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SALVAGING THE BIOLOGICAL DESIGN ARGUMENT IN LIGHT OF DARWINISM?

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Abstract
It is a common assumption that biological organisms appear as though they were designed. Prior to the Darwinian revolution, the order of biological organisms was often taken as a sign of their divine Creator. It is also commonly argued that Darwinian evolutionary theory as a good explanation for the adaptive complexity of biology reveals this appearance to be merely an illusion. However, in recent philosophical discussion several defenses of the compatibility of divine design and Darwinian evolution have emerged. These defenses argue that not only are divine design and evolution compatible, but even that biological organisms can continue to function as pointers to the Creator even in a Darwinian cosmos. This article explores and extends these recent arguments. I analyze four different strategies for arguing that the wisdom of the Creator is apparent in biological organisms. The basic underlying assumption is that the products of some larger whole can reflect the rationality and designedness of that whole.

Introduction: The Idea of Biological Design

In his *Natural Theology* (1802), William Paley argued that when we recognize the divine origins of the biological complexity that surrounds us, "the world from thenceforth becomes a temple, and life itself one continued act of adoration. The change is no less than this, that whereas formerly God was seldom in our thoughts, we can now scarcely look upon anything without perceiving its relation to him. Every organized natural body, in the provisions which it contains for its sustentation and propagation, testified a care on the part of the Creator expressly directed to these purposes."[1] In Paley´s vision of the world, biology becomes a kind of sacred science. The world is a temple and

biological organisms are the icons in it, through which the wisdom of the Creator can be indirectly perceived.

At least on the surface level, it seems that Paley´s understanding of biological design arguments is made obsolete by evolutionary biology. Paley's *Natural Theology* was familiar to Charles Darwin, who had read and loved the book already as a student in Cambridge. But later Darwin would come to reject Paley´s arguments. In a famous passage in his autobiography, Darwin wrote that "the old argument of design in nature, as given by Paley, which formerly seemed to me so conclusive, falls, now that the law of natural selection has been discovered. We can no longer argue that, for instance, the beautiful hinge of a bivalve shell must have been made by an intelligent being, like the hinge of a door by a man."[2] Michael Ruse notes that Darwinian evolutionary biology does in a way continue the legacy of Paley, since it also acknowledges the reality of biological "teleology" or "teleolonomy": biological organisms are full of amazing adaptive complexity that needs to be explained somehow. However, rather than explaining the appearance of teleology by reference to a Creator, Darwinian evolutionary biology explains adaptive complexity as the result of the law of natural selection working on accidental, hereditary mutations.[3]

This has formed the basis for the rejection of the appearance of design in biology as an illusion. For example, Richard Dawkins argues that Darwinian evolutionary theory shows that the apparent of design emerges without the need for any Creator.[4] Many theistic evolutionists have agreed that though a theological and philosophical belief in the createdness of nature remains possible with evolution, it is now difficult for us to see the order of biological organisms as a pointer to God. For Francisco Ayala, this is even a blessing, since attributing the order of the organisms to the design of the Creator would also make the Creator responsible for the poorly designed features of biological organisms. Darwin´s gift to religion is to show how the order of biology can be explained without the Creator´s intervention.[5]

Clearly, theistic evolutionists cannot argue that organisms are designed in the same way as human craftsmen make door hinges. To be fair, Paley himself also would not have thought that God created the organisms in precisely the same way as humans design things. For all his faults, it is clear from his *Natural Theology that* Paley also believed in God´s transcendence. But there does seem to be a tension between Paleyan design arguments and evolutionary biology, because Paley formulated his argument in competition with natural explanations. In his *Natural Theology*, Paley seems to regard the lack of natural explanations for biological complexity as an important merit of his design argument.[6] So in this respect the emergence of a plausible naturalistic explanation for life's adaptive complexity is certainly relevant for Paley's argument. It is also relevant for critiquing ID´s arguments, which are typically formulated in competition against naturalistic explanations.[7]

However, in recent discussion the possibility that biology could still point to the Creator even

in an evolutionary cosmos has been defended by several philosophers, such as Alvin Plantinga, Del Ratzsch and Mats Wahlberg. Their arguments for the compatibility of design are philosophical, and are not meant to challenge evolutionary biology. The purpose of this article is to explore these arguments that there could still be a more subtle or indirect sense in which biological organisms are designed, and point to the Creator even in an evolutionary cosmos.

The argument is also related to the theistic argument from beauty: theists often feel that the existence of God can make sense of the beauty of nature´s order, such as that seen in rainbows and snowflakes. If such phenomena can be at least weak evidence for theism despite our ability to explain them as a result of the laws of physics, then it seems intuitively possible that the phenomena of life could also be such evidence. Charles Kingsley famously wrote: "we knew of old that God was so wise that he could make all things: but behold, He is so much wiser than that, that he can make all things make themselves."[8] As Wahlberg writes on this: "If it takes more wisdom to create through an evolutionary process than by hands-on-design, and if structures created by hand-on-design by humans are expressive of human intent and intelligence, why could not structures created by God in that more wisdom-demanding way reflect divine intent and intelligence?"[9] The main question of the paper is: might design as a pointer towards the Creator be coherently reconciled with evolutionary biology?

The question is separate from the overall compatibility of evolution and creation. In my view, this has already been firmly established in the theology and science literature. For example, it is clearly possible to argue that the Creator has invisibly directed the evolutionary process, such as through directing mutations by working on the quantum level.[10] Theistic evolutionists can combine belief in design and evolution in a theology of nature. In this way, it is possible to argue that biological complexity is not itself a sign or evidence of the Creator, but that theists can believe for some other reason (for example, based on the Biblical scriptures) that God has directed evolution in a way that is invisible to us. Within theistic natural theology, a typical way of defending design arguments has been to shift the level of discourse away from biology to the preconditions of biology. One can argue that evolution does not solve the problem of design completely, but simply pushes it back to the laws of nature. So, theists can still argue that the data of fine-tuning and the rationality of the cosmos, for example, make better sense on a theistic perspective than on the atheistic one. Or theists might argue that evolution overall displays some direction towards increased complexity and intelligence, and this might make more sense on the theistic perspective. But these proposals are not under consideration here: I am interested in the idea that the order of biological organisms itself might still function as some kind of pointer to the divine reality even in an evolutionary cosmos.[11]

So, the question is if we can have evidence of the Creator through biological organisms, rather

than simply believing in the Creator´s involvement because of our other theological views. Naturally, within theistic evolutionism any interpretation of biological adaptive complexity as a pointer towards the Creator will have to be understood as a philosophical or theological interpretation, rather than a scientific viewpoint. Theistic evolutionists generally accept some form of methodological naturalism, and do not wish to insert design as an explanation into the natural sciences, or to argue that the Creator must have intervened in the evolutionary process. So, the challenge for these theistic evolutionists is also to formulate their belief in biological design in a way that does not violate methodological naturalism, and so does not become a form of Intelligent Design or "scientific creationism".

How then might biology still manifest the Creator in an evolutionary cosmos? In this paper, I will consider two main strategies for answering the question: (1) the defense of design as a perceptually based belief, instead of an argument, and (2) the modification of biological design arguments using the strategy of shifting the level of explanation. I will then consider the relevance of the fine-tuning required by evolution, also showing how some of the ID movement´s arguments might be turned around to support a form of theistic evolution instead. I will mostly leave aside the consideration of other objections to the design argument which are independent of the Darwinian objection.[12]

The two strategies for defending the compatibility of evolution and manifest design do not necessarily need to be opposed: it is often the case that we can support a perceptually based belief with further arguments, and relating such beliefs to our broader knowledge is useful. Actually, all the thinkers under consideration here agree that design beliefs are intuitive for humans. In the discourse on natural theology, it is often also argued that the many of the arguments of natural theology develop certain human intuitions about the world into arguments, and thus help expand and evaluate the basis of our intuitive beliefs.[13] The credibility of our commonsense beliefs can often be tested by reflective thinking. So, even if belief in design gains some *prima facie* credibility from being akin to a perception, it does not follow that the strength of our beliefs in design could not be influenced by arguments. Our beliefs could be motivated by a mixture of inferential and non-inferential support, rather than having to choose either one as the exclusive method of reasoning. Intuitively accepted beliefs can gain or lose support based on what further research and analytic arguments show about the same issue.[14] This means that both supporters and critics of design arguments can find value in studying and discussing design arguments, even if they accept the idea that the design intuition grants *prima facie* plausibility to design. Supporters can argue that the reliability of this intuition can be further supported by arguments, while critics can attempt to show the unreliability of the initial perception of design with further evidence.

“Design Discourse” Instead of Design Arguments

The first strategy for combining evolution and design which I will consider is based on the idea that design can be manifest in biological organisms without requiring the defense of a design argument. Already Thomas Reid (1710–96) argued that belief in design is based on a non-inferential capacity to detect design that all humans have and that is required to detect even the intelligence of other humans. Just as we perceive that other humans have minds, and that human artifacts are purposefully created, so too we also perceive that there is a Creator of nature. According to Reid, design arguments can act to reinforce the reliability of this initial perception, but such arguments are not necessary for belief.[15] In the recent discussion, Alvin Plantinga, Del Ratzsch, Mats Wahlberg and John Mullen and Mats Wahlberg have followed Reid´s general line of argument, and have claimed in different ways that belief in the designedness of biology can be based simply on the human perception of biology as designed, without requiring further argument. Usually, perceptually based beliefs such as “I see a tree outside of my window” are believed to be true without argument, as long as we do not have other reasons to distrust the reliability of our faculties. These thinkers argue that we are similarly prima facie rational to trust our cognitive faculties when these faculties tell us that biology is designed. I will concentrate here particularly on Plantinga´s statement of this strategy.

Plantinga is supportive of the Intelligent Design movement´s arguments, and is not fully convinced of the truth of evolutionary explanations. Nevertheless, as a philosophical point, Plantinga does not believe that even the success of evolutionary biology should threaten belief in biological design. This is because for Plantinga, belief in design is not based on arguments, but rather on the normal functioning of our cognitive faculties. When we perceive the nature of biological systems, the belief that these systems are designed simply seems to spontaneously arise in us. Just as we normally trust in the deliverances of our memory, perception, logical intuitions and so, we should also normally trust in our capability to detect design.[16] In Plantinga´s epistemology, we are justified in accepting the beliefs formed by our faculties, if we do not encounter a strong enough reason to disbelieve them. Such beliefs are formed without arguments, and are called “basic beliefs” in Plantinga´s terminology. The reasons to give up such beliefs are called “defeaters”. So, in order to show that we can justifiably see biological organisms as designed, this strategy simply requires us to show that (1) the normal functioning of our cognitive faculties seems to produce belief in the createdness of biology, and (2) that none of the proposed defeaters for this belief, such as Darwinian evolution, actually refute design.[17]

Related to the first point, it is not difficult to find prominent thinkers claiming that biology

appears to be designed. The Duke of Argyll´s account of a conversation with Darwin is famous:

> "In the course of that conversation I said to Mr. Darwin, with reference to some of his own remarkable works on the *Fertilisation of Orchids*, and upon *The Earthworms*, and various other observations he made of the wonderful contrivances for certain purposes in nature – I said it was impossible to look at these without seeing that they were the effect and the expression of Mind. I shall never forget Mr. Darwin´s answer. He looked at me very hard and said, 'Well, that often comes over me with overwhelming force; but at other times', and he shook his head vaguely, adding, 'it seems to go away.'"[18]

In many account, the feeling that biology is designed is described as having a "force like that of sensation", to use David Hume´s phrase in the *Dialogues*.[19] Mats Wahlberg notes that in such texts, the observer of nature is described in passive terms, with the perception that nature is designed coming from the outside, overwhelming the observer.[20] Following work in the cognitive sciences of religion, it has recently been often argued that agent-based explanations are natural to us humans in the sense that they accord with our natural cognitive tendencies, and so are easy for us to accept. Some even argue that children are 'intuitive theists'. Even adults appear to have the same intuitive tendency to explain things by reference to purposes.[21]

These results seem to support the idea that "design thinking may be natural to our sorts of intellects", as Del Ratzsch puts it.[22] But others have used the results of the cognitive sciences of religion to it has been argued that (1) the design-detection mechanisms have evolved to be useful for detecting human agents, so we cannot assume their reliability regarding non-human agents, (2) it might be evolutionary useful for the mechanism to detect agents hyperactively; it might have even aided the survival of the species to believe that non-existent supernatural agents exist. There has been much discussion of these and other critiques, and it is my opinion that good answers to these "debunking arguments" exist.[23]

For example, regarding the first critique, it is plausible to assume that a cognitive mechanism can also be useful and truth-tracking outside of the original context in which it evolved. Thus though the human capacity to detect agents has originally evolved in a context where detecting the operation of other human agents and predators was paramount, it could in principle also be able to detect the existence of extraterrestrial agents, if we were to meet any. And if supernatural agents sometimes act in a way that is in somehow analogous to human agents, then it seems reasonable to assume that we could also detect supernatural agents.[24] Furthermore, defenders of the reliability of detecting design can argue that the hypothetical agency detection device seems reliable in most cases, so without further reason to doubt its reliability we should also begin by assuming its reliability in the case of nature´s order, or at the very least not wholly dismiss its testimony as evidence of a Creator.[25]

One does not need to accept the entire Reidian epistemological approach to grant that we indeed do have many justified beliefs that are formed without arguments, simply on the basis of the normal functioning of our faculties or "common sense." For example, evidentialists like Richard Swinburne and Trent Dougherty also have much good to say about trusting in the general reliability of our common sense. Without such a trust, it is difficult for any discussion, including scientific discourse, to get started at all.[26] If we do have a design detection module, as is posited in some research in the cognitive sciences of religion, then it does seem rational to begin by assuming its reliability, until we gain evidence against it. But as with other commonsense beliefs, it should indeed also be possible to disprove intuitions about biological design. In addition to the results of the cognitive sciences of religion, proponents of this perceptual approach must also show that Darwinian evolution does not provide a defeater for the perceptual belief.

Is evolution then a defeater for design beliefs? Here it is important to note, following Wahlberg, two different senses in which evolution could be such a defeater.[27] First (1), it could be argued that there is a contradiction between evolution and design, such that both cannot be true at the same time. Against such critiques, Plantinga and the other defenders of design as a perceptual belief can appeal to all the common defenses of the compatibility of evolution and creation; there appear to be many ways in which the Creator could have used an evolutionary process to create life. For example, the Creator could have set up nature in the beginning in such a way that evolution would occur, or the Creator could have invisibly directed the course of evolution. The second critique (2) is the more difficult one: evolution could be argued to make design as an explanation unnecessary for the features of biology. According to this critique, though evolution does not falsify the existence of the Creator or his involvement even in biology, evolution does falsify the idea that biology is somehow expressive of the Creator.[28]

Plantinga´s own responses to evolution as a defeater concentrate on showing that evolution is compatible with design. He argues that the unguidedness of evolution is not a part of evolutionary biology itself, but rather merely a metaphysical interpretation of evolution. Evolutionary science itself does not rule out the possibility that many mutations in the history of life could have been divinely guided, and so it is in principle compatible with design. So, evolution does not show that design is false.[29] But this response leaves evolution intact as a defeater in the second, weaker sense. The intuitive belief in design arises in Plantinga´s design discourse as a response to certain features of organisms, such as their adaptive complexity. It seems that at least part of the intuition is that these organisms cannot be explained without design. If evolutionary biology shows that these features are plausibly explained without any need for intelligent guidance, is this truly not at all relevant to how well grounded these believer´s ideas about design are? It seems to me that to defend the rationality of this design discourse, it is needed to go beyond the mere in principle compatibility

of evolution and design to showing how evolution depends on design. It is needed to show that design and evolution function somehow on different levels of explanation, so that evolution does not eliminate the grounds of the design perception. But before discussing this issue further, I need to also introduce the discussion over biological design detection as an argument, not just a perception.

Design and Levels of Explanation

The broad compatibility of design and natural causes is a given in the history of design arguments. Plato's demiurge, for example, created by using matter's existing properties, not out of nothing or contrary to laws of nature. For the death of Socrates, Plato saw several causes. While the poison drank by Socrates was the material cause of his death, it would have been an error to see only this side of the issue. Instead, the political situation of Athens and the plans and purposes of both Socrates and his opponents were also important to note. For Plato, material and teleological explanation were thus complementary levels of explanation. On this model, a design argument is not necessarily in conflict with material explanations.[30] Similarly, Thomas Aquinas separated between primary and secondary causes, arguing that God often works in nature through secondary causes.[31] In the human context, we might think that an architect is still responsible for the overall structure of the house she designed, even if the construction work is done by others.

Nevertheless, biological design arguments have historically been usually formulated in competition with natural explanations. Though there are several different formulations of the argument, typically they proceed roughly in the following manner. First, some property is identified as a marker of intelligent design based on our own experience of that property and our understanding of its nature. For example, teleology as the purposeful arrangement of parts and functional information can be argued to be such markers of design, properties for which design is a particularly good explanation. Second, it is argued that biological organisms are full of such properties. Third, it is argued that there are no credible natural explanations for these properties of organisms, and so design is the most credible explanation of some features of biological organisms. However, if we accept the success of Darwinian evolutionary explanations for biological teleology, this poses a challenge to these design arguments. These arguments occupy the same explanatory space as evolution, so that design and evolution function as competing explanations for the same data. Evolution also functions as a defeater for the claim that the apparent teleology of organisms requires design to produce. How then might we modify biological design arguments to defuse this conflict with evolution?[32]

Clues might perhaps be gleaned from the discussion over cosmological fine-tuning

arguments, in which it is claimed that the laws, constants and conditions of the cosmos are fine-tuned for allowing the existence of complex life and scientific discovery. Life and its evolution require the fulfilment of many highly demanding conditions. I take the basic idea that fine-tuning exists to be fairly uncontroversial, as it is acknowledged by scientists with highly varying worldviews.[33] The explanation of fine-tuning is more controversial. Many argue that if there were an enormous amount of universes with varying constants and laws of nature, then it would be credible that some of the universes would have just the right kind of laws to allow for the existence of complex life even without God. Defenders of the fine-tuning argument have made several different responses to the problem, but the one that interests me here is the argument that the multiverse hypothesis does not actually solve the problem, but merely pushes it back. For example, Robin Collins argues that proposed multiverse hypotheses require precisely fine-tuned laws of nature to generate the universes and their varying natural constants. So, the multiverse hypothesis does not explain the existence of the fine-tuning required for a multiverse capable of generating life-supporting conditions. But this means that the grounds for the fine-tuning argument remain.[34]

Ratzsch and Koperski have called this kind of defense of design arguments "level-shifting", identifying both plausible and implausible examples of level-shifting. On the one hand, suppose that an elderly uncle dies in suspicious circumstances, and relatives suspect the niece killed the uncle. Police investigations, however, reveal a natural cause for the death: the uncle's medication was mixed up. The relatives can plausible claim that the niece killed the uncle by mixing up his medication, thus moving their design-explanation up one level. Here the natural explanation does not eliminate the evidence for design. On the other hand, suppose that crop circles (which some UFO enthusiasts suppose are produced by aliens) are proven with video evidence to be made by humans. An UFO enthusiast could respond to this alternative explanation by claiming that the aliens must be mind controlling the humans. However, here level-shifting is clearly implausible, and the hypothesis of aliens has become unnecessary for explaining the data.[35] The central factor separating plausible and implausible level-shifting in these examples seems to be whether the natural explanation eliminates the reason why the design hypothesis was made in the first place.

David Glass uses the concept of "explaining away" to describe this kind of elimination. Whether something can be explained away depends on if we have access to a well-established hypothesis that can explain all of the evidence. As Glass notes, "in most cases design is compatible with the alternative explanation, but if this is so, why not accept both design and the alternative explanation? The obvious answer is that there is no need to infer two explanations when one will do. When I learn that my children were playing in the study, the hypothesis that there has been a burglary becomes redundant as an explanation for the untidiness. In general, however, there is a question as to when one explanation is good enough to render the other redundant."[36] Applied to the

question of design in biology, the question is: Does explaining biological adaptive complexity by reference to natural evolutionary mechanisms leave any grounds for design as an explanation, or is the evidence of design explained away? If grounds for design-based explanations remain, then a design argument can work without gaps. If alternative explanations more plausibly explain away the data that were originally the basis of the design argument, then no good grounds for such a gapless design argument remain.

Ratzsch makes many further analogies that are helpful at this point. For example, Ratzsch asks us to image that we found the text of John 3:16 written on the surface of the moon. This would be powerful evidence of design, even in the absence of any "gaps" or counterflow in nature´s processes. Even supposing that we were able to explain the text as an event caused by meteor strikes, and were able to trace its origin back to the Big Bang, it seems that this would still not eliminate the evidence of design. Rather, it would simply push back the problem. In this case, it seems that natural explanations and design simply function on different explanatory levels.[37]

Based on Ratzsch´s analogy, one could argue that that finding the physical causes responsible for the formation of living organisms, and being able to trace these back to the Big Bang, would nevertheless not necessarily eliminate the evidence of design that living being exhibit. On this understanding, evolution does not need to eliminate evidence of biological design.[38]

Ratzsch also asks us to consider the possibility of a fully automated factory producing VCRs (video cassette recorders). In this case one could give a complete causal account of the production and physical properties of the VCR´s from the initial factory state. On the level of a physical science studying the processes of the factory, there would be no absolute need to refer to designers. But as Ratzsch points out, "we'd still feel that something was missing – that there was something about the factory itself, perhaps implicit in the "givens" that demanded special explanation."[39] Explaining the VCR´s production in terms of the properties of the factory would leave something unexplained that we would still have to explain through design. If the properties of the factory itself are designed, then this designedness "is not a simple causal irrelevance, given that without that factory's designedness the [products] would fail both to exist and to have key physical properties they in fact have."[40]

Just as the properties of the factory are not irrelevant for explaining the properties of the VCR´s, so also it seems that the properties of the laws of nature are not irrelevant to explaining the properties of biological organisms. The rationality of the factory and so the design behind this rationality is also visible in the VCR´s, even though no interventions into the processes of the factory were made. In the same way, the rationality of the Creator could be visible in biological organisms, even if the Creator works through natural processes.

One central objection to this type of argument comes immediately to mind: in the case of the

text of John 3:16, nobody would claim that physics alone could explain this rational pattern. Though physics could trace the causes of the physical pattern back to the Big Bang, this would still leave the origin of the semantic content of the pattern completely unexplained. However, the case is claimed to be different in biology. Evolutionary biology also attempts to explain the rationality of organisms as the result of chance mutations and natural selection, which cause adaptation to the environment. So, unlike in the case of physics, evolutionary biology attempts to explain just the features which are also the grounds of the traditional design arguments. Furthermore, in some understandings of evolution, what happens in evolution is highly contingent, rather than being determined by the preconditions of the process, which also makes evolution different from Ratzsch´s analogies.[41] Importantly, even after these critiques, the basic point of the analogy remains sound: the products of a larger whole can reflect the designedness of that whole. However, to defend the claim that the biological organisms in our world can also reflect the designedness of that whole, it needs to be shown that in some sense, evolution pushes the problem of the origin of biological forms back to the laws of nature. Evolution also must not demonstrate that teleology can emerge without a designer.

Biological Design, the Extended Synthesis and Intelligent Design

As noted, for defending the reliability of the design perception it needs to be argued that life can in some way make manifest the properties of its Creator, even if there is no need to refer to a Creator when explaining the proximate causes of biological order. And to defend biological design arguments through level-shifting, it must be argued that evolution does not defeat the link between teleology and design. The problem is the same in both cases, and responding to it is challenging, because evolutionary mechanisms have typically been posited to explain the order of life as a contingent result of the operation of natural selection working on random hereditary mutations. However, it seems to me that recent developments, particularly the recognition of the fine-tuning required by evolution, provides grounds for arguing that the mechanism of mutation and selection indeed does not explain the evidence of design alone, but only in conjunction with the fine-tuned natural laws. As Christian de Duve pointed out already in 1984, evolutionary "chance did not operate in a vacuum. It operated in a universe governed by orderly laws and made of matter endowed with specific properties. These laws and properties are the constraints that shape the evolutionary roulette and restrict the numbers that it can turn up."[42]

As stated, I take the general idea of fine-tuning to be fairly uncontroversial. The extent to which the course of evolution is actually predetermined in the laws of nature is a more controversial matter. Some argue for a high degree of direction, others for less. For example, paleontologist Simon Conway Morris argues that the phenomenon of convergence in particular reveals the lawlike nature of evolution, though there remains much room for freedom and contingency in the process. Conway Morris argues that the evidence points to "the existence of something analogous to 'attractors', by which evolutionary trajectories are channeled towards stable nodes of functionality."[43] The phenomenon of convergent evolution, where similar features evolve in many separated lineages, seems to show that evolution repeatedly keeps finding the same solutions. According to Conway Morris, it is plausible that the possible biological forms, and so also the form of the tree of life, are to some degree determined in the laws of nature.[44]

The significance of this for defending biological design is that if Conway Morris and others are correct, then evolution itself depends on the broader laws of nature. As Nicole Hoggard Creegan puts the point, "While teleology strained against the grammar of natural selection alone, it is not at all a foreign or difficult concept in the light of convergence, *evo devo*, and epigenetics."[45] Consider again Dawkins´ idea that evolution shows the appearance of design in biology to be merely an illusion. According to Dawkins, Darwinian evolution functions as a "consciousness-raiser" which shows that teleology can be reduced to material processes, and that we should not trust our intuitions about design in nature. He argues that "a deep understanding of Darwinism teaches us to be wary of the easy assumption that design is the only alternative to chance, and teaches us to seek out graded ramps of slowly increasing complexity. – – After Darwin, we should feel, deep in our bones, suspicious of the very idea of design."[46] Dawkins argues that since Darwinism shows that reductionistic explanations for teleology are possible, it provides grounds for the reduction of all teleology to non-intentional material causes. This is one point where ID proponent Phillip Johnson agrees with Dawkins – according to Johnson, Darwinism lends credence to such reductionism, and thus includes a way of thought which is contradictory with cosmic design arguments as well.[47]

But why should Darwinian evolutionary biology show that our hypothetical agency detection device is in error in the case of biology? It seems that evolutionary biology can only show that we are in error if no design is actually required for the emergence of biological complexity. But following the analogy of the factory, it is possible to believe that while no teleology is required on the level of proximate biological explanations, evolution itself ultimately depends on teleology built into the universe. If this is true, then the Darwinian process does not work without teleology. Just as the designedness of an automated factory is not irrelevant to the production of its products, the designedness of the universe is not irrelevant to the production of organisms. So Darwinian evolution itself cannot prove that biology does not require design. To prove this, we would have to

prove that the laws of nature do not require a designer. But this argument is outside biology. Rather, we need other grounds for rejecting the design intuition.

For this kind of argument to work, the wider teleology of the cosmos must be highly important for the possibility of evolution. As an elaboration of this point, and also since my theme is salvaging biological design arguments", it is also interesting to return to the critique of evolutionary explanations by the ID movement. In my view, many critiques of evolutionary biology seem to show at least ways in which the process of evolution could have failed to work. In this way they can be turned around to work instead as arguments that evolution requires fine-tuning. Take as an example Michael J. Behe´s argument from irreducible complexity. The argument is that certain systems cannot be plausibly derived in a stepwise fashion, if we want to satisfy the condition that each evolutionary step along the way must be beneficial for survival. Evolution through non-beneficial steps would not be aided by natural selection, and so would be too improbable. With his argument, Behe is attempting to answer Darwin's challenge, as set out in the *Origin of Species*: "If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down. But I can find out no such case."[48] If some complex biological organ could not be developed through such small, useful steps, then Behe argues that evolutionary theory's claim to explain life's order would be jeopardized.[49]

Many different lines of critique have been made against the argument, against Behe´s definitions and against his evaluations of the literature. For my purposes, it is not necessary to go into these complications here. What is interesting is that most of Behe's critics have admitted that many biochemical machines indeed do require a minimum amount of parts in order to work. So they could not have generally evolved from simpler precursors fulfilling the same function. However, it is argued that the precursors could have had different functions. For example, a system that is not a biological motor could have started out as a secretory system The evolutionary history of Behe's irreducibly complex systems, such as the bacterial flagellum, could be very complex, with similar parts serving in many slightly different systems with different functions over time.[50]

However, what is typically overlooked is that Behe also considers this option himself and gives reasons for rejecting it. Behe states already in *Darwin´s Black Box* that "an evolutionary story for the cilium must envision a circuitous route, perhaps adapting parts that were originally used for other purposes."[51] Just as his critics, Behe argues in favour of this option by referring to homology: proteins similar to the parts of the motor are used in cells to serve other functions. Behe speculates that perhaps the building of the motor could proceed by adapting these parts first into some simple system serving an unknown function, and then add further parts until we come to the ciliar motor.[52]

So, Behe's scenario is very much like the co-option arguments used by many of his critics.

However, he rejects the co-option argument based on the functional requirements of proteins for a specific machine. He argues that a protein serving in a given irreducibly complex machine has to be fitted to the other proteins required in that machine, attaching itself automatically only to those proteins, and not to any others.[53] Because a machine is composed of many proteins that have to form a seamless whole, the requirements for proteins are, according to Behe, quite strict. The prior functions of the parts make them poorly fitting to serve in the new system.[54] Behe concludes that "analogous parts playing other roles in other systems cannot relieve the irreducible complexity of the new system; the focus simply shifts from 'making' the components to 'modifying' them."[55]

Behe´s argument is that it is implausible to think that precisely the same parts could have a function in several different systems, even if its homologues can indeed do so. This argument for the high functional specificity required of proteins has been developed further by ID proponents Douglas Axe and Ann Gauger, who have argued that there is a great rarity of functional forms, and it is difficult to find functional evolutionary pathways between modern homologues.[56] In response to Axe and Gauger, it has been argued that their failure to find functional intermediates between modern proteins does not demonstrate that no such functional intermediates existed between the ancestral proteins and modern-day proteins. Perhaps ancestral proteins were less specific to particular tasks, and were more evolvable than modern proteins. This would explain the homologies of present-day proteins.[57]

Gauger has admitted that this type of evolutionary fitness landscape is conceivable, though she does not believe it actually exists. But what is interesting here is that Gauger also argues that the existence of such a chain of functional intermediates in the fitness landscape would also be evidence of design: "unless someone paved a highway to Mt. Whitney that went uphill every step of the way, Darwin's engine would never get out of Death Valley. But a paved highway isn't evolution, it's design."[58]

Here these ID thinking come close to admitting the possibility of theistic evolutionism. To answer ID´s critiques of evolutionary biology, we must argue that there serendipitously exists a series of functional forms in morphological space. This series must allow for the move from functional system to functional system, so that the requirements of evolution are met. The fitness landscape must be fine-tuned in a way that allows for parts of one system to be transformed into parts of a new system. The facts of homology arguably provide evidence in favour of such pathways, since evolution from a common ancestor would explain these similarities. Granting this, we can argue that the possibility of the evolution of such complex structures must be written into the laws of nature, and evolution could not proceed otherwise.[59]

Developing the Argument Further

Previously, I argued that defending the idea of biological design as perceptual evidence of a Creator requires responding to evolution as a defeater of this idea. Defenders of this approach require a way to conceptualize how biological organisms to continue to function as some kind of signs of the Creator, even accepting evolution. Conceptualizing evolution as a fine-tuned process where the Creator has left the small details to the working of the processes does seem to provide a credible line of defense here. In the analogy of the factory, the designedness of the factory is visible in the products of the factory; similarly, we could argue that the teleological structure of organisms can point to the overall wider teleology of the cosmos itself. The fine-tuning of evolution provides a way to defend the analogy of the factory. Nevertheless, due to the large amount of contingency in the evolutionary process which remains also in Conway Morris´ account, it seems that some other analogy might be more apt than a factory.

A highly interesting analogy in this vein is provided by Mats Wahlberg. Defending the notion that biology might provide perceptual evidence of design even in an evolutionary cosmos, Wahlberg also makes use of the analogy with evolutionary computer algorithms. There exists a computer program that can write four-part fugues. The user of the program just needs to give the program a general theme, and it will then produce a fugue with many properties that cannot be predicted by the programmer or the user. Nevertheless, all of the fugues will have several features in common: they will be structured according to the western tonal system, exemplify a certain artistic style and so forth. So, it seems fair to say that in terms of these essential features, the products of the program will still be expressive of the programmer´s intent, even if the particulars are left to chance.[60]

Wahlberg argues that if one were to show products of the fugue-writing program to people from the 18th century, they would no doubt conclude that the fugue must be written by an intelligent composer. Though they would be wrong in believing that each particular feature of the fugue must have designed by a composer, Wahlberg argues that these people would still not be totally wrong, since the fugue is indeed broadly expressive of the composer´s intent. Similarly, he argues that people in the 18th century were not totally wrong in perceiving that biology is designed. If the broad lines of evolution are determined in the laws of nature, then the Creator´s intent can be manifest in biology, even if the Creator has left much of biology to the operation of natural selection and chance.[61] Furthermore, the operative principles of evolutionary algorithsm can themselves function as evidence of the fine-tuning required by evolution. The construction of such computer programs requires a good amount of skill, and the programs only generate interesting results when they are well built.[62] By analogy, one might argue that nature also must be quite well built in order for an

evolutionary process to work. Certainly we as humans would not yet be able to design a system capable of producing life.[63]

When we realize that evolution requires fine-tuning, it seems to become coherent to understand the order of organisms as a reflection of the rationality of the broader cosmos. This basic point can be expressed with transitive logic. Suppose that A implies B, and B implies C. By basic transitive logic, it follows that A implies C. If the order of biological organisms (A) requires the rationality of the cosmos (B), and the rationality of the cosmos is evidence for the Creator (C), then the order of biological organisms is evidence for the Creator (A->C). In this way, biological organisms could still indirectly testify of the Creator in an evolutionary cosmos. In defending a fine-tuning design argument, Benjamin Wiker and Jonathan Witt argue that we can appreciate the beauty of biological organisms better when we realize how much fine-tuning is required for this beauty to be possible.[64] Following the previous line of thought, this statement can be turned around: we can appreciate the fine-tuning required for life better when we look at the remarkable complexity and "designedness" visible in organism. The cosmos has to be a pretty wonderful place in order to allow for the evolution of such creatures, and the theologian of nature can argue that such features of the cosmos are well explained on a Christian, theistic view of the universe. In this way the interpretation of biology as a pointer to God could be quite coherent for those who accept the prima facie reliability of the human perception of design in biology.

Considering the Relevance of Design

Based on the prior considerations, the broad compatibility of evolutionary biology and biological design as a sign of the Creator seems defensible. However, it is important to note that the acceptance of this idea as probably true will also depend on our broader worldview and opinion of other arguments. Even though evolutionary biology seems to be compatible with the idea of biology as perceptual evidence of design, it is important to note that there are objections from outside of biological science that I have not considered here. For example, one might argue that the notion of perception that is used by the defenders of this argument is philosophically or psychologically erroneous. Or one might argue that we need to consider the perception of design as unreliable because we have other reason to be sceptical of the existence of God. Or one might argue that because the conclusion of the existence of a Creator is so momentous, we require more evidence than just perception before believing it. The evaluation of the credibility of entire worldviews and theologies depends on more than just one argument like this.

Nevertheless, it seems to me that the idea of biological design as a sign of the Creator fits into

those theistic worldviews which are positive about the general idea of a natural theology or a theology of nature. Related to natural theology, I am under the impression that contemporary natural theologians have managed to defend their arguments in ways that bypass the traditional criticisms by thinkers like Hume and Kant. In the discussion of design arguments, I have been particularly impressed by design arguments based on the fine-tuning of the natural laws and constants of the cosmos, which make the existence of complex life and scientific inquiry possible. Such arguments are not necessarily persuasive for all, but then very few good arguments in philosophy are persuasive to all. But even while I am impressed by such arguments, I find that these arguments can often be somewhat esoteric to a laypersons who are unfamiliar with physics. It would be desirable to also be able to say that things these laypersons experience as evidence of design (such as the order of biological organisms) can in some sense still be such evidence. This would also help make sense of the idea that some revelation of the Creator is available to all.[65]

Even if we do not think that the features of biology are pointers towards the Creator for all people, the idea of biology as a sign of the Creator might still be defensible as part of a theology of nature. It could be that when viewing reality through the lens of Christian theology, it is seen in a different light than from outside the faith, and perceiving design in biology then becomes credible. Something approaching this position is expressed in theologian-scientist Alister McGrath´s natural theology. McGrath´s version of natural theology begins from within Christian theology, rather than from a supposed objective and neutral standpoint. On his understanding, once nature is viewed through Christ, we can perceive God´s glory in nature´s aesthetics and rationality. In McGrath´s natural theology (which is closer to a "theology of nature" in Ian G. Barbour´s terminology[66]), the designedness of the cosmos is visible from the Christian viewpoint, but not necessarily visible for someone outside the Christian tradition.[67] Indeed, McGrath has briefly stated that the complexity of biology is still a pointer towards God in some sense, though he rejects the ID movement´s design arguments and accepts evolutionary theory.[68]

One challenge for integrating the idea of biological design into a natural theological framework comes from the problem of natural evil. Recall Ayala´s point quoted in the beginning of the article that we do not want to give God responsibility for the bad design evident in biology. It would be better to give responsibility for bad design to evolutionary processes which God has left free to work in nature. In the theology and science community, there are different opinions of how good this response to the problem of natural evil is.[69] In any case it seems that Ayala´s theodicy is broadly compatible with the combinations of design and evolution analyzed in this paper, since this combination also allows for a large amount of contingency in the evolutionary process. It may be that emphasizing the contingency of evolution even further would help further remove God´s responsibility for natural evil (though God would still remain responsible for creating the laws of

nature). However, emphasizing the contingency of the evolutionary process to such an extent would also have the drawback of not giving God any glory for the good in biological nature.

The compatibility of design and evolution should also be interesting as a response to the ID movement´s arguments. As a reader of the debate over Intelligent Design (ID), I have noticed that proponents of ID often do not believe that biology could continue to be a pointer towards the Creator in a theistic evolutionist understanding, without design being a scientific argument. In this context, exploring combinations of design and evolution might help increase the respect proponents of ID can feel towards theistic evolutionism.[70] The idea that Darwinian evolutionary biology undermines belief in design is a common reason for laypersons to be doubtful of the theory. Dismantling the opposition between evolution as a scientific theory and design as a philosophical and theological idea would help this discussion immensely. Here literature on the epistemology of testimony is relevant. As has been noted in the literature, most of our justified beliefs come through trusting in the testimony of others.[71] Particularly when faced with issues that are unfamiliar to ourselves, we are quite reasonable to trust those who spent a great deal of time researching those same issues, and have thus become experts in that field. This is simply typically the best way to maximize our amount of true beliefs and minimize our amount of false beliefs. Therefore, it seems reasonable to argue that the agreement of most biological scientists about evolution does give laypersons a good *prima facie* reason to be sceptical of ID´s challenge to evolutionary biology. However, we are often reluctant to accept the testimony of experts in cases where we ourselves have experiences that seem to go against what those experts are telling us. For many people, the strong intuitive experience of the designedness of biology thus provides an understandable motivation to mistrust experts on the veracity of evolutionary biology. The possibility of combining design and evolution might help bypass these objections to evolution, since in this case there would no longer be such a large conflict between the expert testimony and the intuitive perception of design.

I believe the compatibility of design and evolutionary biology should also be interesting for proponents of ID. As I have pointed out in this article, there are already ideas within the ID movement which would allow for such a harmonization. This would allow proponents of ID the possibility of a fallback position if their critique of evolution turns out to fail, and would thus make the overall conclusion of the existence of some kind of purpose behind the universe more secure. If proponents of ID can accept the in principle possibility of theistic evolutionism, and the idea that the rationality of religious belief does not depend on the success of the biological design argument, then it will be easier for ID to avoid the charge that it is just a God of the gaps argument. Proponents of ID could then argue that God as Creator could have created life through fine-tuning the cosmos or through intervening in nature more directly, and that Christians are free to follow the

empirical evidence in questions of origins.[72]

Conclusion

In this article, I have analysed two different strategies for reconciling design and evolutionary biology have been proposed in the literature. The first strategy argues that design beliefs are based on design discourse and the normal functioning of religious believer´s cognitive faculties, rather than arguments as such. The second strategy argues that features of life can be used as evidence in a biological design argument. Both strategies are challenged by the idea that evolution and design are competing explanations of the same features. I have argued that defending either strategy depends on developing a model in which evolution and design are complementary explanations of biology.

Might theistic evolutionists who are so inclined still salvage something of a Paleyan vision of design? They will have to reject an overly literalistic understanding of design, and they may have to write of biological design as an indirect pointer to the Creator, but it nevertheless seems to me that such a position is at least coherent. Of course, other objections to design detection in nature remain, and the overall vision of nature as a great temple displaying God´s glory could also be defended without relying on design arguments at all. But Darwinian evolutionary biology is a popular objection, and the conflict between Darwinism and design is also at the centre of the cultural war between Intelligent Design and the New Atheism. Once we get over this opposition, there is much interesting theological and philosophical discussion to be had.

Endnotes

[1] William Paley, *Natural Theology.* Oxford World´s Classics. Oxford: Oxford University. Chapter XXVII. 2008 [1802]. I do not mean to imply that this is only Paley´s understanding of the matter. Paley was following a tradition of Christian natural theology. For example, the reformer John Calvin stated that God has chosen "so to manifest his perfections in the whole structure of the universe, and daily place himself in our view, that we cannot but open our eyes without being compelled to behold him." For Calvin, the design of the human body was a particularly clear pointer towards God. Calvin argues that this general revelation is not realized by all, however, since human sin distorts our thinking. See Calvin, *Institutes of the Christian Religion*, 51. (Grand Rapids: Eerdmans 1989). For further analysis of the natural theology of the reformation period and its differences from later versions, see Thomas Woolford, *Natural theology and natural philosophy in the Late Renaissance.* Dissertation for the University of Cambridge, Trinity College, 2011.
[2] Charles Darwin, *The Autobiography of Charles Darwin.* Ed. Nora Barlow. London: Collins, 1958
[3] Michael Ruse, *Darwin and Design: Does Evolution Have a Purpose*? (Cambridge, MA: Harvard University Press, 2003). Chapter 6. On the general topic of teleological language in biology, see Denis Walsh, "Teleology". *The Oxford Handbook of Philosophy of Biology.* Ed. Michael Ruse. (Oxford: Oxford University, 2008), 113-137.
[4] Richard Dawkins, *The God Delusion*, London: Bantam Books (2006), 139.
[5] Francisco Ayala, *Darwin's Gift to Science and Religion.* Washington, DC: Joseph Henry Press, 2007.
[6] Paley, *Natural Theology*, chapters I-VI.
[7] See Erkki V. R. Kojonen, "Tensions in Intelligent Design´s Critique of Theistic Evolutionism." Zygon. Vol. 48. 2013. 254-261. See further also Erkki V.R. Kojonen, *The Intelligent Design Debate and the Temptation of Scientism.* (London:

Routledge, 2016). Many further theological critiques of using the terminology of design could be made. For instance, it has been argued that using the word "design" makes for a too anthropomorphic conception of the Creator. It brings to mind God as a great engineer, rather than God as a ground of being who is able to support us in existence. But it seems to me that the word can also be used in a way that affirms the difference between the Creator and human designers. The doctrine of creation does also traditionally refer to God as the originator of the order of the cosmos, and here talk of design can find consonance.

[8] Charles Kingsley, *The Natural Theology of the Future*, xxvii. (London: Macmillan, 1874).

[9] Mats Wahlberg, *Reshaping Natural Theology: Seeing Nature as Creation.* (London: Palgrave Macmillan, 2012.) 182.

[10] Robert J. Russell, *Cosmology from Alpha to Omega: The Creative Mutual Interaction of Theology and Science.* (Minneapolis: Fortress Press, 2008.), chapters 7-8.

[11] I owe the differentiation between theologies of nature and natural theology to Ian G. Barbour, *Religion and Science: Historical and Contemporary Issues.* (San Francisco: HarperOne). 1997, 100.

[12] For example, objections not considered here include Humean critiques of the logic of the design argument and theological critiques of the whole project of natural theology. However, it is worth noting that for many people, these are more important reasons for rejecting design arguments than the Darwinian objections considered in this paper.

[13] See C. Stephen Evans, *Natural Signs and the Knowledge of God.* Oxford: Oxford University Press, 2010.

[14] Daniel Von Wachter, 'Defending Design Arguments Against Plantinga'. *Philosophia Reformata*. Vol. 79. No. 1. 54–65. 2014.

[15] Essays on the Intellectual Powers of Man (1785), essay V.

[16] Alvin Plantinga, *Where the Conflict Really Lies: Science, Religion and Naturalism. (*New York: Oxford University Press.) 2011.

[17] Alvin Plantinga, *Warranted Christian Belief.* (New York: Oxford University Press.) 2000.

[18] George Argyll, "What is Science?" Good Words. April 1885. 236-245, 244. Quoted in Francis Darwin, *The Life and Letters of Charles Darwin, Including an Autobiographical Chapter.* Vol. 1. London: John Murray. (1887). 316.

[19] *Dialogues Concerning Natural Religion*, part III: "Consider, anatomize the eye; survey its structure and contrivance; and tell me, from your own feeling, if the idea of a contriver does not immediately flow in upon you with a force like that of sensation. The most obvious conclusion, surely, is in favour of design; and it requires time, reflection, and study, to summon up those frivolous, though abstruse objections, which can support Infidelity. Who can behold the male and female of each species, the correspondence of their parts and instincts, their passions, and whole course of life before and after generation, but must be sensible, that the propagation of the species is intended by Nature? Millions and millions of such instances present themselves through every part of the universe; and no language can convey a more intelligible irresistible meaning, than the curious adjustment of final causes. To what degree, therefore, of blind dogmatism must one have attained, to reject such natural and such convincing arguments?"

[20] Wahlberg, *Reshaping Natural Theology.* Wahlberg makes much use of philosopher John McDowell´s ideas in elaborating his account of perception as the openness of the mind to the world, see e.g. McDowell, *Mind and World: With a New Introduction by the Author*. Cambridge, MA: Harvard University Press, 1996.

[21] For much helpful discussion of this, see Helen De Cruz & Johan De Smedt, *A Natural History of Natural Theology: The Cognitive Science of Theology and Philosophy of Religion. Cambridge*, MA: The MIT Press, 2015.

[22] Del Ratzsch & Jeffrey Koperski, "Teleological Arguments for God´s Existence." *The Stanford Encyclopedia of Philosophy*, Spring 2015 Edition.

[23] For discussion of these and other critiques, see De Cruz & De Smedt, *A Natural History of Natural Theology*; Wahlberg, Reshaping Natural Theology, chapter 6.4, Jeroen De Ridder, "Design Discourse and the Cognitive Science of Design." *Philosophia Reformata*, Vol. 79, No. 1. 37-53 as well as Aku Visala, *Naturalism, Theism and the Cognitive Study of Religion: Religion Explained?* Ashgate Science and Religion Series. Burlington, VT: Ashgate.

[24] Wahlberg, Reshaping Natural Theology, chapter 6.4.

[25] John Mullen thus argues that we can analyse the triggering conditions of our design detection and discover that the basis of this intuitive process is quite similar both in perceiving human design and in perceiving that nature is designed. See John Mullen, *Design Arguments Within a Reidian Epistemology.* Doctoral Dissertation. Nore Dame, Indiana: University of Notre Dame. 2004.

[26] Richard Swinburne, "Natural Theology, its 'Dwindling Probabilities' and 'Lack of Rapport'." *Faith and Philosophy.* Vol. 21. No. 4. 533-546. 2004. Trent Dougherty, *The Problem of Animal Pain: A Theodicy for All Creatures Great and Small* (New York: Palgrave McMillan). 2014. Chapter 4.1.

[27] Wahlberg, Reshaping Natural Theology, 173-174.

[28] This critique is also at the core of the ID movement´s critique of theistic evolutionism. See Kojonen, "The Intelligent Design Debate", chapter 10.

[29] Plantinga, *Where the Conflict Really Lies*, chapter 1. Plantinga also argues that the most that evolutionary biology can hope to demonstrate is that it is possible for life to have evolved without divine design, not that life actually did develop in this way. But demonstrating that something is possible or even not astronomically improbable is not the same as showing that this is what actually happened. Plantinga argues that if our cognitive faculties tell us that something is designed, we are justified in accepting this conclusion, even if we know that it is possible for this something to have been created without design

This response seems unsatisfactory, because Darwinian evolutionary biology is not meant to demonstrate merely that the evolution of life by natural mechanisms is not astronomically improbable. Rather, it is argued that in our kind of cosmos, it is probable for evolution to occur, and we have good evidence in favour of evolutionary explanations. Plantinga is correct that evolutionary theory is still incomplete. But to argue that evolution is not a probable explanation of life´s complexity is to side with ID theory, not with evolutionary biology. So, Plantinga´s response here does not appear to truly combine belief in evolution and design. Rather, his accounts forces one to choose between evolution and design. While evolution is accepted as a logical possibility, design, not evolution, is still the explanation that is believed to be true.

[30] David Sedley, *Creationism and Its Critics in Antiquity.* Sather Classical Lectures 66. Berkeley, CA: University of California Press, 2007.

[31] See Ignacio Silva, "Great Minds Think (Almost) Alike: Thomas Aquinas and Alvin Plantinga on Divine Action in Nature." *Philosophia Reformata*. Vol. 79. No. 1. 2014. 8-20.

[32] See Kojonen, "The Intelligent Design Debate", chapter 8 for an overview of the logic of the design argument.

[33] In the literature, there are some critics of the idea of fine-tuning, such as Victor J. Stenger, but generally the reality of fine-tuning is acknowledged by thinkers from all religious persuasions. Though some examples of fine-tuning may prove to be unnecessary for life, it seems highly unlikely that the whole phenomena will prove illusory. Evolution could not happen if, for example, there were no heavier elements, and if we did not have elements suitable to be building block of life. Victor J. Stenger, *The Fallacy of Fine-Tuning*. (New York: Prometheus Books, 2011.). Currently the best discussion of the fine-tuning design argument in the literature is Robin Collins, "The Teleological Argument: An Exploration of the Fine-Tuning of the Universe." *The Blackwell Companion to Natural Theology.* Ed. William Lane Craig & J. P. Moreland. (Malden: Wiley-Blackwell, 2012.)

[34] Collins, "The Teleological Argument", 256-262.

[35] Ratzsch & Koperski, "Teleological Arguments for God´s Existence".

[36] David Glass, "Can Evidence for Design be Explained Away?" In V. Harrison and J. Chandler (eds.), *Probability in the Philosophy of Religion. Oxford: Oxford University.* 77-102.

[37] Del Ratzsch, Nature, *Design and Science: The Status of Design in Natural Science.* Albany: State University of New York. Chapter 6.

[38] Ratzsch makes the point as follows: "*if something would constitute evidence of design in the context of some presumed gap in nature, then it will also constitute evidence of design even if the gap in question gets closed naturally"*. (Nature, Design and Science, 59).

[39] Ratzsch, *Design, Nature and Science*, 130-131.

[40] Ibid, 130-131.

[41] E.g. Stephen Jay Gould, *Wonderful Life: The Burgess Shale and the Nature of History. (*New York: W.W. Norton, 1989.)

[42] Christian de Duve, *A Guided Tour of the Living Cell.* New York: Scientific American. 1984. I owe the quote to Karl Giberson and Mariano Artigas from their book *Oracles of Science: Celebrity Scientists versus God and Religion.* Oxford: Oxford University. 32-33.

[43] Simon Conway-Morris, *Life's Solution: Inevitable Humans in a Lonely Universe.* (Cambridge: Cambridge University, 2005). Page 309.

[44] Simon Conway-Morris, "The Predictability of Evoluion: Glimpses into a Post-Darwinian World." *Naturwissenschaften.*(Vol. 96. 1313-1337. 2009.) Page 1331.

[45] Nicola Hoggard Creegan, *Animal Suffering and the Problem of Evil* (Oxford: Oxford University Press, 2013), 121. Creegan is careful to defend this only as a theological and philosophical possibility opened by the new developments, rather than providing grounds for a natural theological design argument. My analysis of the extended synthesis in this section is quite cursory. Readers looking for a deeper consideration of the impact of new developments in evolutionary biology on understanding evolution as a teleological process can consult Creegan as well as Conor Cunningham, *Darwin´s Pious Idea: Why the Ultra-Darwinists and Creationists Both Get it Wrong* (Grand Rapids: Eerdmans, 2010) and Denis Alexander, "Evolution: Intelligent and Designed." In *Intelligent Faith: A Celebration of 150 Years of Darwinian Evolution*. Eds John Quenby and John MacDonald Smith. (Winchester, UK: O Books, 2009.) 7–22.

[46] Richard Dawkins, *The God Delusion*, London: Bantam Books (2006), 139.

[47] Phillip E. Johnson & John Mark Reynolds, Against *all Gods: What's Right (and Wrong) About the New Atheists.* Downer's Grove, IL: IVP Books, 2010, chapter 4.

[48] Darwin, On the Origin of Species, (Oxford: Oxford University, 2008 [1859]), chapter VI. Jerry Coyne agrees: "It is indeed true that natural selection cannot build any feature in which intermediate steps do not confer a net benefit on the organism."(Coyne, "The Great Mutator." *The New Republic.* (June 18, 2007) Available at <http://old.richarddawkins.net/articles/1271>.) Like Darwin, Coyne argues that the existence of any such feature has not been demonstrated. Note, however, that evolutionary biology does not require all features of life to be selected for by natural selection. On the expansion of the modern synthesis, see e.g. Massimo Pigliucci & Gert Müller (eds), *Evolution: The Extended Synthesis. (*Cambridge, MA: The MIT. 2010.)

[49] Behe, *Darwin´s Black Box*, 36. In Behe´s understanding, an irreducibly complex system is "a single system composed of several well-matched, interacting parts that contribute to the basic function, wherein the removal of any

one of the parts causes the system to effectively cease functioning." There are some difficulties with the definition. For example, Behe does not appear to be assuming that all parts of the systems he describes will cause the system to lose function. Rather, he believes that each system has an irreducible core. So the definition needs some work. However, these difficulties are not in focus here.

[50] For this critique of Behe, see e.g. Kenneth Miller, *Finding Darwin´s God: A Scientist's Search for Common Ground Between God and Evolution.* (New York: Harper Perennial, 2002). 132-136. Though the co-option response is the most popular critique of Behe, this is not the only way to imagine the evolution of "irreducible complexity". For example, Allen Orr argues that the co-option scenario is implausible in many cases, and instead argues that irreducibly complex systems have evolved by adding initially useful parts which later became essential for the function. (Orr, "H. Allen Orr Responds." *Boston Review.* February/March 1997.) For further analysis of the debate, see Kojonen, The Intelligent Design Debate, chapter 4.

[51] Behe, *Darwin´s Black Box*, 66.

[52] Ibid.

[53] Ibid.

[54] Ibid. See also appendix A in Behe, *The Edge of Evolution: The Search for the Limits of Darwinism.* (New York: The Free Press, 2007.)

[55] Behe, *Darwin´s Black Box*, 112-113.

[56] Ann Gauger & Douglas Axe, "The Evolutionary Accessibility of New Enzyme Functions: A Case Study from the Biotin Pathway." *Bio-Complexity.* No. 1. 1-17. 2011.

[57] See e.g. Todd C. Wood, "Protein Evolution in Bio-Complexity." *Todd's Blog.* Available at <toddcwood.blogspot.fi/2011/04/protein-evolution-in-bio-complexity.html>. April 13, 2011. Olga Khersonsky, Cintia Roodveldt, & Dan S. Tawfik, "Enzyme promiscuity: evolutionary and mechanistic aspects." *Current Opinion in Chemical Biology.* Vol. 10, No. 5, 498–508

[58] Ann Gauger, "Natural Selection's Reach." *The Biologic Institute.* Available at http://www.biologicinstitute.org/post/42651159801/natural-selections-reach. 2013.

[59] A similar argument has also been made by Joanna Masel, "What Can Evolutionary Biologists Learn from Creationists?" Scientia Salon, 2014. (Available at http://scientiasalon.wordpress.com/2014/09/16/what-can-evolutionary-biology-learn-from-creationists/) Masel argues that creationist arguments should lead evolutionary biologists to think about some interesting features of the genotype-fitness landscape, and the possibility of evolution to cross fitness valleys.

[60] Wahlberg, *Reshaping Natural Theology*, 70-71.

[61] Ibid. Wahlberg (chapter 7) notes that speaking of God as the "designer" of biology need not imply that God is responsible for each property of biological organisms, just as a human designer of a house need not be responsible for every particular detail of how the construction work turns out. He goes on to note, however, that for some speaking of God as broadly as "creator" of biology rather than the "designer" of biology may better describe the nature of God´s involvement.

[62] Dan Simon, *Evolutionary Optimization Algorithms.* Oxford: Wiley-Blackwell, 2013.

[63] Within the ID movement, William A. Dembski and Robert Marks argue that evolutionary algorithms show that evolution can only create information when the efficiency of the evolutionary search is ensured by the engineer. So: *"In these models, careful tailoring of fitness functions that assist in locating targets is always present and clearly teleological. If these models adequately represent biological evolution, then this teleological feature of fitness ought to be preserved in nature, implying that Darwinian evolution is itself teleological."* See William A. Dembski & Robert J. Marks II, "Life's Conservation Law: Why Darwinian Evolution Cannot Create Biological Information". In Bruce L. Gordon and William A. Dembski, eds., *The Nature of Nature: Examining the Role of Naturalism in Science* (Wilmington, Del.: ISI Books, 2009). Available at: <http://evoinfo.org/publications/lifes-conservation-law/>. (Page 31.)

[64] Benjamin Wiker & Jonathan Witt, *A Meaningful World: How the Arts and Sciences Reveal the Genius of Nature.* Downers Grove, IL: IVP Academic, 2006, 242-243.

[65] On this theme see Stephen C. Evans, *Natural Signs and Knowledge of God: A New Look at Theistic Arguments*. Oxford: Oxford University Press, 2010.

[66] Ian G. Barbour, *Religion and Science: Historical and Contemporary Issues.* (San Francisco: HarperOne). 1997, 100.

[67] Alister McGrath, *The Open Secret: A New Vision for Natural Theology.* (Oxford: Blackwell.) 2008.

[68] McGrath, "Darwinism and the Divine." McGrath´s remarks about biological design as a pointer are brief, and were made in an interview. Jenny McGill, "An Interview with Alister McGrath." *DTS Magazine.* 2012. Available at <http://www.dts.edu/read/an-interview-with-alister-mcgraith-mcgill-jenny/>. Accessed on September 10, 2014.

[69] See Kojonen, The Intelligent Design Debate and the Temptation of Scientism, chapter 9.

[70] This extends the arguments in Kojonen, "Tensions in Intelligent Design´s Critique of Theistic Evolutionism."

[71] See further my previous work. Rope Kojonen, "Luottamus toisten todistukseen perustana Jumala- ja evoluutiouskolle." *Teologinen Aikakauskirja - The Finnish Journal of Theology*. No. 1. 23-37. 2015. For discussion of social epistemology in English, see e.g. Linda Zagzebski, *Epistemic Authority: A Theory of Trust, Authority, and Autonomy in Belief.* Oxford: Oxford University Press, 2012.

[72] See further Kojonen, "Tensions in Intelligent Design´s Critique of Theistic Evolutionism", as well Kojonen, "The

God of the Gaps, Natural Theology and Intelligent Design", *Journal of Analytic Theology*, vol. 4. (May 2016). On concerns of falsifiability related to such an approach, see Wahlberg, *Reshaping Natural Theology*, 191-193. My own view is that the argument could still be falsified by showing that the explanation of biological teleology is wholly immanent, based fully on contingent factors and does not even require fine-tuning.