Scientific Research Publishing

Open Journal of Philosophy, 2020, 10, 155-186
https://www.scirp.org/journal/ojpp
ISSN Online: 2163-9442
ISSN Print: 2163-9434

Dismantling Paley's Watch: Equivocation Regarding the Word "Order" in the Teleological Argument

Randall S. Firestone

El Camino College, Crenshaw Blvd., Torrance, California, USA
Email: Randyfirestone@verizon.net, rsfirestone@elcamino.edu

How to cite this paper: Firestone, R. S. (2020). Dismantling Paley's Watch: Equivocation Regarding the Word "Order" in the Teleological Argument. *Open Journal of Philosophy, 10,* 155-186.
https://doi.org/10.4236/ojpp.2020.101012

Received: January 8, 2020
Accepted: February 9, 2020
Published: February 12, 2020

Abstract

William Paley's classic version of the Teleological Argument contends that just as a watch is ordered for a purpose and we rightfully conclude that it had a creator who ordered it, the universe is also ordered in many ways and for a variety of purposes, so we should similarly conclude that it had a creator, God, who ordered it. This paper contends that Paley committed the fallacy of equivocation when he lumped various types of order together as if they had no differences. The watch's operations are an example of Intentional Order—order created intentionally by a conscious agent for a specific purpose. The universe, on the other hand, until it had conscious and purposeful beings such as human beings, had exhibited only Ramseyian Order, Purposeless Order, and Functional Order. These three types of order can be explained by science in naturalistic terms, and therefore it is superfluous to appeal to a conscious Creator-God, let alone a supernatural one. Additionally, the paper asserts that the best scientific evidence indicates that the universe has always been and still is primarily disordered, and further argues that the natural laws, contrary to popular belief, are not ordered. Moreover, the order that is present is riddled with design flaws. As such, our universe is inconsistent with what one would expect from an Intelligent Designer/God. Therefore both Paley's analogical argument and all standard versions of the Teleological Argument, which rely on the order present in the universe to argue for the existence of God, fail.

Keywords

Teleological Argument, Argument from Design, Paley, Watch Analogy, Order, Ramsey Theory, Natural Laws, Scientific Laws, Problems with the Teleological Argument, Disordered Universe, Types of Order, Intentional Order, Functional Order, Self-Organization

1. Introduction

Analytic Philosophy and especially the logical positivists such as A.J. Ayer have shined a light on the fact that many philosophical issues and arguments are really non-issues or pseudo-arguments once we realize that ambiguities in language are the cause behind a given controversy or argument. Equivocal language is one culprit as it can mislead us into thinking an argument is well-reasoned when it is not. The fallacy of equivocation occurs when a word or phrase is not consistently used to mean the same thing on all occasions. I believe that William Paley's classic version of the Teleological Argument for the existence of God, also known as the Argument from Design, which he wrote in 1802, is an example of this.[1]

Paley's argument contends that just as a watch is ordered for a purpose and we rightfully conclude that it had a creator who ordered it, the universe is also ordered in many ways and for a variety of purposes, so we should similarly conclude that it had a creator who ordered it. It is a simple and emotionally appealing argument. However, this paper will argue that there is no order in the universe which in any way resembles the order found in a watch. When we look at the universe, we see much chaos or disorder along with local pockets of patterns and order, but no order created for a specific purpose by a conscious entity such as a supernatural god. Indeed, the universe displays nothing that is in any way similar to the order created for a specific purpose that is found in a watch.[2]

Furthermore, although I am using Paley's watch analogy as a springboard for my discussion, my argument refutes all standard versions of the Teleological Argument. In other words, the Teleological Argument need not be based on an analogy, and in fact, since there are so many problems in comparing a watch to the entire universe, one might reasonably believe that the argument is in fact stronger without the analogy. In such a case, the argument asserts that the order of the universe reasonably gives rise to the inference that it has a maker who created the order. This paper disputes that position—and does so in a novel way in that it argues that the Teleological Argument is based on an unnoticed confusion about the meaning of the word order, specifically, by conflating the following four very different types of order, which we can differentiate with the sym-

[1]There are other examples of the equivocation fallacy in philosophy of religion. For example, Michael Scrivens has argued that one cannot put various weak arguments for God's existence together and assert that taken together they make for one strong argument, especially when the various arguments have in mind different conceptions of God. Scrivens makes his point as follows: "It could be argued that the greatest confidence trick in the history of philosophy is the attempt to make various arguments for the existence of God support each other by using the same term for the entity whose existence each is supposed to establish. In fact, almost all of them bear on entities of apparently quite different kinds, ranging from a Creator to a moral Lawgiver… Instead of attempting to establish monotheism, one can, of course, frankly accept the arguments as separate proofs of the existence of separate beings (Scriven, 1966: pp. 351-352).

[2]The language problem in the Argument from Design was noted by physicist Victor Stenger, and although he focuses on the word "design" instead of "order," the point is the same. Not all types of design are referring to the same kind of design, and not all types of order are referring to the same type of order. Stenger states, "Some authors use the term 'design' to refer to any structure of atoms and molecules that exhibits some pattern or purpose. Indeed, many are inconsistent in their usage and definition of the term 'design' " (Stenger, 2008: p. 67).

bols O1, O2, O3, and O4.

1) Ramseyian Order: This is merely the inevitable patterns which emerge whenever multiple things exist, and is not true order. (O1)

2) Purposeless Order: Order for no real purpose. (O2)

3) Functional Order: Order for a purpose which could and likely did emerge naturally. (O3)

4) Intentional Order: Order for a purpose which could not have arisen naturally and was therefore **intentionally** created or designed by a conscious being. (O4)

An example of Ramseyian Order, which are random patterns and are actually part of any disordered system, is seen in a cloud or a set of stars which are roughly in the shape of an animal, or the "man in the moon"; Purposeless Order is found in the shape and symmetry of a snowflake; Functional Order is demonstrated by the human eye; and Intentional Order is illustrated by human creations such as houses and watches.

Paley confused these four as he asserted that O4 was present in situations when in fact O1, O2 or O3 were the proper explanations. It is here where the equivocation takes place as Paley saw Intentional Order not only where it does not exist, but he also believed that order for a purpose never, or at the very least rarely, emerges naturally and therefore such order must have a conscious creator. Modern science has taught us, however, that order for a purpose (Functional Order: O3) can and does occur naturally, as demonstrated by evolution.[3]

Returning to Paley's argument, we can formally lay it out as follows:

1) A watch is a complex system that displays order for a purpose.

2) We correctly conclude that such order was created by a maker.

3) The universe is also a complex system that displays order for a purpose.

4) Therefore we should likewise conclude that it was created by a maker, in this case God.

Paley argued that the parts of the universe are ordered for a purpose and he implies that the universe displays order both as a whole and in its parts. Additionally, his argument asserts that order appears at different levels in the universe—both in the big things, such as the heavenly bodies, and in much smaller things, such as the human body—although he admits that he does not know the particulars of the organization of the heavenly bodies (Paley, 1809: pp. 378-382).

I contend in this paper that the order found in a watch is significantly different than what we find when we look at the universe both as a whole and in its

[3]We should note that we could characterize Paley's equivocation fallacy as not being about *order*, but rather regarding *purpose*, because Paley fails to differentiate order for a purpose which occurs naturally from order for a purpose which is created by a conscious being. We might say one is a conscious purpose and the other an unconscious or random purpose—so not all purposes operate the same way or are the same thing. Although this is correct, I think it is better if we focus on order as that was the primary focus of not only Paley, but as we shall see, also of most other philosophers who have analyzed the argument. Moreover, I differentiate the kinds of order in terms of their type of purpose, or lack thereof.

parts. We should keep in mind that Paley's order for a purpose means order which a conscious entity would create in order to achieve some goal or end, and this we do see in a watch, but not in nature, or so I will argue. When addressing the apparent order of the universe, I will look at the following five developmental stages of the universe.

1) The first moments of the universe immediately subsequent to the Big Bang.

2) The development of the initial natural or scientific laws that arose after the Big Bang.

3) The patterns or order that formed in non-living matter and energy from and as a result of the natural laws.

4) The order that eventually formed in living organisms.

5) The present universe.

As far as I know, no prior papers on this subject have examined all five stages in the systematic manner that will be undertaken here. Furthermore, one of the areas of original contribution of this paper is regarding the second stage, namely, the natural or scientific laws, as it will be argued that, contrary to popular belief, these laws do not display true order.

Specifically, this paper contends that the first two stages of the universe, immediately after the big bang and subsequently during the formation of the natural laws, did not exhibit true order and can be best considered as disordered or chaotic. At most, they displayed a type of Ramseyian order (O1), which is not really order at all. In the third stage we find order or, probably more accurately, patterns in non-living matter, but this can best be characterized as exhibiting a Purposeless Order (O2), a type of order which has no recognizable purpose that one would expect from a conscious designer. The fourth stage produces living things which for the first-time exhibit order for a purpose or Functional Order (O3), but this type of order can be scientifically explained in naturalistic terms (e.g., evolution) without an appeal to a conscious creator. The final stage, which is our present universe, is characterized for the most part by disorder. This disorder, however, is accompanied by pockets of the various types of order, including O1, O2, and O3, namely, Ramseyian Order, Purposeless Order, and Functional Order. It even has Intentional Order (O4) in very small doses—but only in those places where there are intelligent beings who intentionally create things for a purpose, such as we human beings on earth.

Indeed, contrary to Paley's belief, there is no order for a purpose which cannot be explained in naturalistic terms. As such, our entire universe, with its order and disorder, can be explained without a Creator-God. The only Intentional Order (O4) which we find are the creations of quite limited beings such as human beings. Taking all of these points into consideration, the universe has never, and still currently does not, resemble a watch regarding either order or design for a purpose, and as such Paley's analogical argument lacks persuasive force.

In the balance of this paper, words in many of the quotations are highlighted by me in bold typeface to draw attention to them.

2. Paley's Argument and Some Problems with It

Paley begins his argument as follows:

> In crossing a heath, suppose I pitched my foot against a *stone*, and were asked how the stone came to be there; I might possibly answer, that, for anything I knew to the contrary, it had lain there for ever: nor would it perhaps be very easy to show the absurdity of this answer. But suppose I found a *watch* upon the ground … when we come to inspect the watch, we perceive (what we could not discover in the stone) that **its several parts are framed and put together for a purpose**, e.g. that they are so formed and adjusted as to produce motion, and that motion **so regulated as to point out the hour of the day**; that if the different parts had been differently shaped from what they are, or of a different size from what they are, or placed after any other manner, or in any other order, than that in which they are placed, either no motion at all would have been carried on in the machine, or none which would have answered the use that is now served by it. To reckon up a few of the plainest of these parts, and of their offices, **all tending to one result**. (Paley, 1809: pp. 1-2)

We see that Paley is emphasizing that the parts of the watch are put together for the purpose of telling time, and that the parts have a precision in that if they were differently shaped or differently placed then the watch would not be able to carry on its purpose of telling time. Paley then concludes that the universe works the same way as a watch—with its parts tending to one result, or as Paley put it, the parts are "accommodated to their end".

> [E]very indication of contrivance, every manifestation of design, which existed in the watch, exists in the works of nature; with the difference, on the side of nature, of being greater and more, and that in a degree which exceeds all computation. I mean that the contrivances of nature surpass the contrivances of art, in the complexity, subtility, and curiosity of the mechanism; and still more, if possible, do they go beyond them in number and variety; yet in a multitude of cases, are not less evidently mechanical, not less evidently contrivances, not less **evidently accommodated to their end**, or suited to their office, than are the most perfect productions of human ingenuity. (Paley, 1809: pp. 17-18)

At first glance and before considering the advances in scientific knowledge which have occurred after Paley, Paley's argument appears quite persuasive. In his time there was no naturalistic explanation for any order present in the universe, including the poster child of his argument, the human body, as Darwin's book on evolution had not yet been written. What could account for the order illustrated by human body parts, such as the eyes to see, the ears to hear, and the heart to pump blood? If it could not be explained in naturalistic terms, it would seem that a supernatural explanation would be the logical choice.

However, there were some significant problems with Paley's analogy that could have been discerned at that time, and today many additional problems have come to light as a result of a myriad of scientific advances. The first glaring problem with the argument is that it is not obvious at all that the universe has a purpose. The watch's purpose is to tell time, and the parts of the watch contribute to that purpose, but it is not clear that the parts of the universe contribute to any overall purpose, or what that purpose would be. Indeed, the analogy seems to immediately break down because it is unclear if the many parts of the universe contribute to any purpose at all, and if not, then there would be no strong reason to assume it had a designer.[4]

Moreover, unlike the watch, it seems that we could rearrange and reposition the parts of the universe without any noticeable or relevantly significant difference in the overall integrity of the universe or in the operation of its parts.

Another striking difficulty with the argument is that one of the reasons that we know that a watch has a maker is because watches are not found in nature (as they are made by humans). The universe, on the other hand, is nature. Paley admits that the watch is not like the stone as the stone, for all we know, could have been there forever, and if so, would not and could not have been created by anyone. Similarly, the universe, for all we know, could have existed forever.

There are numerous other problems with the argument, many of which were pointed out by David Hume even before Paley offered his version of the argument. Indeed, even a strong Christian apologist such as Alvin Plantinga has noted the failure of Paley's version of the Teleological Argument to produce any appreciable evidence to support the conclusion that the universe has an intelligent designer. Plantinga, in fact, agrees with David Hume's many criticisms of the argument.[5] I have elsewhere offered my own analysis of the failures of Paley's analogy and the Teleological Argument in general (Firestone, 2014, 2019). For

[4]William Rowe makes this same point as follows: "A teleological system, we shall say, is any system of parts in which the parts are so arranged that under proper conditions they work together to serve a certain purpose… The human eye, for example, is clearly a teleological system. Its parts exhibit an intricate order and are so arranged that under proper conditions they work together for the purpose of enabling a person to see. Other organs in humans and animals are undoubtedly also teleological systems, each serving some reasonably clear purpose… It is one thing to believe that the universe contains many *parts* which are teleological systems, and quite another to believe that the *universe itself* is a teleological system… To show that, we would have to claim that the universe itself has a purpose and that its parts are so arranged that they work together toward the realization of that purpose. But can we, by just looking at the small fragment of our universe available to us, hope to discern the purpose of the universe itself? It seems clear that we cannot." (Rowe, 2007: pp. 57-59).

[5]In analyzing the Teleological Argument, Plantinga asserts the following: "In believing that God exists, the theists believes a proposition logically equivalent to a *conjunction*; among the conjuncts we should find at least the following: (1) The universe was designed (2) The universe was designed by exactly one person (3) The universe was created *ex nihilo* (4) The universe was created by the person who designed it (5) The creator of the universe is omniscient, omnipotent, and perfectly good and (6) The creator of the universe is an eternal spirit, without body, and in no way dependent upon physical objects. Now we can put the objection as follows. Perhaps the teleological argument gives us a smidgin of evidence for (1); but it does nothing at all for (2) through (6). The sort of evidence to which it directs our attention is entirely ambiguous with respect to these others…Hume's criticism seems correct. The conclusion to be drawn, I think, is that the teleological argument, like the cosmological, is unsuccessful." (Plantinga, 1974: pp. 83-84).

example, as to Paley's analogical argument I wrote the following:

> First, we are comparing a little watch to the entire universe. It is hard to think of many things that are more unlike than these two. A watch is small, the universe is very big. A watch lasts only a relatively short time, while the universe has existed billions of years. We have experience in the formation and creation of watches, but, as David Hume pointed out, we have no experience in the creation of universes. In fact, we know that a watch is created by humans. We do not know how the universe was created. A watch has a purpose—to tell time. The universe has no obvious purpose. A watch is clearly organized, but the universe is not clearly organized. In fact, the universe has a lot of chaos, seeming disorganization, destruction, and species extinction that seem to make it questionable as to whether it had an organizer. Stars crash into other stars, black holes gobble up solar systems, earthquakes destroy, meteors have caused mass extinctions of plants and animals on earth, people and animals kill each other, and evil and suffering are present everywhere. (Firestone, 2019: p. 419)

In addition to the myriad of difficulties created by comparing a watch to a universe, it is the position of this paper that Paley's argument is a non-starter as the universe and a watch do not share even the first similarity that is claimed in the argument, namely, the same type of order, so there is no basis to conclude that the universe has the other claimed similarity with a watch, a conscious designer who created and ordered it.

One might object to my characterization of Paley's analogy. It might be claimed that Paley does not assert that the universe as a whole is ordered for a purpose as he only gives examples of many of the parts of the universe which he believes exhibit order. For example, Paley refers to the structures and parts of plants, insects, animals, and humans, to make his case that nature exhibits an abundance of order for a purpose. He wants us to extrapolate that all things must have a purpose, although he admits that as to many things, such as what he calls the elements, consisting of air, water, fire and light, and the celestial bodies, he does not know their purpose. As such, his argument could be viewed as claiming that both the parts of a watch and the parts of the universe display order for purpose, and perhaps further, that a watch and the universe should be considered as ordered as a whole due to all of their parts being ordered. His position could then be that the universe as a whole is ordered, but not ordered for a purpose, but this does not matter because the parts are ordered for a purpose.

I think, however, that this possible interpretation of Paley's argument is problematic because Paley does not merely claim that each part of the watch is ordered and has a purpose; rather, he proclaims that the watch as a whole has the overall purpose of telling us the time, or as Paley put it, "to point out the hour of the day." Therefore, to maintain the consistency of the comparison of a watch to a universe it seems he must conclude that similar to the watch having an overall purpose, the universe, too, has an overall purpose—and it is not merely the or-

der of the parts which is important.[6]

Specifically, this paper will respond to what I take to be Paley's full argument and the position of any standard version of the Teleological Argument, namely, that similar to a watch, the universe both as a whole and in its parts displays order for a purpose, that this order is manifested by the universal laws, and the universal laws then produce the further instances of order for a purpose that we observe, including the order we see in our complex human bodies.

I will dispute Paley's position by arguing that the universe as a whole has always been largely and primarily disordered, that the natural scientific laws which are driving the universe are not in themselves ordered at all, and that all instances of local order which have developed from the natural laws can be explained naturalistically without a need to appeal to a conscious creator. I will, therefore, have addressed not only Paley's specific argument, but all standard versions of the Teleological Argument which claim that the universe has purposeful or intentional order and therefore has an Intellligent Designer/God who created the order.

Before we analyze the fallacy, I will make my case that I have fairly and correctly portrayed the argument, specifically that the claimed first similarity between a watch and the universe is in fact order and that it is upon this similarity that a similar conclusion should be reached, namely, that both the watch and the universe had a maker or designer who created the order.

3. Order Is the Key Component of Paley's Argument

Paley's rather simple argument has been explained in various ways, and there

[6]I think that Graham Oppy has properly picked out the salient features of the watch which Paley believes make it likely that it had a designer. Oppy explains as follows: "Although it can't be said that Paley's discussion is entirely clear, it seems reasonable to suggest that he supposes that it is the observations 1) that the watch has a principle function, 2) the various of the parts of the watch have functions, and 3) that the materials from which the parts are constructed are well suited to the functions that those parts have that lead us to make the inference that the watch has a designer." (Oppy, 2006: p. 176). Notice that the first factor is that the watch as a whole has a principle function, not just the parts. That Paley never gives us the purpose of the universe does not mean that he did not believe it had a purpose. Indeed, Paley pointed out that in the early 1800s we, as finite humans with limited knowledge of the universe, did not know the organization or purposes of many of the things in the universe. For example, Paley states that at that time we did not know about the organization of the elements of water, air, fire, and light, nor did we know the organization and purpose of the stars and planets, or what he calls the heavenly bodies: "WHEN we come to the elements, we take leave of our mechanics; because we come to those things, of the organization of which, if they be organized, we are confessedly ignorant… MY opinion of Astronomy has always been, that it is *not* the best medium through which to prove the agency of an intelligent Creator… We are destitute of the means of examining the constitution of the heavenly bodies… Our knowledge therefore of astronomy is admirable, though imperfect." (Paley, 1809: pp. 368, 378-379, 381-382). As such, we could reasonably conjecture that Paley did not think he needed to propose the purpose of the universe, nor how the myriad of things in the universe might serve some overriding purpose, since if we cannot even understand the order and organization of many of the things in the universe nor know the purpose of all of its parts, then it would be reasonable to infer that we would not understand the purpose of the universe as a whole. Additionally, near the end of his book Paley does assert that "therefore one mind hath planned, or at least hath prescribed, a general plan for all these productions." (Paley, 1809: p. 541). This could be interpreted as asserting that there is a general plan for all of creation, although it could also be interpreted as meaning that each of the creations or productions has their own general plan.

has been some disagreement as to whether the basis of the conclusion that both a watch and the universe have a creator is on the assertion that both are ordered. In their discussions of Paley's argument, some commentators have focused on the idea of design, others on the concept of purpose, and still others on the complexity found in a watch and the universe—or a combination of these. Furthermore, during both the initial presentation of his argument and in his conclusion, Paley does not emphasize the word "order," although it is implied.[7] I will now make the case that order is in fact the primary focus of both the Teleological Argument in general and Paley's version of it.

First, we should note that Paley does mention order on more than one occasion. For example, he explains that the watch has a kind of order that could not be a natural order:

> Nor, fifthly, would it yield his inquiry more satisfaction to be answered, that there existed in things a principle of ***order***, which had disposed the parts of the watch into their present form and situation. He never knew a watch made by the principle of ***order***; nor can he even form to himself an idea of what is meant by a principle of **order**, distinct from the intelligence of the watch-maker. (Paley, 1809: p. 6)

Paley also emphasized the order of the universe when he set forth the argument of those who would question his conclusion that the order is caused by a conscious creator. Paley says of his opponent's position "that if such argument be listened to, it leads to the inference, not only that the present **order** of nature is insufficient to prove the existence of an intelligent Creator, but that no imaginable **order** would be sufficient to prove it." (Paley, 1809: p. 415)

Paley's argument was actually a rehashing of David Hume's argument on the same subject, but instead of watches Hume compared the universe and its parts to the man-made creations of machines, houses, and stairs. Hume specifically refers to order both when setting forth the Teleological Argument and when presenting criticisms of the argument. Here he sets forth the argument:

> But is the whole adjustment of means to ends in a house and in the universe so slight a resemblance? The economy of final causes? The **order**, proportion, and arrangement of every part? Steps of a stair are plainly contrived, that human legs may use them in mounting; and this inference is certain and infallible. Human legs are also contrived for walking and mounting. (Hume, 1779: p. 19)

When criticizing the argument, Hume points out that the order of the universe may be natural and not require a supernatural conscious creator:

[7]Paley also uses the word "design" in his argument. I am not focusing on the word "design" because then Paley's argument would be a circular argument as it would be assuming what it must prove. To say that something is designed seems to have already assumed that it has a designer. "Order," on the other hand, seems to be a somewhat more neutral concept which more fairly raises the issue of whether any order that is present in the universe can be explained in a naturalistic fashion or must have (or likely has) a supernatural creator.

> And will any man tell me with a serious countenance, that an **orderly universe** must arise from some thought and art, like the human; because we have experience of it? (Hume, 1779: pp. 24-25)

We can clearly see that Hume believes the essence of the argument is that both human creations and the universe have order, and so both must have a conscious maker who created such order. Much earlier, Saint Thomas Aquinas had made a similar claim when he concluded as follows: "Therefore, there is something intelligent by which all natural things are ***ordered to an end***—and this we call God." (Aquinas, 1274: p. 166)

Kant, who realized that neither experience nor reason could provide evidence or certainty about the existence of God,[8] believed in God (the Supreme Cause) apparently, at least in substantial part, due to the order he observed in the universe. He asserts as follows:

> I may say, that the causality of the Supreme Cause holds the same place with regard to the world that human reason does with regard to its works of art. Here the nature of the Supreme Cause itself remains unknown to me: I only compare its effects (**the order of the world**) which I know, and their conformity to reason, to the effects of human reason which I also know. (Kant, 1783: p. 818)

The Religious Existentialist Soren Kierkegaard likewise seems to have believed in God due to the apparent order in the universe, although he admits that as the order is not perfect there is room to doubt God's existence. As such, he believed that a leap of faith was required. Kierkegaard addressed the issue thusly:

> I contemplate nature in order to find God, and I do indeed see power and wisdom, but I also see much more that excites anxiety and disturbs…Or does the wisdom in nature, the goodness, the wisdom in the governance of the world, reside on the very face of things? Are we not here confronted with the most terrible temptations to doubt, and is it not impossible finally to dispose of those doubts? But from such an **order of things** I will certainly not prove God's existence… (Kierkegaard, 1846: pp. 21, 25-26)

Turning to three contemporary philosophers who are well known in the area of Philosophy of Religion, Louis Pojman, William Rowe, and the prominent Christian apologist Richard Swinburne, we also see an appeal to order as the essence and basis of the Teleological Argument. Pojman explains the argument as follows:

> It begins with the premise that the world exhibits intelligent purpose or **or-**

[8]Kant states as follows: "Consequently, the objective reality of these concepts (viz., that they are not mere chimeras), and the truth or falsity of metaphysical assertions, cannot be discovered or confirmed by any experience" and "Pure reason does not in its ideas point to particular objects, which lie beyond the field of experience, but only requires completeness of the use of the understanding in the system of experience. But this completeness can be a completeness of principles only, not of intuitions and of objects." (Kant, 1783: p. 804, 806).

> **der** and concludes that there either must be or probably is a divine intelligence, a supreme designer to account for the observed or perceived intelligent purpose or **order**. (Pojman, 2001: p. 31)

Rowe, when he sets forth the Teleological Argument, (which he is unconvinced by), similarly appeals to order as the salient similarity between a watch and nature.

> But if we look carefully at many things in nature—plants and animals, for example—we discover that their parts exhibit an **orderly** arrangement fitted to a purpose (survival of the organism and the reproduction of its kind) that, if anything, exceeds the purposeful arrangement of parts in the watch. How absurd, then, to suppose that the world of nature arose from accident rather than intelligent design. (Rowe, 2007: p. 58)

Swinburne is more specific as he describes the teleological argument as being based on the order exhibited by the natural scientific laws, and he refers to two distinct types of order, temporal order and spatial order.

> Among the strongest arguments for the existence of God, it seems to me, are two forms of the "argument from design"—which I shall call the argument from **temporal order** and the argument from **spatial order**. (Swinburne, 2002: p. 208)

I think that it is clear that all standard versions of the Teleological Argument focus on order, and it is due to this claimed similarity between a watch and the universe that we are asked to conclude that just as a watch has a conscious creator, so too does the universe.

4. 1st Stage: The Initial Universe Was Not Truly Ordered—Displaying Only the Inevitable Patterns of Ramseyian Order

One would expect that if there were a designer of the universe, then the beginnings of the universe would exhibit that design or order. But this is not the case. Supporting the position that the world did not begin with the order one would expect from a creator or 'Grand Designer" God, physicist Victor Stenger has explained that the big bang actually produced total chaos and maximal disorder with no structure at all. Without such initial order, there is no reason to believe there was a conscious creator such as God. Stenger elucidates as follows:

> If the universe were created, then it should have possessed some degree of order at the creation—the design that was inserted at that point by the Grand Designer… [However], the universe began with no structure. It has structure today consistent with the fact that its entropy is no longer maximal. In short, according to our best current cosmological understanding, our universe began with no structure or organization, designed or otherwise. It was a state of chaos. (Stenger, 2008: p. 117, 121)

Indeed, in 2010 Stenger's conclusions were verified by physicist Adilson Motter. Here is an article written by Science and Engineering editor Megan Fellman describing Motter's conclusions:

> Seven years ago Northwestern University physicist Adilson E. Motter conjectured that the expansion of the universe at the time of the big bang was highly chaotic. Now he and a colleague have proven it using rigorous mathematical arguments. The study, published by the journal *Communications in Mathematical Physics*, reports not only that chaos is absolute but also the mathematical tools that can be used to detect it. When applied to the most accepted model for the evolution of the universe, these tools demonstrate that the early universe was chaotic. (Fellman, 2010)

It is important to notice, however, that what I call Ramseyian Order would be present even in the initial disordered universe once objects were formed. That patterns cannot help but emanate or develop from or as a part of disorder was previously demonstrated by mathematician Frank Ramsey. In fact, Ramsey mathematically proved that patterns will necessarily emerge when there are enough numbers or things being considered. For example, at any given party with at least six people, there are three people who are all either mutual acquaintances (each one knows the other two) or mutual strangers (each one does not know either of the other two). This would be true in any world which had conscious beings who could know each other, and a god or creator could not design a universe where this pattern were not true. These types of patterns are a result of randomness, are inevitable, and are not the result of conscious design. They are not order as the term is normally used.

Mathematicians Ronald Graham and Joel Spencer explain what is now known as Ramsey Theory in the following words:

> According to a 3500-year-old cuneiform text, an ancient Sumerian scholar once looked at the stars in the heavens and saw a lion, a bull, and a scorpion… Could it be that such geometric **patterns** arise from unknown forces in the cosmos?
>
> Mathematicians provide a much more plausible explanation. In 1928 Frank Plumpton Ramsey, an English mathematician, philosopher and economist, proved that such **patterns** are actually implicit in any large structure, whether it is a group of stars, an array of pebbles or a series of numbers generated by throws of a die. Given enough stars, for instance, once can always find a group that very nearly forms a particular **pattern**: a straight line, a rectangle or, for that matter, a big dipper. In fact, Ramsey theory states that **any structure will necessarily contain an orderly substructure**. As the late American mathematician Theordore S. Motzkin first proclaimed some 25 years ago, Ramsey theory implies that **complete disorder is an impossibility**. (Graham & Spencer, 1990: p. 112)

Notice that Graham and Spencer used the word "pattern" instead of the word

"order," which might be helpful to avoid being induced to equate the workings of a watch with the workings of our universe, as random patterns (O1) are quite different from the intentional order (O4) created for an intentional purpose which is found in a watch. Moreover, we should again note that Ramseyian Order is not what we normally mean when we use the word "order" as Ramseyian Order appears in what is actually disordered, random, and chaotic.

5. 2nd Stage: The Natural Scientific Laws of the Universe Are Not Truly Ordered

Even if the universe started with disorder, one could argue that it quickly manifested order with the formation of the natural or scientific laws of nature, which then led to the further omnipresent order we find in the universe today. While Paley is guilty of making a circular argument (the fallacy of Begging the Question) when he assumes what he must prove when he says that "a law presupposes an agent"[9] (Paley, 1809: p. 7), one could claim that it is a reasonable assumption that the natural laws display a kind of order that is best explained by a conscious designer. Let us return to Swinburne who relies on the order present in the natural scientific laws for his conclusion that God created those laws:

> The argument from **temporal order** begins by drawing our attention to the fact that throughout all of possibly infinite time and space, material objects behave in the simple way **codified by scientific laws**… The second form of argument—the argument from **spatial order**—draws our attention to the intricate construction of plants, animals, and humans. They are so **organized** as to be able to catch the food for which their digestive apparatus is suited, escape from predators most keen to catch them, breed and reproduce—they are like very, very complicated machines. Now, of course, there is a well-known explanation of all this in terms of evolution by Natural Selection… And why are there laws of evolution? That is, laws which bring it about that animal genes mutate randomly, that animals produce many offspring, etc.? Presumably because those laws follow from the **fundamental laws of nature.** (emphasis added) (Swinburne, 2002: p. 208)

Swinburne's position, I believe, has inaccurately portrayed the natural laws of the universe as exhibiting the type of order found in a watch or in other "very complicated machines" created by human beings. In fact, the natural scientific laws do not display that type of order, nor arguably any real order at all. Why?

All things that exist have attributes or characteristics. If they did not have any attributes, then it is difficult to imagine how they could be anything. The things in the universe, which include both matter/objects and energy, interact with each other. In any universe the way that things behave, and, due to their attributes, interact with other things, constitute the natural or scientific laws of that universe.

[9]Graham Oppy also accuses Paley of making a circular argument--or what he calls "question-begging." (Oppy, 2006: p. 182)

As such, the scientific laws consist not only of a description of the behaviors of things, but also on the attendant causes and effects of each thing when it interacts with other things.[10] This does not mean that any of these universes are ordered or organized by a conscious organizer. It only means that the scientific laws work a certain way—that there are facts of the matter about each thing's attributes and the way those attributes interact with other things and their attributes. Ohm's law, for example, merely describes the relationship between voltage, current, and resistance.

Indeed, the natural laws of science are simply the expression of the way things work. Newton's law of universal gravitation describes the attractive force between two masses; the law of conservation states that matter/energy can neither be created nor destroyed; and Mendel's law of segregation explains how physical traits are passed from one generation to another. These laws describe how matter and energy behave and interact in our universe, and these laws flow from the fact that our universe has things, and things have attributes or characteristics. The same would be true in any universe which had things. This does not mean that the natural laws display true order; rather, it means that a universe with things in it will necessarily have things which behave in a certain way due to the attributes of those things.

Swinburne has not only failed to recognize that the natural laws are not ordered, but he also seems to have made the related error of believing that the universe must conform to the natural laws, which he implies when he writes that "material objects behave in the simple way codified by the natural laws." As such, his view appears to be that the best explanation for our natural laws is a supernatural God as there is no naturalistic explanation as to why we have these particular natural laws to which the universe must conform. He explains his position as follows:

> Science could not explain why the basic laws of nature are as they are…The data inexplicable by science to which I have drawn attention—**the uniform behavior of objects in accord with laws of nature**, and the special character of those laws and of the initial (or boundary) conditions of the Universe—are readily explicable in terms of the action of a God, omnipotent

[10]Anne Marie Helmenstine explains the natural laws and their causal character in a similar way: "Scientific laws (also known as natural laws) imply a **cause and effect** between the observed elements and must always apply under the same conditions. In order to be a scientific law, a statement must describe some aspect of the universe and be based on repeated experimental evidence." (Helmenstine, 2019). Wikipedia similarly defines the natural laws of science as follows: "**Scientific laws** or **laws of science** are statements that describe or predict a range of natural phenomena. A scientific law is a statement based on repeated experiments or observations that describe some aspect of the natural world. The term *law* has diverse usage in many cases (approximate, accurate, broad, or narrow) across all fields of natural science (physics, chemistry, biology, geology, astronomy, etc.). Laws are developed from data and can be further developed through mathematics; in all cases they are directly or indirectly based on empirical evidence. It is generally understood that they implicitly reflect, though they do not explicitly assert, **causal relationships** fundamental to reality, and are discovered rather than invented… A scientific law always applies under the same conditions, and implies that there is a **causal relationship** involving its elements." (Wikipedia, Scientific Law, 2019).

> (all-powerful), omniscient (all-knowing) and perfectly free. (Swinburne, 2002: p. 209)

Swinburne's argument, however, is based on a conceptual error as he fails to comprehend that the universe does not conform to the natural laws; rather, the natural laws necessarily emerge from the things in the universe—and precisely because there are things in the universe. Nietzsche seems to have been making the same point when he wrote "but 'nature's conformity to law,' of which you physicists talk so proudly…exists only owing to your interpretation and bad 'philology'." (Nietzsche, 1887, BG &E 22: p. 220). In other words, nature does not conform to the natural laws; rather, the natural laws are the inevitable regularities which emerge from the basic nature of things—since things must have attributes and those attributes will encounter other things with other attributes which will then form the natural laws.[11]

The renowned chemist Peter Atkins, whose areas of expertise include molecular quantum mechanics and the laws of thermodynamics, seems to offer support for my idea when he describes the constants or laws of the universe as primarily and merely being the interactions between the things that exist in the universe:

> To my mind there are two classes of fundamental constants: those that don't exist and those that do… The latter, the constants that really do exist in a fundamental way, and thus which are the truly fundamental constants, are **coupling constants** that summarize the strength of the **interaction between entities**, such as the strength of the force between electric charges, the strength of the **interaction** of an electric charge with an electromagnetic field, and the strength of the nuclear forces that bind elementary particles together and into the structures we call atomic nuclei. (Atkins, 2018: p. 134)

Atkins goes further and argues that quantum mechanics emerged naturally from the disorder or what he calls the anarchy of the universe: "My aim, then, is simply to show that a central plank of quantum mechanics emerges very naturally from anarchy and that that plank is a springboard for the emergence of Newton's classical mechanics in a very straightforward way." (Atkins, 2018: p. 41)

Philosopher Nicholas Everitt, who is also unconvinced by Paley's analogy, explains the so called "order" of the universe in a similar way to my explanation, implicitly recognizing Ramseyian Order as the inevitable result of a random and otherwise disordered universe:

> [W]e arrive at the conclusion that for all kinds of stuff and all kinds of objects, if there is to be a stuff or object of that kind at all, it must display cer-

[11]To be fair to Swinburne, he does have a point that the fact that our universe has the particular things which it has calls for an explanation. That explanation or cause, however, need not be supernatural, and further, might well be due to the possibility that our universe is only one among a vast multiverse, and may be in some respects an "accidental" universe, as is briefly discussed later in this section.

> tain regularities in its behaviour. If it didn't, it simply would not be a stuff or an object of that kind. This implies that it could not have been the case that the world contained kinds of stuff or kinds of objects and yet was wholly random. The concept of kinds of stuff (like bread or water, or coal or gold) and of kinds of objects (like trees or mountains, or telephones) is inextricably linked to the concept of order and regularity… This means that we cannot coherently envisage a universe which was totally chaotic, any more than we can coherently envisage a circle with four sides… But since order, as we have seen, is necessarily implicit in the very concept of substances and objects, there cannot be a *separate* argument from order. For there to be a material universe at all is for there to be an *orderly* material universe… Given that the universe contains objects and kinds of substance, it is *certain* at once that it displays some order. (Everitt, 2004: p. 89)

Notice that this type of order does not need an organizer or maker of the order, unlike a watch. So what we call order when applied to the natural laws is in reality just the interactions of the attributes of the things in the universe. They would have to interact in some way, and given the definite and specific attributes or characteristics of things, we would expect that the interactions between things would be somewhat regular and predictable. In other words, presumably, given their specific attributes, specific pieces and groups of matter and energy will interact in predictable specific ways due to those attributes.

B.C. Johnson makes the point that the attributes and interaction of things *naturally* produce a kind of organization or order, although again, this is not true order, but rather is merely how things operate.

> After all, oil mixed with water tends to separate into a layer of water topped by a layer of oil; the tendency here is toward a more organized result. Gaseous nebulae tend to contract to form stars, a result more organized than diffused gases. Mixed atoms of hydrogen and oxygen tend to combine when heated to form molecules with an exact ratio of two hydrogen to one oxygen. (Johnson, 1983: pp. 57-58)

In fact, what we call our natural laws are in some sense merely accidents. Numerous cosmologists now believe that there are likely many other universes which have different natural laws from our own, and that there is no overriding reason why we have the universe which we have, and which operates in the way that it does. Specifically, two theories in physics, the eternal inflation theory and string theory, indicate that our universe may well be only one universe in a grand multiverse, and that other universes would have very different properties from our own. Saying that our natural laws are accidental is another way of saying that they are a product of randomness and not of conscious organization. Physicist Alan Lightman in his book *The Accidental Universe*: *The World You Thought You Knew* makes this point as follows:

> Dramatic developments in cosmological findings and thought have led

> some of the world's premier physicists to propose that our universe is only one of an enormous number of universes, with wildly varying properties, and that some of the most basic features of our particular universe are mere **accidents—random** throws of the cosmic dice. (Lightman, 2014: p. 4)

Accordingly, my conclusion is that the natural laws of our or any universe do not exhibit Intentional Order (O4), which is what the Teleological Argument takes them to be. Indeed, things with attributes cannot fail to exhibit patterns or some degree of order if order merely means that due to its characteristics it will behave in a certain manner, but that is not the type of order that we find in a watch. As Ramsey Theory conclusively has shown, "complete disorder is an impossibility" as patterns will necessarily emerge in things, and the more things there are the more patterns we would expect to find. These patterns, however, are not what we usually mean by the word order.

6. 3rd Stage: Order as the Result of Natural Self-Organization

We have seen that the natural laws are not really ordered at all. They are a result of the fact that our universe is not empty, and a universe with things in it means that the attributes of the things and their interactions with other things will form the natural or scientific laws of that universe. These scientific laws, in turn, give rise, through a process that scientists call self-organization, to the many limited and local instances of pattern or order found in the universe. Self-organization is a natural process that can be explained fully without the consideration of an external creator. Moreover, these self-organized patterns display no purpose if we mean by purpose a goal by an external conscious creator. As such, these patterns are instances of order without purpose, or what we are calling Purposeless Order (O2), and not the type of order created by a conscious entity, Intentional Order (O4).

As stated in the Encyclopedia of Ecology, "Self-organization is the emergence of pattern and order in a system by internal processes, rather than external constraints or forces." (Green, Sadedin, & Leishman, 2008: p. 3195). So external forces such as a God are not needed to explain self-organization. Due to self-organization, we see a world populated by numerous local pockets of patterns or order, although it differs from the order of a watch in that the order can be explained by the matter and energy already existing in nature.

Francis Heylighen, a Belgian cyberneticist specializing in the investigation of the emergence and evolution of intelligent organization, instructs us that the apparent order can be accounted for by the blind processes of nature:

> The spontaneous emergence of new structures is easy to observe, both in the laboratory and in our day-to-day world. Perhaps the most common example is crystallization, the appearance of a beautifully symmetric pattern of dense matter in a solution of randomly moving molecules… More complicated examples are certain chemical reactions… **What these examples**

> **have in common is *self-organization*: the appearance of structure or pattern without an external agent imposing it.** (Heylighen, 1999: p. 2)

Indeed, the symmetry we find in crystals and leaves are best characterized as order without real purpose. Philosopher of science Niall Shanks and the evolutionary biologist Istvan Karsai, make it abundantly clear that self-organization is a natural process that does not require the introduction of a conscious creator such as God:

> Ordered, organized, complex states of matter abound in the world around us. How are we to explain this complexity? Our current best account of these types of phenomena is given by dynamical systems theory, a branch of natural science that explains the existence of complex, organized systems in terms of self-organization… **Hence, self-organization** is evidently a pathway to irreducible complexity and one **that involves no intelligent design, supernatural or otherwise**… The orderly, complex structures emerge as the consequence of the operation of blind, unintelligent, natural mechanisms operating in response to chancy, contingent, and unpredictable environments. (Shanks & Karsai, 2005: p. 85, 99, 106)

A recent 2018 paper by Markus Aschwanden et al. (2018) indicates how common self-organization is in the field of astrophysics, and how that self-organization is a product of spontaneity, a natural process. The abstract for the article states as follows:

> Here we investigate for the first time a comprehensive number of **self-organization** processes that operate in planetary physics, solar physics, stellar physics, galactic physics, and cosmology. Self-organizing systems create **spontaneous "*order out of randomness*"**, during the evolution from an initially disordered system to an ordered quasi-stationary system… (Aschwandan, 2018: p. 1)

The paper goes on to explain how widespread self-organization is as it is found throughout the many various fields of scientific inquiry:

> *Self-organization is the spontaneous often seemingly purposeful formation of spatial, temporal, spatio-temporal structures or functions in systems composed of few or many components. In physics, chemistry, and biology, self-organization occurs in open systems driven away from thermal equilibrium. The process of self-organization can be found in many other fields also, such as economy, sociology, medicine, technology.* (Aschwandan, 2018: pp. 2-3)

More than two centuries ago, Hume anticipated this type of naturalistic order. He described this possibility as follows:

> For aught we can know *a priori*, **matter may contain the source or spring of order originally, within itself**, as well as mind does; and there is no

> more difficulty in conceiving, that the several elements, from an internal unknown cause, may fall into the **most exquisite arrangement**… (Hume, 1779: pp. 20-21)

What is this self-organization? It seems to me that all that it is are the results of the natural laws interacting on and with all of the objects in the world. This self-organization causes formations or patterns and could not avoid doing so. Purpose is absent.

Indeed, self-organization is a natural process that can be explained by the interactions within a system, or in this case within the universe. There is no need to appeal to an outside force or creator as the things and their interactions can fully account for any patterns or order. Moreover, no real purpose is present in these type of instances of self-organization.

Additionally, in a universe that is 14 or so billion years old, such as our own universe, one might expect there to be the appearance of design without true design if the initial patterns or order are preserved long enough so that they are still present when new patterns or order are formed on top of them or from them. This idea was expressed by Graham Oppy: "On the one hand, as we noted in our discussion of Paley's argument, there is a question of whether the appearance of design requires any explanation in an infinitely old universe in which order is preserved as time passes." (Oppy, 2006: p. 240). In fact, this is how evolution works, which brings us to our next section.

7. 4th Stage: Naturalistic Order for a Purpose (Evolution)

Paley believed that the human body provided the strongest example and support for his position that the universe was ordered in way that that it must have been created by a conscious designer.[12] However we can now explain the order and complexity of the human body by the naturalistic process we call evolution. Evolution is a self-organizing principle that has produced the myriad of life forms on earth. It is the process which describes how living things respond to their environment in order to survive. Evolution is an example of what I have referred to as Functional Order (O3), order which can be fully explained by natural properties, forces, and/or laws, and not of Intentional Order (O4), order which requires a conscious creator.[13]

Evolutionary biologist Richard Dawkins describes the success of evolution in

[12]Paley stated as follows: **"…applied to the proof of an intelligent Creator. For my part, I take my stand in human anatomy**." (Paley, 1809: p. 536).

[13]J.L. Mackie concludes that what I call Functional Order, or what he calls teleological explanations ("telos" means purpose or end), are actually the result of the processes of efficient causation, and therefore are not in need of a conscious creator to explain. "While several uses of distinctively teleological descriptions of processes and behavior are admitted and explained, it is argued that no objective processes are in themselves irreducibly teleological. We have teleological concepts, and teleology belongs to some processes as we know them, but not to the processes in the objects. In reality, efficient causation only is the cement of the universe… And again, it is an evolutionary story that provides this explanation, making essential mention of some goal *G*—the harmony of organic functions which promotes the survival and reproduction of organisms—and yet itself involving only processes of efficient causation." (Mackie, 1980: p. xvi, 283).

explaining the world we see: "The theory of evolution by cumulative natural selection is the only theory we know of that is in principle capable of explaining the existence of organized complexity." (Dawkins, 1986: p. 452). Additionally, Dawkins explains that the apparent design found in nature has occurred naturally and without the requirement of positing a conscious creator, similar to the self-organization in non-living things.

> The natural temptation is to attribute the appearance of design to actual design itself. In the case of a man-made artefact such as a watch, the designer really was an intelligent engineer. It is tempting to apply the same logic to an eye or a wing, a spider or a person… The temptation is a false one, because the designer hypothesis immediately raises the larger problem of who designed the designer… Darwin and his successors have shown how living creatures, with their spectacular statistical improbability and appearance of design, have evolved by show, gradual degrees from simple beginnings. We can now safely say that **the illusion of design in living creatures** is just that—an illusion. (Dawkins, 2006: p. 188)

Similar to Dawkins, Stenger concluded that the world can misleadingly appear to be designed because simple systems *naturally self-organize* into more complex systems, including complex living beings, but this natural self-organization provides no evidence of organization or design by an organizer or designer.[14]

Peter Atkins echoes the conclusion that simple naturalistic processes can produce order and complexity:

> Thus, it is much easier to comprehend Nature in the light of Darwinian natural selection than simply to lie back and marvel at the richness and complexity of the biosphere: his **simple idea** provides a framework for understanding even though the complexity emerging from the framework may be profound. (Atkins, 2018: pp. 5-6)

Daniel Dennett, in his award-winning book *Darwin's Dangerous Idea*, explains how evolution is the result of several natural algorithmic processes, an idea which Dennett claims was implicit in Darwin's conclusions and has since been supported by a great body of evidence. An algorithm is merely a set of rules or operations, and Dennett concludes that a relatively simple set of rules or operations such as random mutations accompanied by natural selection can account for the immense diversity and complexity in living organisms. Dennett explains as follows:

> Evolution is not a process that was designed to produce us, but it does not follow from this that evolution is not an algorithmic process that has in fact

[14]Stenger asserts the following: "Biologist Stuart Kaufman has long argued that self-organization plays a larger role in the evolution of life than previously thought… For my purposes here, suffice it to say that complex systems do not need complex rules in order to evolve from simple origins. They can do so with simple rules and no new physics… **It follows that no complex rule maker of infinite intelligence is implied by the existence of complex systems in nature.** (Stenger, 2008: pp. 64, 66-67).

> produced us… Evolutionary algorithms are manifestly interesting algorithms… No matter how impressive the products of an algorithm, the underlying process always consists of nothing but a set of individually **mindless steps succeeding each other without the help of any intelligent supervision**; they are "automatic" by definition… (Dennett, 1995: pp. 56, 59)

Furthermore, it seems that we can explain both the cosmological laws and the laws of biology in terms of contingency and historical accident, and without the presence of a conscious organizer such as a god. Chemist Ashutosh Jogalekar makes this point as follows:

> Thus biologists have accepted history and **accident** as integral parts of their fundamental laws…What physicists are essentially saying is that there have been several universes in the past and there are likely several universes in the present, and our unique universe with its specific combination of fundamental constants is an **accident**. The multiple universe argument is very much similar to the argument establishing evolution by natural selection as the centerpiece of biology: there are several species with several genotypic and phenotypic features, and our own human species is a result of **contingency and historical accident**. (Jogalekar, 2014)

Moreover, we can better explain the world of living organisms by the natural processes of natural selection and self-organization than by a conscious creator. This can be seen because the world is not organized or ordered for a purpose since it is not ideal or even necessarily good for its living beings. Stenger explains this by emphasizing how the human body is not organized in such a way that it maximizes the well-being of individual human beings:

> The parts of the human body hardly resemble a watch. In an article in *Scientific American* [March 2001] titled: "If Humans Were Built to Last," S. Jay Olshansky, Bruce Carnes, and Robert N. Butler have looked at flaws in the human body and shown how an engineer might have fixed them to enable us to live a hundred years or more in better health. They trace our physical defects to the Rube Goldberg way evolution cobbles together new features by tinkering with existing ones. Natural selection does not seek out perfection or endless good health. The body has to live only long enough to reproduce and raise young… Our bones lose minerals after age thirty, making them susceptible to fracture and osteoporosis. Our rib cage does not fully enclose and protect most internal organs. Our muscles atrophy. Our leg veins become enlarged and twisted, leading to varicose veins. Our joints wear out as their lubricants thin. Our retinas are prone to detachment. The male prostrate enlarges, squeezing and obstructing urine flow… However, not just biological data but, as we will see in future chapters, the whole realm of scientific observations lead to the same conclusion: the universe does not look designed… **The other place where evidence for the absence of beneficent design can be found is in the short, brutal exis-**

> **tences of most life-forms… Indeed, Earth and life look just as they can be expected to look if there is no designer God.** (Stenger, 2008: pp. 69-71)

Indeed, we can see that naturalistic processes such as evolution produce order that is nothing like the order found in a watch. In the next section we will revisit the fact that evolution is a process that has serious design flaws which an intelligent (and certainly an omnipotent and all-good) designer would never create. Before we do so, I want to briefly mention another possible support for Paley's Argument that has been set forth by several scientists such as biochemist Michael Behe.

Behe asserts that some things in nature display irreducible complexity (IC) that are best explained by an intelligent designer instead of the result of a naturalistic process. Behe specifically cites bacterial flagellum, blood clotting, the proteosome, and the immune system as examples of irreducible complexity which cannot be explained by natural processes. However, this view has been discredited by many scientists who have been able to explain these complexities by way of the natural process of evolution. For example, David Ussery, director for the Arkansas Center for Genomic and Ecological Medicine at the University of Arkansas for Medical Sciences (UAMS) in Little Rock, and who has been working with bioinformatic analysis of bacterial genomes since the first sequence was published in 1995, rejected Behe's conclusions with the following explanation:

> In summary, all three of the irreducible components of the flagellum could have evolved independently, and the flagellum could have evolved from a combination of the three independent parts rather than suddenly being created by an intelligent designer. Such coevolution is one of several alternative mechanisms for evolution of Behe's irreducibly complex biochemical systems. Similar arguments show that Behe's three other IC systems (blood clotting, the proteosome, and the immune system) consist of reducible components that could have evolved (Miller 1999, Ussery 1999, Thornhill and Ussery 2000). As a general principle, complex biochemical systems can arise from simple precursors (Ptashne and Gann 2002). (Ussery, 2005: p. 54)

Victor Stenger had this to say about Behe's arguments for God based on irreducible complexity:

> Thoroughly refuting Behe's argument, evolutionary biologists have listed many examples in nature where an organic system changes functions as the system evolves. They have provided plausible natural mechanisms for every example Behe presents, many of which were well known (except to Behe) before Behe ever sat down to write… Behe is a biochemist, not an evolutionary biologist, and was unaware when he wrote his book that the mechanisms for the evolution of "irreducibly complex" systems were already discussed six decades earlier by Nobel Prize winner Hermann Joseph Muller and have been common knowledge in the field since then. (Stenger, 2008: pp. 55-56)

I think that the overwhelming consensus of the scientific literature published by evolutionary biologists clearly shows that the irreducible complexity cited by Behe and others can be explained by naturalistic processes. As stated by Graham Oppy, "there is no reason to suppose that an irreducibly complex biological system could not arise as the result of 'numerous, successive, slight modifications'," which is a description of evolution (Oppy, 2006: pp. 193-194). Moreover, these naturalistic processes do not display the order we would expect of a conscious designer as they regularly exhibit design flaws, as just explained by physicist Victor Stenger and will be elaborated in the next section of this paper.

8. 5th Stage: Our Current and Primarily Disordered Universe

Although we have seen how there are many pockets of limited or local patterns or order in the universe, including the order we find in living organisms, the universe in most places is still best characterized as disordered. Disorder predominates over order, and it is the disorder that abounds, not order. In fact, the overall lack of order and design in the universe is supported by well-established physics. For example, physicist Victor Stenger explains as follows:

> Most of the matter and energy of the universe exhibits little structure and shows no sign of design. We noted above that 96 percent of the mass of the universe appears to be composed of dark matter and dark energy whose exact natures are unknown but that are definitely not composed of familiar atomic matter. As far as we can tell, these components have little structure. (Stenger, 2008: p. 162)

Recent research by theoretical physicist Ekrem Aydiner published in Scientific Reports lends further credence to Stenger's conclusion. The paper is titled "Chaotic Universe Model" and proposes a theory which combines the big-bang and oscillating universe models in a novel way which solves several current cosmological mysteries. The abstract states as follows: "These results provide that the time evolution of the universe is chaotic." (Aydiner, 2018)

Noson Yanofsky, Professor of Computer and Information Science, further articulates this point.

> There is another, more interesting, explanation for the structure of the laws of nature. Rather than saying that the universe is very structured, say that the universe is mostly chaotic and for the most part lacks structure. The reason why we see the structure we do is that scientists act like a sieve and focus only on those phenomena that have structure and are predictable. They do not take into account all phenomena; rather, they select those phenomena they can deal with. (Yanofsky, 2017)

So we can see that the universe began with the big bang, which was total disorder, and although it has developed pockets of patterns and order, it is still in the main disordered. Moreover, the order which developed is explainable without appeal to a conscious designer.

Furthermore, when we look at the areas of the universe where we conclude that order exists, in both living beings and non-living things, we can also see much disorder and destruction—in fact far more disorder than order. Black holes gobble up anything within their path, stars shred other stars and hurl planets into outer space, and planets collide with other planets and moons. Moreover, on our own planet, at times, excessive volcanic activity and asteroids have destroyed the majority of the then existing species. Additionally, most of the universe is incompatible with life, and certainly with the higher forms of life, as life cannot survive in outer space, in black holes, on stars, on asteroids, nor on most planets. There just does not seem to be the order or purpose which we would expect from an intelligent designer.

What I have argued is in keeping with the second law of thermodynamics which states that the universe and the things in the universe are moving toward disorder. The higher the degree of disorder, the higher the entropy. What this means is that although pockets of so-called order or patterns emerge simply from the facts that things exist in the universe, those things interact with each other, and those interactions are primarily stable or predictable due to those attributes, even those relatively small pockets of order do break down over time. In fact, humans are examples of pockets of order, but our bodies move toward disorder as they break down and eventually die. Atkins elaborates on the second law of thermodynamics as follows:

> Whenever a change takes place, the disorder of the universe increases, the quality of its energy degrades, its entropy increases. The funny thing is, such is the interconnectedness of events in the world, that this degradation is not a cosmically uniform sliding into disorder, a general elimination of structure, a global dispersal of energy, a collapse of matter into slime. There may emerge local abatements of chaos, we among them. The only requirement of the second law is that the total entropy of an isolated system (the universe, or an isolated part of it…) increases in a spontaneous change: in localized pockets the entropy may decrease and a structure emerge provided that overall there is an increase in disorder. (Atkins, 2018: p. 83)

That the universe is actually dominated by chaos instead of order is not a new idea. In 1992, British mathematician Ian Stewart wrote an article for *Discover* titled "Does Chaos Rule the Cosmos?" in which he reached the following conclusions:

> Chaos, being ubiquitous, strikes at the heart of what we think of as nature's laws, with their safe, predictable consequences. Though simple rules may govern individual atoms, nevertheless the behavior prescribed by those rules may well be chaotic… While chaos may run the universe on its greatest scale, it may also be at work on its smallest. On the level of subatomic particles, Lady Luck seems to rule. Radioactive atoms decay at random, their only regularities being statistical. A large quantity of radioactive atoms

> has a well-defined half-life, a period of time during which half the atoms will decay. But we can't predict which half. This randomness isn't just a matter of ignorance; it's explicitly built into the theory of quantum mechanics. (Stewart, 1992)

Turning from the non-living world, what about the apparent design of living organisms, and the complexity found in human beings, especially the intricacy of the human brain? Besides the fact that this type of order can be explained by naturalistic processes and as such is an example of Functional Order (O3) and not Intentional Order (O4), there is also abundant disorder in living beings and the world they inhabit and share that is inconsistent with a conscious designer. On a common sense level, if there were a designer, why would that designer create a world where its inhabitants kill and eat each other, where viruses and bacteria debilitate and exterminate its higher beings, where natural disasters wipe out whole villages of good people, and where in the past so many mothers died in childbirth—robbing many young women of their lives and so many children of their mothers? What is the purpose of such things? This is quite puzzling as it does not seem that this is a very good design that we would expect of a Grand Designer.

Indeed, the relatively good and happy lives experienced by so many people in our modern advanced societies masks how difficult life has been for most life forms, including human beings, throughout all of the earth's past history. Hume masterfully described the condition of most living things on earth.

> A perpetual war is kindled amongst all living creatures. Necessity, hunger, want, stimulate the strong and courageous: Fear, anxiety, terror, agitate the weak and infirm. The first entrance into life gives anguish to the new-born infant and to its wretched parent: Weakness, impotence, distress, attend each stage of that life: and 'tis at last finished in agony and horror… Consider that innumerable race of insects, which either are bred on the body of each animal, or flying about infix their stings in him. These insects have others still less than themselves, which torment them. And thus on each hand, before and behind, above and below, every animal is surrounded with enemies, which incessantly seek his misery and destruction. (Hume, 1779: pp. 70-71)[15]

[15]Paley greatly underestimated how poorly the earth is fashioned to give humans and animals a long and healthy life filled with happiness. For example, Paley wrote, "But it will be said, that this provision, when it comes to the case of bites, deadly even to human bodies and to those of large quadrupeds, is greatly *overdone;* that it might have fulfilled its use, and yet have been much less deleterious than it is. Now I believe the case of bites, which produce death in large animals (of stings I think there are none), to be very few." (Paley, 1809: p. 470). As for animals, Paley admits that their lives are often difficult and brutal, but he downplays this by declaring that they do not know this, an assertion which I believe is contrary to the facts and greatly underestimates the ability of animals: "To contemplate the insecurity of their condition with anxiety and dread, requires a degree of reflection, which (happily for themselves), they do not possess." (Paley, 1809: p. 475). Indeed, Paley does his best to make sense of this universe so as to maintain the possibility that it was designed by a moral designer, but here Paley demonstrates a lack of knowledge about the true lives of humans and animals, and is also guilty of fashioning his analysis so as to be able to support his thesis of a well-ordered universe.

Addressing insects, it has been estimated that the mosquito has been responsible for up to half of all human deaths on earth, with the majority of those deaths due to malaria.[16] This does not look like the design of any conscious designer unless that designer were exceedingly cruel.

Malcolm Murray discusses how evolution better explains the development and disappearance of species on earth than does an appeal to a conscious creator because evolution predicts that species will go in and out of existence based on their ability to adapt and survive in a changing environment, while with Paley's design argument one would expect the perfect or even relatively good designer to design beings that would be able to survive a changing environment. Murray explains as follows:

> Evolution provides a much better account of the seeming "design" than the theory of design itself… If the design theory were right, we wouldn't expect many things to have been designed that wouldn't fit. This is doubly so if the designer is deemed to be perfect in every sense… The evolutionary theory makes no such suggestion. Rather, the evolutionary account predicts that the currently existing things should be a tiny fraction of what there has been and will be. Alas, fossil evidence supports the latter theory and counts against the first theory. The number of species existing today is less than one per cent of the species *known* to have existed. It seems a poor design if only one per cent of it survives. (Murray, 2010: pp. 77-78)

Gregory Paul uses a statistical analysis and shows that the majority of fetuses and fully half of all children have died before reaching maturity.[17] According to his calculations, only 1 out of 8 human conceptions have survived to adulthood. This hardly resembles what we would expect from a conscious designer. Paul summarizes his point as follows:

> Of the hundreds of billions of human conceptions, the large majority died before birth, over half the one hundred billion born have died as children, a portion of the survivors were severely harmed, and among children the great majority suffered high and even extreme levels of discomfort, pain, and fear that qualifies as torture. This dysfunctional system can be objectively described as merciless or ruthless… (Paul, 2009: p. 132, 141)

Additionally, probably the strongest example of order, the parts of the human body which serve important and identifiable purposes, are not crafted in a way that is consistent with a designer. For example, mutations that help us survive

[16]Timothy Winegard provides this statistic: "The mosquito has killed more people than *any* other cause of death in human history. Statistical extrapolation situates mosquito-inflicted deaths approaching *half of all humans that have ever lived*. In plain numbers, the mosquito has dispatched an estimated 52 billion people from a total of 108 billion throughout our relatively brief 200,000-year existence." (Winegard, 2019: p. 2).

[17]Specifically, Paul cites studies which indicate that 75% of all conceptions have ended in miscarriage and that throughout history 2/3 of pre-adult deaths have occurred to children under 5 years old (Paul, 2009: p. 128).

often have other poor consequences for us: the development of a big brain took away the room needed for our wisdom teeth to grow and also made childbirth both extremely painful and riskier than it had been; the development of walking upright offered some advantages but also created back and foot problems; and the development of genetic mutations helped Africans better resist malaria but also made them more susceptible to getting sickle cell anemia. A designer, unless the designer were cruel, would not be expected to have intentionally designed things this way, and in any event, evolution is certainly a much better explanation because each of these changes offered survival advantages even with the accompanying and substantial disadvantages.

Columbia University philosophy professor Philip Kitcher, who specializes in the philosophy of science, biology, and mathematics, makes this point as follows:

> If we lapse from the official story for a moment, we have to have some idea about what Intelligence "wants to achieve"… For, if Intelligence has been waiting in the wings throughout the history of life, seizing opportunities as they arise, we know that there are all sorts of things it hasn't done. Apparently, Intelligence isn't directed toward eliminating the junk from genomes or removing vestigial structures like the whale's pelvis or generating radically new arrangements for mammalian forelimbs… For there are really simple genetic problems with respect to which Intelligence seems to be impotent. As I noted earlier, sickle-cell anemia has persisted because the gene which gives rise to the disease … confers an advantage … by providing resistance to malaria. (Kitcher, 2010: p. 549)

Indeed, evolution can account for both the positive changes and the negative side effects found in living organisms. It can explain both the natural order found in animal and human bodies and the attendant and abundant disorganization and imperfection that has come along with it. Moreover, our entire universe, with the pervasive disorder, chaos, and destruction that permeates it, along with the hardships endured by its living beings, is inconsistent with what we would expect from an Intelligent Designer.

9. Research Summary and Implications

Putting together the scientific research and the insights made in this paper, we can summarize the results and implications as follows:

1) The universe began in disorder.

2) The natural laws, from which all order was eventually formed, are not truly ordered, displaying only the inevitable patterns of Ramseyian Order.

3) The universe has always been and still is primarily disordered.

4) The universe as a whole displays no order for a purpose.

5) The pockets of order in the universe, which include Ramseyian Order, Purposeless Order, Functional Order, and the Intentional Order exhibited by limited beings such as human beings, can be fully explained by naturalistic scien-

tific processes, primarily various self-organization processes.

6) The pockets of order in the universe do not display the order for a purpose which one would expect from an intentional agent or Intelligent Designer.

7) Specifically, the order found in nature is not one which is to the consistent advantage of its living beings.

8) Similarly, the order found in the bodies of conscious beings is not what one would expect from an intentional agent or intelligent designer because that order is riddled with design flaws.

9) Because the universe as a whole displays no order for a purpose and all order can be explained in naturalistic scientific terms, the belief in a supernatural God or Intelligent Designer is superfluous.

10) Furthermore, because the universe is primarily disordered and what order exists is full of design flaws, it is inconsistent with an Intelligent Designer or God.

10. Concluding Comments: Paley's Equivocation Fallacy

Paley committed a fallacy of equivocation when he lumped the various types of order together as if they had no differences. He failed to realize that we mean something quite different when we say that a watch is ordered, which is an example of Intentional Order (O4), and we claim that the universe is ordered, which exhibited only Functional Order (O3), Purposeless Order (O2), and Ramseyian Order (O1) until it had conscious and purposeful beings such as human beings. Furthermore, we have seen that Ramseyian Order is inevitable and consists of random patterns, which is not real order at all.

For the watch, we are claiming that it is not part of the natural world and therefore needs an intentional creator to order it so that it will serve the purpose of telling us the time, which is known before the watch is even made, while for the universe all we mean by order is that it works a certain way, and even though that way will come to manifest some patterns (Ramseyian Order: O1), self-organization (Purposeless Order: O2), and even the type of order that we find in living things (Functional Order: O3), all of these types of order can be explained in naturalistic terms. Moreover, in most areas and in most ways the universe exhibits a lack of structure and disorder with no apparent overall purpose.

In summation, the watch's type of order (Intentional Order: O4) causes us to conclude that it has a designer or maker, while the universe's very different types of limited or local instances of patterns or order (primarily O1, O2, and O3), which are in a sea of overwhelming and abundant chaos and disorder, should lead us in the opposite direction. The natural laws and the types of order that they have produced just do not exhibit the type of order which should lead us to infer an organizer/designer/maker.

Amazingly, Hume had it figured out quite well in the 1700s. He described the possibility that our universe began in a state of disorder, and then naturally developed what seems to be order but is in actuality merely the behavior of "un-

guided matter."

> Suppose (for we shall endeavor to vary the expression), that matter were thrown into any position, by a **blind unguided force**; it is evident that this first position must in all probability be the most confused and **most disorderly** imaginable, **without any resemblance to those works of human contrivance**… If a glimpse or dawn of order appears for a moment, it is instantly hurried away, and confounded, by that never-ceasing force, which actuates every part of matter. **Thus the universe goes on for many ages in a continued succession of chaos and disorder.** But is it not possible that it may settle at last, so as not to lose its motion and active force (for that we have supposed inherent in it) yet so as to preserve an uniformity of appearance, amidst the continual motion and fluctuation of its parts? This we find to be the case with the universe at present. Every individual is perpetually changing, and every part of every individual, and yet the whole remains, in appearance, the same. May we not hope for such a position, or rather be assured of it, from the eternal revolutions of **unguided matter**, and might not this account for all the appearing wisdom and contrivance, which is in the universe? (Hume, 1779: pp. 60-61)

Indeed, there is no order manifested in our universe which resembles the conscious and intentional order for a purpose that we find in a watch. Our entire universe, with its pervasive disorder, chaos, and destruction, is inconsistent with what we would expect from an intelligent designer. Moreover, what order there is can be explained in naturalistic terms without an appeal to a conscious designer.[18]

As such, Paley's famous version of the teleological argument fails. It fails, in part, due to being guilty of an equivocation fallacy dealing with the word "order," as Paley mistook disorder and Ramseyian Order for true order, and further mistakenly equated Purposeless and Functional Order with Intentional Order.

Moreover, this paper is an indictment of all standard versions of the Teleological Argument in that they, similar to Paley's argument, rely on the claim that the universe is ordered in such a way that it must have a conscious creator. I have suggested that perhaps instead of calling the universe and its parts ordered, we should merely state that they work a certain way, as would be the case in any universe. In the alternative, we should note that the types of order found in the universe, Ramseyian Order, Purposeless Order, and Functional Order, should not be mistaken for Intentional Order. It is this equivocation fallacy which mis-

[18]Although I have described the universe as primarily disordered with local pockets of order, this description is looking at the parts of the universe. One might ponder as to what is the best description of the universe as a whole. It certainly isn't one of functional or intentional order since the universe as a whole does not seem to display any overriding purpose or function. Moreover, the universe does not have the symmetry of a snowflake, which is an example of purposeless order, but it has progressed to recognizable patterns which form according to the natural laws. Perhaps the current universe as a whole would best be described as something between total disorder (with the inevitable Ramseyian Order) and Purposeless Order.

leads us into believing that the Teleological Argument rests on a firm foundation, when in fact it does not.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

Aquinas, T. (1274). Summa Theologica. In M. Rea, & L. Pojman (Eds.), *Philosophy of Religion* (7th ed., pp. 164-166). Stamford, CT: Cengage Learning.

Aschwanden, M. et al. (2018). Order Out of Randomness: Self-Organization Processes in Astrophysics. *Space Science Reviews, 214,* 55. https://doi.org/10.1007/s11214-018-0489-2

Atkins, P. (2018). *Conjuring the Universe: The Origins of the Laws of Nature*. New York: Oxford University Press.

Aydiner, E. (2018). Chaotic Universe Model. *Scientific Reports, 8,* Article No. 721. https://doi.org/10.1038/s41598-017-18681-4

Dawkins, R. (1986). *The Blind Watchmaker*. New York: W.W. Norton & Company.

Dawkins, R. (2006). *The God Delusion*. Boston, MA: Mariner Books, Houghton Mifflin Company.

Dennett, D. (1995). *Darwin's Dangerous Idea*. New York: Simon & Shuster Paperbacks.

Everitt, N. (2004). *The Non-Existence of God*. New York: Routledge. https://doi.org/10.4324/9780203643785

Fellman, M. (2010). *Universe Chaotic from Very Beginning*. Northwestern Now, September 7. https://www.northwestern.edu/newscenter/stories/2010/09/universe-chaotic-from-beginning.html

Firestone, R. S. (2014). Naturalistic vs Supernatural Explanations: Charting a Course away from a Belief in God by Utilizing Inference to the Best Explanation. *Open Journal of Philosophy, 4,* 281-302. https://doi.org/10.4236/ojpp.2014.43034

Firestone, R. S. (2019). Oversimplification in Philosophy. *Open Journal of Philosophy, 9,* 396-427. https://doi.org/10.4236/ojpp.2019.93025

Graham, R., & Spencer, J. (1990). Ramsey Theory. *Scientific American, 263,* 112-117. https://doi.org/10.1038/scientificamerican0790-112

Green, D. G., Sadedin, S., & Leishman, T. G. (2008). Self-Organization. In S. E. Jorgensen, & B. D. Fath (Eds.), *Encyclopedia of Ecology* (pp. 3195-3203). Amsterdam: Elsevier. https://doi.org/10.1016/B978-008045405-4.00696-0

Helmenstine, A. M. (2019). *What Is a Scientific or Natural Law*? https://www.thoughtco.com/definition-of-scientific-law-605643

Heylighen, F. (1999) The Science of Self-Organization and Adaptivity. In L.D. Kiel (Ed.), *Knowledge Management, Organizational Intelligence and Learning, and Complexity*. Encyclopedia of Life Support Systems. Oxford, UK: Eolss Publishers Co.

Hume, D. (1779). *Dialogues Concerning Natural Religion*. New York: Barnes and Noble Publishing, Inc. https://doi.org/10.1093/oseo/instance.00044084

Jogalekar, A. (2014). *Should Physicists Stop Looking for Fundamental Laws*? https://blogs.scientificamerican.com/the-curious-wavefunction/should-physicists-stop-

looking-for-fundamental-laws

Johnson, B. C. (1983). *The Atheist Debater's Handbook*. Amherst, MA, New York: Prometheus Books.

Kant, I. (1783). Prolegomena to Any Future Metaphysics. In L. Pojman (Ed.), *Classics of Philosophy, Volume II: Modern and Contemporary* (pp. 774-820). New York: Oxford University Press.

Kierkegaard, S. (1846). Concluding Unscientific Postscript. In R. Solomon (Ed.), *Existentialism* (pp. 3-33, 2nd ed.). New York: Oxford University Press.

Kitcher, P. (2010). Living with Darwin: Evolution, Design, and the Future of Faith. In P. Peterson, W. Hasker, B. Reichenbach, & D. Basinger (Eds.), *Philosophy of Religion* (4th ed., pp. 542-550). New York: Oxford University Press.

Lightman, A. (2014). *The Accidental Universe: The World You Thought You Knew*. New York: Vintage Books.

Mackie, J. L. (1980). *The Cement of the Universe: A Study of Causation*. New York: Oxford University Press.

Murray, M. (2010). *The Atheist's Primer*. Buffalo, NY: Broadview Press.

Nietzsche, F. (1887). Beyond Good and Evil. In *Basic Writings of Nietzsche* (Kaufman, W., Trans., pp. 179-435). New York: The Modern Library/Random House, 1992.

Oppy, G. (2006). *Arguing about Gods*. New York: Cambridge University Press. https://doi.org/10.1017/CBO9780511498978

Paley, W. (1809). *Natural Theology: Or, Evidences of the Existence and Attributes of the Deity* (12th ed.). London: Printed for J. Faulder. http://darwin-online.org.uk/content/search-results?freetext=Paley

Paul, G. (2009). Theodicy's Problem: A Statistical Look at the Holocaust of the Children, and the Implications of Natural Evil for the Free Will and Best of All Worlds Hypotheses. *Philosophy & Theology, 19,* 125-149. https://doi.org/10.5840/philtheol2007191/27

Plantinga, A. (1974). *God, Freedom, and Evil*. Grand Rapids, MI: Wm. B. Eerdsman Publishing Company.

Pojman, L. (2001). *Philosophy of Religion*. Long Grove, IL: Waveland Press, Inc.

Rowe, W. (2007). *Philosophy of Religion: An Introduction* (4th ed.). Belmont, CA: Thomson Wadsworth.

Scriven, M. (1966). Primary Philosophy. In L. Pojman (Ed.), *Philosophy of Religion, an Anthology* (pp. 344-352, 4th ed.) Belmont, CA: Wadsworth/Thomson Learning.

Shanks, N., & Karsai, I. (2005). Self-Organization and the Origin of Complexity. In M. Young, & T. Edis (Eds.), *Why Intelligent Design Fails* (pp. 85-106). New Brunswick, NJ: Rutgers University Press.

Stenger, V. (2008). *God: The Failed Hypothesis—How Science Shows That God Does Not Exist*. Amherst, NY: Prometheus Books.

Stewart, I. (1992). Does Chaos Rule the Cosmos? *Discover Magazine*. http://discovermagazine.com/1992/nov/doeschaosrulethe147

Swinburne, R. (2002). Arguments from Design. In M. Rea, & L. Pojman (Eds.), *Philosophy of Religion* (pp. 207-210, 7th ed.). Stamford, CT: Cengage Learning.

Ussery, D. (2005). Darwin's Transparent Box: The Biochemical Evidence for Evolution. In M. Young, & T. Edis (Eds.), *Why Intelligent Design Fails* (pp. 48-57). New Brunswick, NJ: Rutgers University Press.

Wikipedia (2019). *Scientific Laws*.

Winegard, T. (2019). *The Mosquito: A Human History of Our Deadliest Predator*. New York: Dutton. (Penguin Random House)

Yanofsky, N. (2017). Chaos Makes the Multiverse Unnecessary. *Nautilus, Issue 49,* June 22, 2017. http://nautil.us/issue/49/the-absurd/chaos-makes-the-multiverse-unnecessary