate the second law of thermodynamics. These considerations motivate the second argument for spirit. It is the *Anxious Physicalist Argument*. Nietzsche ran an argument like this for his *will to power* (*Beyond Good and Evil*, sec. 36). This argument is anxious because it suffers from two worries. It goes like this: (1) Physical evolution exhibits an arrow of complexity. (2) This arrow requires an explanation. (3) The best explanation is that there exists some *extropic force* which drives all physical systems in our universe to gain complexity. It drives physical, chemical, and biological evolution. (4) So, by inference to the best explanation, this extropic force exists. (4) This extropic force is spirit.

The first worry concerns complexity. If spirit really is an extropic force which drives things to greater complexity, then there must be some physical way to measure complexity. At least one way is available. Chaisson (2001) argues that the complexity of any physical system is proportional to the amount of energy flowing through one unit of mass of that system in one unit of time. It is proportional to the energy-rate density of the system, measured in joules per second per gram (j/s)/g. Although Chaisson's analysis has problems, it shows that complexity can at least be approximated by a purely physical quantity. So perhaps this worry is not fatal.

The second worry concerns the existence of any extropic force. Bogus extropic forces have been posited before. For example, although Teilhard de Chardin argued for an extropic force which he called *radial energy*, no such force exists.[7] Do any extropic forces really exist? Our best science appears to recognize only *four fundamental forces:* gravity, the strong nuclear force, the weak nuclear force, and the electromagnetic force. Some other forces, like the van der Waals force, are derived from the four fundamental forces. But these four forces and their derivatives do not include any extropic force. So, if these fundamental and derivative forces are the only ones, then spirit does not exist. Fortunately for spiritual naturalists, the thesis that there are only four fundamental forces

is somewhat sloppy. It is more accurate to say that there are only *four fundamental exchanges* which give rise to forces. It is entirely possible that there are other fundamental forces which are not produced by exchanges.

3. The Thermodynamics of Spirit

According to the third hypothesis, spirit is original and universal. It emerges with the Big Bang and it works throughout the universe. But spirit is not one of the four exchange forces; so, if it exists at all, then it must be some other kind of force. Since the evolution of complexity is closely linked to thermodynamics, it seems plausible to search there for spirit. And indeed modern physics recognizes many *entropic forces:* "An entropic force is an emergent phenomenon resulting from the tendency of a thermodynamic system to maximize its entropy" (Roos, 2014: 1161).[8] Elastic forces are familiar entropic forces. When you stretch a rubber band, the force which pulls it back into its unstretched shape is an entropic force: "the elastic force of rubber is *entropy induced;* energy plays no role in rubber elasticity" (Muller, 2007: 112; his italics).

Although entropic forces emerge from the tendency of a thermodynamic system to increase its entropy, they can drive disordered systems towards order. Entropic forces include *depletion forces* (Asakura & Oosawa, 1958). As systems increase their entropies, depletion forces can increase order (Wolpert, 2013: 247-8). Within living cells, depletion forces assist "in the assembly of a wide range of cellular structures, ranging from the cytoskeleton to chromatin loops and whole chromosomes" (Marenduzzo et al., 2006: 681). At the level of large molecular structures, "entropy alone is sufficient to stabilize ordered phases of ever-increasing complexity" (Kang et al, 2016: 386). Through his analysis of entropic forces in an idealized model, Wolpert shows "how the second law not only *allows* an open system to have high complexity, but can actually *drive* it to have high complexity" (2013: 251; italics his). More generally, it has been argued that entropic forces drive the evolution of complexity by maximizing entropy production rates in open systems (Wissner-Gross & Freer, 2013).

This reasoning suggests that spirit is an extropic force which emerges from entropic forces. As they work to globally increase entropy, they produce a force which locally decreases entropy. Spirit is a force which causes entropy to locally decrease. So the key to spirit comes from thinking about the entropy of our universe and its parts. Our universe began with the Big Bang, which filled it with a uniform mixture of very hot gas. This gas was in an extremely low entropy state (Greene, 2005: 173-4). Since the universe begins in this low entropy state, it begins far from thermodynamic equilibrium. The second law entails that it will move towards equilibrium. As it approaches equilibrium, it will be just a bunch of black holes.[9] Black holes have extremely high entropies. Gravity is a force which increases entropy by driving the low entropy state of the initial hot gas to the future high entropy state of equilibrium.

As gravity works on the initial hot gas, it pulls it together to make stars. Stars fuse simpler atoms into more complex atoms. Gravity, which increases entropy, somehow drives the production of greater complexity. As matter organizes itself under the influence of gravity, it forms solar systems in which planets orbit stars. The surfaces of planets receive energy from their stars and radiate it back into empty space. They are

thermodynamically open systems operating far from equilibrium. Dissipative structures, such as living things, can emerge near the surfaces of these planets.

Any process far from equilibrium produces entropy at some rate. Any process is a more or less orderly flow of matter. According to Swenson, the second law of thermodynamics entails that "ordered flow produces entropy faster than disordered flow" (2006: 318). So consider the currents of air in the atmosphere of earth. They carry heat from the hot surface towards the cold emptiness of space. These can form three regimes: flows poorly organized; flows somewhat organized into Benard convection cells; flows highly organized into cyclones. More highly organized flows minimize energy potentials more efficiently. They produce entropy more efficiently. As flows shift from low order regimes to higher order regimes, their entropy production rates increase.

The *maximum entropy production principle* (MEPP) states that physical systems tend to maximize their entropy production rates (Martyushev & Seleznev, 2006). Swenson puts it like this: "A system will select the path or assembly of paths out of available paths that minimizes the potential or maximizes the entropy at the fastest rate given the constraints" (2009: 334). This means that if a process can shift into a faster entropy production regime, then it almost certainly will. Consider an air stream that starts in a chaotic regime. If it can become a convection cell, it almost certainly will; if it can become a cyclone, it almost certainly will. Hence processes tend to evolve in ways that increase their entropy production rates or efficiencies. Saying that they *tend* may be too weak; it may be more accurate to say that they *strive* to produce entropy faster.[10]

Thus Swenson offers the following *Extropic Argument:* (1) Ordered flow produces entropy faster than disordered flow. (2) The MEPP asserts that physical systems tend or strive to maximize their entropy production rates. If they can produce entropy faster, they almost certainly will. (3) Therefore, physical systems tend or strive to increase their orderliness. If they can become more orderly, they almost certainly will. Swenson summarizes the argument like this: "the world can be expected to produce order whenever it gets the chance. . . . [The world] is in the order production business, because ordered flow produces entropy faster than disordered flow" (2006: 318). The MEPP is original and acts everywhere in the universe (Lineweaver, 2006).

The Extropic Argument states that if a physical flow can self-organize, then it almost certainly will self-organize. The MEPP *drives* this self-organization (Dewar, 2006). The driving power of the MEPP is confirmed by many examples of self-organization.[11] Via experiments with self-organizing nanoscale structures, Belkin et al. provide "strong evidence that maximum entropy production principle plays an essential role in the evolution of self-organizing systems far from equilibrium" (2015: 1). Since processes evolve according to the MEPP, they have a tendency to self-organize. They have a real directionality which moves from disorder towards order. This directionality is active; since it is active, it is the expression of some force. Hence there exists an *extropic force*, which, under certain conditions, drives physical processes to self-organize (Annila & Kuismanen, 2007). On the third hypothesis about spirit, this extropic force is spirit. Spirit is an extropic force which emerges from the MEPP just as entropic forces emerge from the second law.[12] Of course, since the MEPP itself is entailed by the second law, spirit ultimately emerges from the second law.

These considerations motivate the *Thermodynamic Argument for Spirit*. It goes like this: (1) All physical processes far from equilibrium tend or strive to move from disorder

to order. (2) This tendency or striving is the expression of an extropic force. (3) This force is spirit. Thus spirit drives all physical systems from lesser complexity to greater complexity. Spirit drives matter to organize itself; it is the power of self-organization. Spirit drives the evolution of dissipative structures, such as living organisms, to greater complexities. Spirit emerges right away; it is original and universal. It begins with the Big Bang; it acts on all physical processes in our universe.

4. The Complexity of Our Universe

The third hypothesis about spirit asserts that spirit is an extropic force in our universe. As such it is an emergent force which drives all physical systems in our universe from lesser to greater complexity. Spirit emerges from *four spiritual features* of our universe: (1) The fact that our universe started in a low entropy state. (2) The second law of thermodynamics, which states that processes in our universe tend or strive to maximize entropy. (3) The maximum entropy production principle, which states that processes tend or strive to maximize their entropy production rates. (4) The fact that faster entropy production entails greater self-organization. Many philosophers believe that features like these demand an explanation. Theists say the best explanation for features like these is the existence of some intelligent cosmic designer. Many atheists say that the best explanation is a multiverse in which all cosmic features are realized. For spiritual naturalists, these features have an evolutionary explanation.

To defend the thesis that the four spiritual features of our universe have an evolutionary explanation, spiritual naturalists offer the *Argument for a Cosmological Arrow*. Here it is: (1) Our universe has the four spiritual features. (2) If it has those features, then its internal evolution will generate great complexity. (3) If its internal evolution generates great complexity, then our universe is highly complex. (4) So, our universe is highly complex. (5) All complex things are produced by evolutionary processes in which complexity gradually accumulates. (6) Therefore, our universe has been produced by some process of *cosmological evolution*. (7) Cosmological evolution resembles biological evolution (Hume, 1779: part 7; Steinhart, 2014: chs. 6 & 7). Just as biological evolution began with some simple organism, so cosmological evolution begins with some simple universe. Just as organisms beget organisms, so universes beget universes. Just as biological evolution tends or strives to produce increasingly complex organisms, so cosmological evolution tends or strives to produce increasingly complex universes. (8) Consequently, just as biological evolution exhibits an arrow of complexity, so cosmological evolution exhibits an arrow of complexity.

Of course, if spirit plays a role in the production of our universe, then it cannot be an extropic force internal to our universe. Any extropic forces in our universe are local expressions or manifestations of spirit. But spirit itself is deeper than any physical force internal to any universe. So the third hypothesis about spirit must be revised in favor of the *fourth hypothesis:* spirit is a power which drives cosmological evolution. This fourth hypothesis can be justified by the *Cosmological Argument for Spirit*. It goes like this: (1) Cosmological evolution exhibits an arrow of complexity. (2) This arrow requires an explanation. (3) The best explanation is that there exists some *ontological power* which drives all universes in nature to gain complexity. (4) So, by inference to the best

explanation, this ontological power exists. (5) This ontological power is spirit. Spirit is a natural power which drives all universes in nature from lesser to greater complexity. And, just as organisms gain their organic features from biological evolution, so universes gain their spiritual features from cosmological evolution.

These cosmological considerations assert that *nature* is like an ecosystem in which the organisms are universes. Although spirit is not fundamental in every universe, spirit is fundamental in nature. The Argument for a Cosmological Arrow posits a simple initial universe. Spirit animates that universe. It flows from every universe into its offspring. As it drives universes to become more complex, it drives them to gain features which enable spirit to act ever more intensely inside those universes. For example, it equipped our universe with its four spiritual features. Those features ensured the emergence of an extropic force in our universe. That extropic force drives the evolution of complexity inside of our universe. That extropic force is merely the *local appearance* of spirit in our universe. But the local appearance of spirit in *any* universe is merely a manifestation or expression of spirit itself. It is the phenomenal manifestation of a noumenal power. It is the ontic expression of an ontological power. So the fourth hypothesis about spirit entails the third hypothesis. Spirit works in every universe to drive increasing complexity; but it works in different universes in different ways according to local physical laws. Spirit cannot violate the laws which it produced.

Of course, universes are not like ordinary physical things. Their complexities cannot be defined in local physical terms (e.g., they cannot be defined in terms of energy-rate densities). They must be defined using abstract evolutionary concepts. Since universes gain their complexities through evolution, the complexity of any universe is a kind of accumulated organization. Accumulated organization can be mathematically analyzed using concepts associated with logical depth.[13] Many writers have argued that accumulated organization is intrinsic value.[14] If that is right, then cosmological evolution produces universes with ever greater intrinsic values. Thus spirit strives to increase those intrinsic values. Spirit is a value-increasing power.

5. Evolution by Axiological Selection

According to the fourth hypothesis about spirit, spirit is an ontological power, which drives cosmological evolution. It produces the simple initial universe. It drives simpler universes to beget more complex offspring. It thus drives the evolution of an infinitely ramified genealogical tree of increasingly complex universes. As an ontological power, spirit is deeper than any physical force which acts inside some universe. For example, it is deeper than any extropic force acting in our universe. Any extropic force acting in our universe is a local manifestation or expression of spirit. If spirit really is an ontological power, then it must be an *ultimate* power. It must play an essential role in explaining the very existence of any concrete things. It must explain why there are some concrete things rather than none. Of course, that explanation cannot involve any concrete things. It can involve only abstract objects in abstract relations.

One such explanation, in which spirit plays an essential role, is inspired by the Leibnizian *theory of the striving possibles* (Leibniz, 1697; Blumenfeld, 1981; Rescher, 1991: 171-5). The Leibnizian theory of the striving possibles offers an appropriately

abstract explanation for the existence of concrete things. But the original Leibnizian theory suffers from many problems.[15] They can be solved by recasting it in evolutionary terms (Swenson, 1997: 58). The *evolutionary version of the striving possibles* is inspired by Rescher (2010). This evolutionary version treats the striving possibles as abstract objects. They are abstract possibilities which strive for concrete actuality. More precisely, they are the mathematical forms of universes.[16] Although nominalists will object to these abstract objects, spiritual naturalists can defend them by appealing to the indispensability of abstract objects in scientific theories (Colyvan, 2001). Of course, if the nominalists are right, then the evolutionary version of the striving possibles cannot justify the existence of spirit. Hence spiritual naturalism now proceeds under the assumption that these abstract cosmic forms exist. An abstract cosmic form is actual if and only if it is instantiated by some concrete universe.

The *Argument for an Initial Universe* now runs like this: (1) Following Leibniz, every form strives to be actual.[17] Every form strives to be instantiated by a concrete thing. Thus every cosmic form strives to be instantiated by a concrete universe. (2) Again following Leibniz, every form will be actual unless there is some reason which prevents it from being actual.[18] Equivalently, if there is no reason which prevents some form from becoming actual, then that form will become actual. (3) Any reason which prevents some form from becoming actual lies in some other form on which it depends. (4) So, if any form is independent, then there is no form on which it depends; but if there is no form on which it depends, then there is no form which can prevent it from gaining actuality; there is no form which contains any reason against its actuality. Hence the striving of every independent form succeeds. Every independent form is actual. (5) Since complexity is a cumulative quantity, which is developed through the addition of structure, every complex form depends on some simpler form. Hence any independent form is as simple as possible. So every simplest form is actual. (6) There exists exactly one simplest form. For if there were many simplest forms, they would all have some common intersection, which would be simpler. The simplest cosmic form is the form of the empty universe. This form is the empty set; it is the cosmological zero. (7) Since every simplest form is actual, the unique simplest cosmic form is actual. It has an instance. Hence the unique simplest universe exists. This is the initial universe. There is something rather than nothing because the striving of the simplest form succeeds.

The *Argument for the Tree of Universes* now goes this way: (1) Any form is the parent of at least one offspring form. Each offspring is derived from its parent by some variation. It is analogous to a genetic variant of an organism. (2) Any offspring can be compared with its parent in terms of its intrinsic value. Its intrinsic value is either less than, equal to, or greater than that of its parent. (3) Since any form can be prevented from gaining actuality by and only by some other form on which it depends, every offspring form can be prevented from gaining actuality by and only by its parent. A parent form prevents some offspring form from gaining actuality if and only if that parent contains some reason against the actuality of that offspring. (4) Given any set of alternatives, it is rational to select the best and reject the rest. So every parent contains a reason against actualizing any offspring which is not more valuable than the parent. Every parent selects all and only its more valuable offspring for actualization. This selective process resembles a biological struggle for survival: the offspring resemble siblings which compete among themselves for actuality from their parent. Each sibling

strives more or less *intensely* for actuality. Following Leibniz, its intensity is proportional to its intrinsic value.[19] Rescher states that "in the virtual competition for existence among alternatives it is the comparatively best that is bound to prevail" (2010: 33-4). Just as the fittest biological offspring win the struggle for survival, so the best formal offspring win the struggle for actuality. (5) So the better offspring of every actual universe become actual in the next generation. (6) The iteration of this reproductive logic produces an infinitely ramified tree of actual universes. One of these is our universe.

These ideas motivate the *Leibnizian Argument for Spirit*. It goes like this: (1) There are many explanations for the very existence of concrete things. (2) One of these is the evolutionary version of the Leibnizian theory of the striving possibles. Since value plays a key role in that theory, it can be referred to as *evolution by axiological selection*. (3) One great advantage of evolution by axiological selection is that it parallels evolutionary theories in the natural sciences (in physics, chemistry, and biology). (4) Since evolution by axiological selection has this advantage, it is better than every competing explanation for the very existence of concrete things. (5) Hence it is the best explanation. (6) So, by inference to the best explanation, evolution by axiological selection is true. This means that the premises in the Arguments for the Initial Universe and for the Tree of Universes are true. (7) Those premises say that every cosmic form strives for actuality. But if those forms strive, then they are animated by some abstract power. This power aims at the maximization of comparative value. It is an optimizing power. (8) This power is *spirit*. Therefore spirit is an abstract optimizing power, which gives concrete existence to valuable abstract cosmic forms. It thus produces all concrete things.

This evolutionary version of the striving possibles differs from Leibniz on two crucial points. First, although Leibniz says that exactly one universe is actual, the evolutionary version implies that infinitely many universes are actual. And second, although Leibniz says that our universe is the best, the evolutionary version entails that every universe in the genealogical tree is surpassed by every possible improvement of itself. Hence no universe is the best of all possible universes. The universes in the genealogical tree are stratified into generations. These generations can be indexed by ordinal numbers. The zeroth generation contains just the initial simple universe. Each next generation contains every improvement of every universe in the previous generation. The series of generations continues into the transfinite using standard limit principles. Hence there is no upper bound on the value of universes and things in them.

6. The Ontological Argument for Spirit

The fourth hypothesis about spirit states that it is an ultimate ontological power. Any extropic force in our universe, or in any other universe, is merely a local expression of spirit. The Leibnizian Argument for Spirit supports and refines this fourth hypothesis. But that argument is merely inductive. If spirit really is an ultimate ontological power, then there ought to be some deductive argument which derives the existence of spirit from purely logical first principles. Fortunately, such an *a priori* argument for spirit exists. Since it is based on recent versions of the Ontological Argument for God, it can be referred to as the *Ontological Argument for Spirit*.[20] But this Ontological Argument is atheistic. It has two parts. Its first part is the *Axiological Argument*.

The first premise of the Axiological Argument states that propositions exist. Propositions are abstract objects. Their existence can be defended by well-known indispensability arguments. Because of their roles in the natural sciences, propositions are natural objects. The second premise of the axiological argument states that some propositions are ranked by value. These propositions assert the existence of generations of universes. Since these generations are indexed by ordinal numbers, the propositions are also indexed by ordinal numbers. They can be referred to as the *ordinally-indexed propositions*. The *n*-th proposition asserts that every cosmic form in every generation *up to and including* the *n*-th generation is actually instantiated by a concrete universe. Since universes in higher generations are better, propositions with higher indexes are better. Better propositions entail more surpassing. They entail that more universes (and things in them) surpass themselves in more ways. The third premise states that there exists a unique best proposition. This unique best proposition asserts that, for every ordinal number *n*, the *n*-th ordinally-indexed proposition is true. It is better than every ordinally-indexed proposition. It is that proposition that which no better is possible. Of course, the best proposition does *not* entail the existence of any best universe. It entails that every universe (and every part of every universe) surpasses itself in every way.

The fourth premise asserts that propositions are either true or false. The fifth premise asserts that some propositions are true. The sixth premise is the *principle of the superiority of truth*. Truth is a *value* and true propositions are more valuable than false propositions. Any attempt to refute the superiority of truth must rely on valid inference from true premises. Hence any such attempt assumes the very principle which it aims to refute, and thereby contradicts itself. The superiority of truth is analytically true. And a false proposition does not entail that any thing surpasses itself in any way. It entails no self-surpassing at all. Hence any false proposition has no value.

The Axiological Argument now proceeds as follows: (1) There are some propositions. (2) These propositions are ordered by value. More valuable propositions assert more self-surpassing. (3) There exists some unique best proposition. It asserts that every ordinally-indexed proposition is true. This best proposition entails that every universe surpasses itself in every possible way. (4) Propositions are either true or false. (5) Some propositions are true. (6) A true proposition is better than any false proposition. (7) Assume for *reductio* that the best proposition is false. (8) If the best proposition is false, then any true proposition is better than it. (9) But then the best proposition is not the best proposition. (10) Since this is a contradiction, the best proposition must be true. (11) Therefore, every universe surpasses itself in every possible way.

The second part of the Ontological Argument for Spirit reasons from the universal self-surpassing to the existence of spirit. It goes like this: (1) Every universe surpasses itself in every way. (2) If every universe surpasses itself in every way, then every thing in every universe surpasses itself in every way.[21] (3) So every thing surpasses itself in every way. (4) If every thing surpasses itself in every way, then every thing has the power of self-surpassing. (5) So, every thing has the power of self-surpassing. (6) If every thing has that power of self-surpassing, then there exists some power of self-surpassing which is common to all things. (7) So, there exists some power of self-surpassing which is common to all things. (8) The *fifth and final hypothesis* about spirit identifies that power of self-surpassing with spirit. Therefore, spirit is a power which emerges strictly from the logic of concreteness. Since this logic stands behind the

existence of every natural thing, in any universe, it is reasonable to say that spirit is a natural power. Spirit is a natural creative optimizing power; it is the power of self-surpassing in all things. This fifth hypothesis about spirit entails the fourth and third hypotheses. It entails that spirit manifests itself as an extropic force.

As a creative optimizing power, spirit drives the initial cosmic form to actualize itself. And spirit drives every universe to produce its offspring; it drives every universe to produce every possible improvement of itself. As these universes become more complex, they contain internal systems of things which become more complex. As these systems become more complex, their components enter into conflicts. Although these conflicts can create value, they can also destroy it. On earth evolution entails that life violently feeds on life. On the one hand, these biological conflicts drive evolution to produce ever more richly detailed ecosystems; on the other hand, they destroy the values accumulated in lives and species. Here spiritual naturalists adopt a Plotinian theory of evil.[22] Evil comes from the conflicts among goods. It comes from disharmonies. Since spirit is a creative optimizing power, it uses the disharmonies in any universe as dramatic materials for the production of greater harmonies in its descendent universes.

7. Conclusion

Since spirit drives the evolution of universes, it brings our universe into being. Since it animates all things in all universes, it animates all things in our universe. Spirit appears in our universe as an extropic force driving the evolution of physical complexity. It thus drives the evolution of biological complexity on earth. As an extropic force, spirit strives to optimize all living organisms by driving them towards thermodynamically optimal states (Mora & Bialek, 2011; Hidalgo et al., 2014). These are *critical* states at the boundary between order and chaos.[23] Critical states are associated with health and well-being. For example, it has been argued that the human brain strives to maintain itself in critical states, and that it functions optimally in such states (Hesse & Gross, 2014; Massobrio et al., 2015; Shew & Plenz, 2012). Since optimal brain functionality manifests itself as optimal mental functionality, spiritual naturalists hypothesize that these thermodynamically optimal states of the brain and body are also spiritually optimal (Sharp, 2011; Carhart-Harris et al., 2014). They are interested in refining and testing this hypothesis. They are interested in studying the psychological and ethical qualities of these optimal states. And they are interested in the methods which can finely tune the brain and body to produce and maintain these optimal states.

Notes

[1]Primal energies include Polynesian *mana*, Shinto *musubi*, Daoist *qi* (or *ch'i*), Stoic *pneuma*, Aztec *teotl*, Algonquian *manitou*, and so on. These concepts share the idea of life-force generalized into an ultimate energy animating all things.

[2]Religious naturalists like Peters regard God as an impersonal energy or force (2002: chs. 1 & 5). According to the Pew Forum (2008: 5), one in four Americans who believe in God also believe that God is an impersonal force.

[3]Subtle energy is common in New Age spiritualities (Albanese, 1999). Along with these New Age and Eastern beliefs, one quarter of Americans affirm that physical things contain spiritual energy (Pew Forum, 2009: 3).

[4]Hobbes thinks of spirit naturalistically as subtle matter (*Answer to Bramhall*, 309; *The Elements of Law Natural and Politic,* 1.XI.4). Descartes also says spirit is subtle matter (*The Passions of the Soul,* art. 10). At the end of the *General Scholium*, Newton uses the term *spirit* to refer to a natural force which may be electricity. Henry More and Ralph Cudworth posited a spirit of nature which was spatially extended and which drove matter to organize itself into more complex forms. Hegel asserted that spirit drives the evolution of nature through historical phases of ever increasing complexity.

[5]The complexity of an organism has been defined as its number of distinct cell types (Bower, 1988). Or as its ratio of its non-protein-coding-DNA to its total DNA (Taft, Pheasant, and Mattick, 2007). Both ways are consistent with each other and with physical complexity as energy-rate density.

[6]The activity of spirit in living things does *not* entail orthogenesis; on the contrary, it is entirely consistent with the neo-Darwinian synthesis. Spirit is not a substance; it must be understood in terms of the mathematical dynamics of complexity.

[7]It has been argued that Teilhard's radial energy should be understood in thermodynamic terms as Gibbs free energy (Morowitz et al., 2005). Likewise Bergson's *elan vital* should be understood in thermodynamic terms (DiFrisco, 2015).

[8]Entropic forces (like all forces) are measured in newtons.

[9]As the universe approaches equilibrium, it will be a bunch of black holes. These may fuse into a single black hole or they may evaporate through Hawking radiation. So there will probably be later states closer to equilibrium. But the arguments made here depend only on the second law of thermodynamics; they do not depend on any further specific assumptions about the ultimate equilibrium state.

[10]Clausius formulated the second law like this: "Die Entropie der Welt strebt einem Maximum zu" – the entropy of the world *strives* to a maximum (see Prigogine & Stengers, 1984: 119). This striving lies behind the MEPP and the claim that under certain conditions physical systems strive to increase their complexities.

[11]This argument has been used to explain the evolution of the earthly geochemical system (Kleidon, 2010); the evolution of the earthly ecosystem (Vallino, 2010); the evolution of plants (Dewar, 2010); the evolution of cellular metabolic networks (Unrean & Srienc, 2011). It explains the self-assembly of molecular structures (Belkin et al., 2015). Further examples in physics, chemistry, and biology are easy to find.

[12]On the third hypothesis, spirit is an extropic force derived from the MEPP; since the MEPP is a consequence of the second law, any extropic force is an entropic force. So the physical features of spirit resemble those of other entropic forces (such as depletion

forces or elastic forces). Many depletion forces acting on molecules and molecular assemblies have strengths of a few *kT* per nanometer, thus producing forces in the piconewton range (Marenduzzo et al., 2006). So spirit acts with similar strengths. It changes the microstates of systems. But changes in microstates scale up to become changes in macrostates. So spirit acts at larger scales.

[13]The depth of an object (such as a bit string) is the amount of computational work needed to produce it (see Bennett, 1988; Machta, 2011).

[14]For a review of the writers who argue that historically accumulated order is intrinsic value, see Steinhart (2014: secs. 72-4).

[15]It seems to imply the existence of the best of all possible universes; but no such universe exists. It seems to maximize the number of things; but this maximization of the number of things conflicts with the maximization of value.

[16]Leibniz thought of these possibilities as bit strings (Rescher, 1991: 191; Strickland, 2006: 21-5). But bit strings are equivalent to pure sets. Thus spirit ultimately flows through the arrows in the graph of the membership relation.

[17]Leibniz says that every possible strives for actuality; every essence strives for existence (1697: 86). He says that "Everything possible demands that it should exist" (Leibniz, in Rescher, 1991: 171). Here every form strives to be instantiated.

[18]Leibniz says "Everything possible demands that it should exist, and hence will exist unless something else prevents it, which also demands that it should exist and is incompatible with the former" (Leibniz, in Rescher, 1991: 171).

[19]Leibniz says each potential has a tendency to actuality and that "the degree of this tendency [is] proportionate to the quantity of essence or reality, that is, to the degree of perfection of the possible involved" (1697: 86). And again "the possible demands existence in its own nature, and indeed in proportion to its possibility or according to the degree of its essence" (Leibniz, in Rescher, 1991: 171-2; see also 206).

[20]The Ontological Argument for Spirit is inspired by the ontological arguments of Millican (2004) and Steinhart (2014: sec. 127).

[21]An improvement of a whole composed of parts is a whole composed of improvements of the parts. Suppose universe U contains parts A and B. The ways to improve A are A1 and A2 while the ways to improve B are B1 and B2. So the ways to improve U are {A, B1}, {A, B2}, {A1, B}, {A1, B1}, {A1, B2}, {A2, B}, {A2, B1}, {A2, B2}.

[22]For Plotinus, evil has no reality of its own; it is the privation of the good. Plotinus says it emerges from the conflicts among goods (*Enneads*, 4.4.32). And yet, since nature is animated by conflict, even this conflict is good (*Enneads*, 2.3.16). Evil is in the parts but the whole of reality is good (*Enneads*, 3.2.3, 3.2.11, 3.2.17, 4.4.32).

[23]It has been argued that the MEPP drives self-organizing systems into critical states (Dewar, 2006). The MEPP is similar to the free-energy principle (Friston, 2010), which has been extensively applied in neuroscience.

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