

Kojonen's The Compatibility of Evolution and Design

with Zachary Ardern, "The Contentious Compatibility of Evolution and Design: Introduction to the Book Symposium"; David H. Glass, "An Evaluation of the Biological Case for Design"; Meghan D. Page, "Thomist or Tumblrist: Comments on The Compatibility of Evolution and Design by E. V. R. Kojonen"; Peter Jeavons, "The Design of Evolutionary Algorithms: A Computer Science Perspective on the Compatibility of Evolution and Design"; Denis R. Alexander, "Evolution, Chance, Necessity, and Design"; Bethany N. Sollereider, "Response to The Compatibility of Evolution and Design"; Mats Wahlberg, "Divine Design and Evolutionary Evil"; and Erkki V. R. Kojonen, "Response: The Compatibility of Evolution and Design."

RESPONSE: THE COMPATIBILITY OF EVOLUTION AND DESIGN

by Erkki V. R. Kojonen

Abstract. Denis Alexander, David Glass, Peter Jeavons, Meghan Page, Bethany Sollereider, and Mats Wahlberg have offered interpretations, critique, and defenses of E. V. R. Kojonen's book *The Compatibility of Evolution and Design*. Here, Kojonen responds to their comments on wideranging issues related to the teleology and evolution, from models of God as Creator to the meaning of randomness and design.

Keywords: argument from design; Darwinism; divine action; evolution; teleology

INTRODUCTION

Arguments for the existence of a designer behind nature often compare intentional design and chance as explanations. Xenophon reports Socrates as arguing as follows: "Compare things with regard to which there is no sign of what they are for, and things which evidently serve a beneficial purpose. Which ones do you judge to be the products of chance, and which of design?" (*Memorabilia*, I 4.2–7). Such arguments have a long history, with substantial variation. The argument attributed to Socrates is not identical to that of Hindu philosophers (Brown 2008), and St. Thomas'

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[*Zygon*, vol. 57, no. 4 (December 2022)]

www.wileyonlinelibrary.com/journal/zygon

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teleological argument is not quite the same as the design argument of the modern Intelligent Design movement (Koons and Gage 2011; George 2013; Newton 2014). Nevertheless, although there are many differences in design arguments throughout the ages, I believe it is plausible to see the modern debate about design arguments and creationism as continuing this ancient Greek and Roman discussion (Sedley, *Creationism and Its Critics in Antiquity*).

However, evolutionary biology is commonly seen as providing a plausible third option (in addition to chance and design) for explaining biological teleology. Darwin (1985 [1887] 87) himself argued that with the discovery of natural selection, “the old argument from design in nature, as given by Paley, which formerly seemed to me so conclusive, fails.” Nevertheless, already in Darwin’s day, others disagreed and argued for the compatibility of evolution and perceiving design in biology. Darwin’s friend Asa Gray, for example, held that evolution “leaves the question of design just where it was before [...] the issue between the skeptic and the theist is only the old one, long ago argued out – namely, whether organic Nature is a result of design or of chance” (Gray 1876, 96). Gray believed that the ability of evolution to produce complex structures like the eye is better explained by design as opposed to chance; therefore, the ordered complexity of the eye still provides evidence of design. In my book *the Compatibility of Evolution and Design* (Kojon 2021), I essentially take Gray’s side in this debate, and attempt to update his case utilizing developments in evolutionary biology, philosophy of science, and philosophy of religion. “Asa Gray 2.0” has been a convenient short way several friends have summarized the argument.

Although Darwin and others certainly presented arguments against Gray’s position (Johnson 2015), my own suspicion, after analyzing these arguments in detail, is that the abandonment of Gray-style ideas owes more to currents of intellectual fashion and the changing of the “social imaginary” (Taylor 2007) than to the failures of evolutionary design arguments as such. As Michael Ruse (2018) has argued, Darwinian evolutionary theory soon began to be used (or abused) as a kind of secular religion, which was antagonistic to ideas of divine design. The rise of the myth of a great war between science and religion, the rise of positivism, and the rise of Barthian theological critiques of natural theology also likely influenced the waning of the popularity of evolutionary design arguments. Thus, quite a bit of ground clearing needs to be done in order to reclaim the intellectual territory once inhabited by Gray. But the payoff for salvaging the biological design argument, and the idea of signs of purpose in living organisms, is also substantial. It creates new opportunities for engagement between, for example, fundamental evolutionary biology and the philosophy of religion. And it allows for defending the fundamental correctness of the human intuitive detection of design in biology, even in

an evolved cosmos. This will be of value to many ordinary religious believers, who will now not have to choose between believing in evolution and trusting in their perception of design in biology.

To help evaluate these and other ideas, I am grateful for the very constructive comments given by interlocutors at the “Nature’s Goals” workshop, held in Cambridge at the Corpus Christi college on March 15. In what follows, I will respond to each of the distinguished contributors in alphabetical order.

RESPONSE TO DENIS ALEXANDER: GROUND CLEARING AND THE IDEA OF CHANCE

Dr. Denis Alexander, known for his career as a biochemist and as founding director of the *Faraday Institute for Science and Religion*, has been one of the most prominent writers on the question of divine purpose in biology. In his own carefully argued writings on the subject, such as his “Is There Purpose in Biology? The Cost of Existence and the God of Love” (2018) Alexander has not attempted to argue for the existence of God as Creator based on the apparent purposiveness of biology. Rather, he argues for a more limited conclusion: The biological data “fits particularly well within the Christian narrative, complete with a traditional understanding of God as creator.” (Alexander 2018, 248) As he argues, features like convergence and the “sophisticated structure of the genetic code; the elegant selection of a limited repertoire of protein structures out of possible fields of trillions; the ‘arrival of the frequent’ due to physical constraints on the structure of molecules such as RNA [...] point to a high degree of organization and constraint in which molecular mechanisms are ‘steered’ along certain channels defined by the needs and challenges of being alive (and reproducing) on planet Earth.” (Alexander 2018, 139). Evolution, argues Alexander, can plausibly be understood as purposeful, although he sees this as a metaphysical and theological conclusion, rather than a scientific one. He is careful to state that his aim is not to “reinstate religious arguments derived from biological design or teleology” or to “suggest that Purpose can be inferred from biology” (Alexander 2018, 57). Rather, Alexander’s goal is to establish that the science itself does not rule out belief in purpose, but leaves the door open to theological interpretation.

Alexander’s ground clearing operation, which he continues with respect to the term “chance” in his article here, is very congenial to my argument in the *Compatibility of Evolution and Design*. I do go further than Alexander in that I defend a biological design argument as well, but I agree with him that doing this is best seen as part of the philosophical and theological interpretation of biological science. Like Alexander, I also see the idea of the incompatibility of purpose and design as philosophical, not scientific, although discussion of such ideas should be informed by science. We also

agree in having reservations about calling the evolutionary process “free,” since nomic regularity operates on all levels.

However, in his response to my book, Alexander also expresses some reservations about design arguments. I do not wish to argue merely for the compatibility of evolution and divine creation, but wish to argue that we can reasonably understand the features of biological organisms, such as the eye, to still be revelatory of their Creator’s existence and wisdom. Alexander agrees with me that nature does reveal its Creator in some way. He writes that the “beauty and complexity of evolutionary history are there for all to see and therefore accessible to all, an important point when considering the role of natural theology in initiating the pathway to saving faith.” The focus on evolutionary history here strikes me as a disadvantage of Alexander’s approach, since it seems to limit the accessibility of natural revelation just to the time after the advent of evolutionary biology. Even today, knowing about the beauty and complexity of evolutionary history requires a good deal of study. In contrast, the apparent teleology or apparent design of biological organisms is visible already on the surface level.

Despite his agreement regarding the value of natural theology, Alexander is unsure about using the language of “design” because the concept may be “too complex and multi-faceted in its biological context to communicate clearly either to the Theist-on-the-street or indeed to the average secular biologist.” He points out that given the Christian understanding of God as upholding all of creation, “assigning intentionality to one particular component of the evolutionary process rather than another becomes problematic. The system as a whole certainly displays God’s intentionality, but that does not mean that the components considered individually are intentional – there could be many different precise routes to fulfil God’s overall intentionality.” Alexander admits that it may be easier to refer to the designedness of the “overall intentions and purposes in the mind of the designer who, as ‘primary cause’, brings about a universe with the intelligible material properties that fulfil those intentions, the ‘secondary causes’.”

In response, as a Christian I agree that everything in the cosmos depends on God’s creative act and will. I even have the religious belief that the existence of us as individuals is divinely intended. Nevertheless, I would argue that some facets of the cosmos may be more revelatory of God’s wisdom and glory than others. Thus, for example, I think the possibility of evolving complex structures like the eye is better explained by the (metaphysical) hypothesis that God as a primary cause set up the process to make the evolution of such features possible, than by the hypothesis that there was no designer overseeing the process. I will return to some of the complexities in this argument, and the theological appropriateness of the term “design” further below in the other responses.

RESPONSE TO DAVID GLASS: CONJUNCTIVE EXPLANATIONS AND GUIDED MUTATIONS

David H. Glass from Ulster University is an expert on Bayesian reasoning, and has written a number of publications (e.g. Glass 2022) analyzing the features of “conjunctive explanations,” in which two or more explanations are combined to explain some phenomenon. Simplicity has traditionally been a valued feature of explanations, and thus Occam’s razor has often been invoked against combinations of evolution and design. For example, Young Earth Creationist John Woodmorappe (2000) has compared the idea of divinely guided evolution to a tractor pulled by an invisible horse. If the tractor works, then the hypothesis that an invisible horse is pulling the tractor becomes unnecessary to explain its movement. Similarly, claims Woodmorappe, if evolutionary explanations are correct, then references to divine intentionality in explaining life become unnecessary. Occam’s razor mitigates against combining the explanations, and those who want to defend design as an explanation should therefore become creationists. However, as Glass points out in his response, “while there is indeed an *explanatory cost* incurred by a more complex explanation, this can be outweighed if it presents sufficient *explanatory gain*.”

Glass’ comments on my arguments in the *Compatibility of Evolution and Design* are supportive. He states that I present “a very plausible case which amounts to showing that design provides significant explanatory gain” depending on the underlying scientific details. I argued that the biological design argument is compatible even with an understanding of evolution in which no divine interventions into the process (in the form of guided mutations, for example) are needed to explain evolution. Insofar as evolutionary mechanisms like natural selection work, this depends on features of the environment, as well as physics and chemistry that make evolution possible. I claimed that this is sufficient for the biological design argument, particularly given the scientific details of the kind of features that the metaphorical “landscape” or “library” of biological forms must have. My goal in the book was to develop a design argument that does not require guided mutations, or indeed any deviation from standard evolutionary biology on the level of biology. Secondary causation, I argued, is sufficient for the biological design argument.

However, as Glass notes, there remains disagreement among evolutionary biologists on how contingent the evolutionary process is. The discussion of how features of fitness landscapes and the landscape of biological forms influence evolution is cutting edge work in evolutionary theory, so many details remain to be worked out. It is thus important and interesting to consider what would happen, as Glass suggests, if “new evidence comes to light to show [...] that the constraints on evolution are much more limited than Kojonen has argued.” To what extent does the biological

design argument depend on the evidence for “laws of form” and similar factors influencing evolution? Glass suggests that it would be better to argue, following Gray, that the products of evolution provide sufficient evidence for design, without determining the precise process through which these features came about. Thus, the defender of the biological design argument could be satisfied with both the options of fine-tuned evolution, where evolution unfolds based on a divinely planned potential built into nature, and the divine guidance of subsequent evolutionary events, including guided mutations.

I am sympathetic to Glass’ argument: as I note in the *Compatibility of Evolution and Design*, I have no a priori theological reason not to believe that God acts in the world, including in natural history. I also think that the perception of design in biological organisms is more certain than particular theories about how the Creator brought that design about. My purpose, after all, was to argue that the evolutionary design argument affirms the fundamental correctness of intuitive human design beliefs about biology, even though acceptance of evolution changes the interpretation of the mode of design. Thus, I also do not think my biological design argument depends on the precise means God used—guided mutations would be fine, if that ends up being what best fits the evidence (and our theology of divine action). However, I still see value in formulating the design argument in a way that does not require divine interventions into the process, or the divine guidance of mutations. And for this reason, I argue that insofar as evolutionary means have been used, then these plausibly depend on divine design. Thus understood, a full step by step evolutionary explanation of features of life like the bacterial flagellum or the human eye cannot undermine the biological design argument.

RESPONSE TO PETER JEAUVONS: EVOLUTIONARY ALGORITHMS AS AN ANALOGY OF DESIGNED EVOLUTION

In *The Compatibility of Evolution and Design*, I argue that evolutionary algorithms provide both insights into the requirements that an evolutionary process must fulfil, and an interesting case of designed evolution in action. The use of such algorithms by engineers to solve some problems shows that there is no logical contradiction in a designer using an evolutionary process to reach some goal, and even that the products of such a process can still be reflective of an engineer’s intelligence. I believe that the analysis of evolutionary computer algorithms gives insights into the demanding preconditions of evolutionary processes in general, and found this so intriguing that I also took inspiration from this for the cover image of my book.

Peter Jeavons is a leading expert on evolutionary algorithms and has supervised high quality work in fundamental evolutionary theory as well. I

was glad to discover that Jeavons' evaluation of the argument is supportive, and he argues that a more detailed analysis "can help to strengthen the claim that evolutionary mechanisms generally require a considerable degree of fine-tuning." According to Jeavons, the study of evolutionary algorithms in computer science has shown that "the detailed features of such algorithms, and the environment that they work in, need to be carefully chosen and delicately balanced, in order for the outworking of such an algorithm to yield high quality outcomes in a feasible amount of time." He then argues that these results should be taken into account for the full understanding of biological evolution, and contribute to the salvaging of the biological design argument.

Jeavons' analysis of evolutionary algorithms is a wonderful example of the way new scientific work can still contribute new understanding to the old discussion of design and evolution. In addition to the work referenced in my *Compatibility of Evolution and Design*, and in Jeavons' response, relevant further research continues to be published. For example, workshop participant Ard Louis and his research group recently published research on how phenotype bias determines certain forms of RNA structures to be easier to evolve, showing that this influences evolution (Dingle et al. 2022). Theologians and philosophers should definitely take these new developments into account when considering the relationship of design and evolution. It is an exciting time to follow the development of evolutionary theory. Moreover, as Jeavons notes, these scientific questions are also interesting for other reasons: "Discovering the properties of genotype-phenotype maps is an important research question, not just for understanding the historical evolution of the biosphere, but also for understanding the processes of mutation and selection within individual organisms that drive diseases such as cancer."

RESPONSE TO MEGHAN PAGE: EXPLAINING DESIGN AND EVOLUTION

Meghan Page, a philosopher of science at Loyola University Maryland, deserves credit for bringing philosophical expertise to the science and religion discussion. Page's knowledge of the nature of scientific explanation is valuable for clarifying the debate around design as well. Before reading her comments, I already had an inkling that Page might have something critical to say, since she has described the teleological argument as one of her most hated arguments in the philosophy of religion. I was not disappointed: Page's response is the most skeptical of my argument among these, though Page does admit that the argument has some strengths. She deserves credit for the enjoyably written and well stated criticisms.

Many of the criticisms are less severe and only require clarification. For example, Page points out that "nothing in the levels metaphor suggests

that one of the levels is ‘fundamental’.” But I had stated merely that spatial metaphors make it intuitive to think that one level of reality can be dependent on a more fundamental level, not that such a dependence is a necessary part of the idea of levels of explanation. Similarly, I noted that my use of the proximate-ultimate distinction is not the same as Ernst Mayr’s. Rather, I only argued that there is relevant similarity, which I do not think is threatened by Mayr’s nonteleological understanding of ultimate causes. I make very limited use of this comparison, and I do not think much should rest on its specifics, given how much the proximate/ultimate distinction continues to divide opinion in the philosophy of biology (Laland et al. 2011; Dickins and Barton 2013).

Page goes on to analyze the examples of explanatory level-shifting further. She points out that on closer analysis, causal responsibility is typically divided and argues that this threatens the idea of simple causal chains. She presents a case where it is difficult to determine the most important cause of a death, and uses this to criticize an example of level shifting explanations in the case of a murder investigation. Similarly one might ask why a fire started, and argue that the arsonist is not solely responsible causally, since the fire would have been impossible without flammable materials, the lack of rain, lack of police intervention, and so on. However, though the difficulty of identifying the dominant cause is commonly discussed in the philosophy of causation, I do not think the existence of some difficult scenarios is a reason to think we are unable to recognize some causes as being more important in other cases.

Page goes on to analyze the example of crop circles. She takes issue with my suggestion that video evidence of a natural cause producing a crop circle would make a design-based explanation unnecessary. Page correctly points out that if we were to “see a video of a storm creating perfectly manicured crop circles—something that storms never do—[we] would want a further explanation about the very generation of the crop circles. This is precisely the sort of case that leaves an *explanandum* remainder, here the remainder being ‘why did that storm act in such an orderly way and contrary to the normal development of storms?’” Page suggests that this is actually analogous to my design argument. I agree that if we add the point that the crop circle is perfectly shaped or forms some kind of highly detailed pattern, the case becomes analogous to my argument. That said, I do think Page’s suggestion of analyzing both of these cases in terms of explanatory remainder also provides a potential way of formulating design and evolution as complementary explanations. Evolutionary biology, although it provides complete explanations on its level, nevertheless leaves some explanatory questions unanswered, such as “what explains the ability of evolution by natural selection to produce organisms possessing complex teleology?.” This can be explored in more detail in terms of fine-tuning of fitness landscapes: “why do we live in a world where evolution-promoting

fitness landscapes (and other features required by evolution) are actual, rather than one where evolution goes nowhere interesting?”

Page argues, however, that it is not clear what design is supposed to explain. She argues that Hoosier cavefishes, blind fish that have their anus on their forehead instead of eyes, call into question the idea that evolution is ordered towards a purpose. This is because, Page claims, Hoosier cavefish do not in her view plausibly exhibit “property D” (complex teleology or other features of organisms that act as markers of design in the biological design argument). Or if they do, then “I find it quite hard to make sense of what, precisely, property D is.” She further argues that the hypothesis of designed evolution does not explain the Hoosier cavefish’s particular properties, whereas evolution by natural selection does. The cavefish’s loss of eyes and the migration of the anus to the forehead exist due to particular historical circumstances, rather than a design plan. She appears to assume that either all properties of biological organisms must be better explained by design, or none can: “For Paley and Kojonen, presumably it is the purposiveness of nature that should force our hand towards design. But if we take homo sapiens and Hoosier cavefish to both be products of evolution, we have no reason to posit that evolution is directed towards one rather than the other. And while homo sapiens may seem like a reasonable ‘purpose’ for a designer to pursue, the Hoosier cavefish does not.”

However, as I discuss in *The Compatibility of Evolution and Design*, the argument for designed evolution does not require that all features of biological organisms are equally part of a design plan or equally revelatory of design. Even Paley (2008 [1802] 38) allowed that warts and moles, for example, are not evidence of divine design. The ability of evolution to create beautiful and complex functional structures like the eye is best explained, I claim, by positing that the process was designed. Such evolution, I argue, plausibly depends on designed preconditions, just as the evolutionary algorithms discussed by Jeavons depend on design. Similarly, the ability of organisms to endlessly adapt to different ecological niches is, I think, better explained as a divine gift than a happy accident. However, this does not require that the loss of eyes needs to be equally great evidence of design as the evolution of the eye. Moreover, the whole point of the book is to argue that design does not need to replace or compete with evolutionary explanations for features of biological organisms. Thus, there is no necessity to explain the features of the Hoosier cavefish, for example, without reference to their evolutionary history. The appropriate question is not “did this arise by designed evolution or natural selection?,” but rather “does natural selection really give a full explanation here, or can it reasonably be supplemented?”

RESPONSE TO BETHANY SOLLEREDER: THE POSSIBILITY OF
INTUITIVE ERRORS AND THEOLOGICAL METAPHORS OF DESIGN

Bethany Sollereeder, currently *Lecturer in Science and Religion* at the University of Edinburgh, has written on many topics relevant for my book, such as on the evolutionary problem of evil, theodicy, models of divine action, and even on Asa Gray's correspondence with Charles Darwin (Sollereeder 2010). I was glad to read her assessment that "Kojonen succeeds, in my view, in his attempt to salvage the boat of biological design from the obscurities of history and to show its compatibility with contemporary evolutionary theory. He has ably updated the argument to encompass new science and other developments in the design debate such as Intelligent Design Theory." However, in the spirit of constructive criticism, Sollereeder presents three main issues that should be taken into account in developing the argument further. I will now respond to these.

First, turning to science, Sollereeder points to the possibility that, due to future discoveries, "the proud ship of biological design would be consigned once again to the bottom of the sea." She references Stephen Freeland's (2011) article criticizing the arguments of Intelligent Design proponents on the origins of genetic information. Freeland juxtaposes natural processes and design as explanations, and argues that biology does not need interventions by a designer to explain the origins of information. Rather, the information can be understood to derive from the environment. Sollereeder suspects that this line of argument, if it proves to be correct, may lead to seeing biological "design" as an inevitable result of the fine-tuning of physics and chemistry. It could also, argues Sollereeder, undercut "the idea that there is any design in life that is separable from or in addition to any possible design in the general physical laws. Freeland disagrees with the idea that life is more complex and ordered than the non-living environment. For him, life is far simpler – it is a distillation of surrounding information." The conclusion, then, is that there is little place for a biological design argument in distinction from the more general fine-tuning design argument.

However, in my view, Freeland's work is quite consonant with the kind of argument I am making. As noted, my version of the design argument does not require the failure of natural explanations for events like the origin of life. It also does not require indeterminism in evolution—in my view, the biological design argument would work quite well on the supposition that evolution and biology are simply expressions of the environment. As I write in the *Compatibility of Evolution and Design*, on such a view, "in effect, biological organisms become the metaphorical icons of the temple of nature, which best manifest the inbuilt potential of the entire cosmos, and thus also manifest the wisdom of the Creator [...] the remarkable fine-tunedness of the cosmos can be better appreciated through

observing the marvelous products of that cosmos. The cosmos must be special indeed to allow for the evolution of the kind of complex teleology and the large variety of creatures that we observe.” (Kojonen 2021a, 162) It is true that, in my view, the design argument does imply that biological organisms are a better manifestation of the fine-tuning than rocks, for example. But this seems compatible with Freeland’s idea that organisms receive their information from the environment over the very long and complex process of biological evolution. Also, as Mats Wahlberg noted in his response, such fine tuning would go beyond the standard cosmological fine tuning argument.

Second, Sollereder turns to psychology. In the *Compatibility of Evolution and Design*, I presented two different ways of understanding how biological nature could be revelatory of the Creator. First, humans could, as Ratzsch (2003), Plantinga (2011), and Wahlberg (2012) have suggested, be equipped with a perception-like capacity for recognizing marks of design, which then triggers in the case of biology. We could then be rational in trusting the veracity of these beliefs, until we find a defeater, just as we do with the other beliefs produced by our senses. Second, the features of biological organisms could provide evidence that is best explained on a worldview which includes a designer of the evolutionary process. Evolution has been suggested as a defeater in both cases. Perhaps evolutionary biology could show that the seemingly designed features of organisms in fact do not require design, and so undercut these arguments. The bulk of my book is then focused on these evolutionary objections, although I do also consider some other objections, such as those presented by Hume and in the cognitive science of religion (on these see also Kojonen 2021b).

Sollereder points to the possibility of errors as a potential undercutting defeater for the reliability of perceptions of design in biology. Her chosen example of the unreliability of our faculties is *pareidolia*, seeing faces in inanimate objects. In order to undercut the rationality of trusting in design perceptions, it seems to me that we need more than just the possibility of error. None of our capacities, from memory to sense perception, are free from error in all cases, so if the possibility of error were sufficient to undercut our reliance on them, we would end up in full blown skepticism regarding all our knowledge, not just design arguments. Thus, the example of *pareidolia* is not, in my view, a sufficiently weighty example of error to undercut all reliance on our intuitive or perceptual beliefs. Moreover, it is not clear to me that Sollereder’s examples of *pareidolia* even are examples of errors. Seeing such pictures, I think most people will form the correct conclusion that the patterns merely *look like* faces, rather than thinking that these are the faces of actual persons. Nevertheless, whether design beliefs really are perceptual or produced by a natural capacity are interesting questions, to be studied further—an issue also dealt with in Wahlberg’s response here.

Third and finally, Sollereeder turns to the question of theological metaphors. She argues that “metaphors in the design argument have become overwhelmingly mechanical and lifeless, and that this can lead arguments down absurd paths.” One example of an absurd path would be the idea that suffering in nature could be justified by a utilitarian calculation, where the good in nature outweighs the bad. Thus, “by starting with an unhelpful metaphor of God or thinking too much in terms of a single metaphor of God, theodicy becomes entangled in an impossible mess, trying to calculate the incalculable.” In the *Compatibility of Evolution and Design*, I suggested that design-language need not be understood to imply a simplistic mechanistic worldview. Rather, we could think of the world as a designed house, temple, a garden or a kingdom, for example. However, Sollereeder argues that “these are still very deterministic analogies, which point towards control, productivity and engineering.” She draws on tradition and feminist scholarship to suggest intriguing alternative metaphors, such as the cosmos as an egg, a womb or the body of God. This would, suggests Sollereeder, mean that design in biology need not mean “engineering” or “coding” but could rather refer simply to “having an aim or an intention”—the desire of love and the gift of being.

I find Sollereeder’s suggestions for alternative metaphors intriguing and worthy of further research. Design arguments have a long history, and I see no necessity in thinking of design only in terms of machine metaphors, as important as those have been historically to biology. I do continue to find metaphors from engineering and coding useful as well to convey facets of the complexity of biology and the way designers can work through secondary causes. However, it does not seem to me that the use of analogies with machinery requires reducing life or morality to mere machinery or utilitarian calculations. Design arguments are far older than Paley, and have been proposed in a number of different cultures with different metaphysics and morality. It seems to me, for example, that a very similar design argument could also be made from a Thomistic hylomorphist perspective (Koons & Gage 2011; George 2013). The place of the idea of design in a theology of nature remains an interesting topic for further discussion.

RESPONSE TO MATS WAHLBERG: PERCEIVING DESIGN AND DIVINE RESPONSIBILITY

Mats Wahlberg, associate professor of systematic theology at Umeå University, has written one of the works inspiring my own book, *Reshaping Natural Theology: Seeing Nature as Creation* (Palgrave 2012). Wahlberg is currently the leader of a research project on evolutionary theodicy, funded by the John Templeton foundation. In his response, he presents a perceptive and helpful analysis of the book’s structure and remarks regarding the problem of natural evil, meant to further contribute to the case for

compatibility. Commenting on the worry that the biological design argument might collapse into the cosmic fine-tuning argument, Wahlberg points to the argument (in chapter 4 of the *Compatibility of Evolution and Design*) that “evolution in fact has very demanding preconditions and requires more precise fine-tuning of basic laws than the mere existence of a stable universe with planets and life-permitting conditions requires.” Moreover, as Wahlberg summarizes, “if it is reasonable to believe that evolution has produced complexity as a result of designed preconditions, then it follows that it is reasonable to believe that biological complexity is (indirectly) designed.” He also helpfully argues that “a person is rationally entitled to take her putative perceptions of design in nature as veridical as long as she has no good reason to question their reliability.” We are in agreement with Wahlberg that since evolution is not a defeater of the claim that biological organisms are designed, or the claim that design can be perceived in living organisms, then evolution, at least, does not give a rational reason for doubting design perceptions in nature.

Wahlberg then goes on to analyze the relationship of the evolutionary biological design argument with the problem of natural evil. In my treatment of the issue in chapter 5.3 of *The Compatibility of Evolution and Design*, my goal was to argue that the biological design argument does not make the problem of evil any worse than it already is, and that the defender of the BDA can appeal to the same theodicies commonly used in the literature. In the literature, some have suggested that the BDA is incompatible with theodicies appealing to evolution as a free process. In such theodicies, the claim is that evolution is in some way free to create outcomes not intended or designed by God, and that the value of evolution as a free process justifies God in allowing the evolution of harmful or repulsive animal behaviors such as parasitism. I expressed reservations about this approach related to the concepts of divine responsibility and the “freedom” of a non-sentient and constrained evolutionary process. Nevertheless, I argued that in principle, the proponent of the BDA could also admit a great deal of freedom in the evolutionary process, since the argument does not require divine determinism of evolutionary outcomes.

Wahlberg argues that the evolutionary problem of natural evil can be tackled without invoking the concept of the freedom of evolution and without limiting divine causal control of evolution. Wahlberg’s argument is based on the classic scholastic distinction between what God causes as an intentional outcome, and what God foresees and accepts. In the Thomistic understanding of God, God causes everything, since all secondary causes depend on God, but everything is not equally intended by God. Wahlberg spells out the argument in the case of evolution by arguing for the importance of creaturely autonomy, instead of freedom. According to Wahlberg, it is plausible that “an autonomous creation is more valuable than a non-autonomous creation, and creation’s autonomy

presupposes that God's causal influence over it respects the inherent natures and natural tendencies of things." Thus, God's control of the evolutionary process would be expected to respect the inherent natures of creatures, and thus, "many of the things that God causes through the mediation of secondary causes need not be directly intended by God. For example, when God causes hedgehogs to walk across roads in their natural slow pace, he knows that this will mean that many of them will become traffic victims. Nevertheless, what he intends is not that those hedgehogs be traffic victims, but rather that hedgehogs in general act out their nature as the kind of slow-moving animals they are." Similarly, insofar as God wants to create through evolution, he must endow all species with the tendency to act for their own survival and to maximize their chances of reproduction. This will then cause creatures to exploit ecological niches that "appear malicious or unsavory to us."

As Wahlberg notes, I come very close to this idea in the book, in arguing that "the prospect of evolving parasitism and predation is an inevitable by-product of the way the 'library of forms' must be designed in order to allow for evolution at all" and that "It may be logically impossible to design a library of forms that would allow for evolution without also allowing for the evolution of parasitism and predation, while also giving some room for chance within the creation" (Kojonen 2021a, 191). The only part of this Wahlberg objects to is the bit about chance: as Wahlberg notes, that some event is a coincidence does not yet remove divine responsibility or divine control. Instead, he argues that the autonomy of creatures to act according to their own natures—to seek to survive and reproduce—will lead them to occupy different ecological niches and thus explore the "library of forms." Although it still leaves further questions to explore, it seems to me that Wahlberg's proposal is more promising than the free process defense. In *the Compatibility of Evolution and Design*, I also argued for the compatibility of chance and divine control, and noted the difficulty of removing divine causal and moral responsibility for the outcomes of evolution. Nevertheless, I still want to emphasize that the biological design argument itself is compatible with a variety of views of divine action in nature, including views which deny exhaustive divine control over the evolutionary process.

CONCLUSION

The assumption that evolutionary biology and biological design arguments are in conflict continues to be influential not only on the popular level, but also in the science and religion literature. Design arguments are commonly thought to require the intervention of God into gaps in natural processes, setting up an opposition between nature and grace. Yet the arguments for incompatibility are not as strong as commonly assumed,

and the negation of design arguments should not be understood as a part of evolutionary biology. Rather, both claims, whether incompatibility or compatibility of design arguments and evolution, are fundamentally philosophical in nature. *The Compatibility of Evolution and Design* presents a case for compatibility, throwing the challenge to those who continue to defend incompatibility. But the argument also presents the opportunity to free design discourse and design arguments from being shackled to the creation-evolution controversy. Neither evolutionary biology nor strong design intuitions are about to disappear, so it seems to me that there should be plenty of value for many people in an account of the compatibility of evolution and design.

I was greatly encouraged by the comments of the participants in this discussion of the book. The pushback against design arguments mostly related to concerns about design arguments in general, rather than about the compatibility of design arguments and evolution as such. The participants' many supporting, constructive and critical remarks showcase the potential for further fruitful discussion of issues related to design and evolution. I hope the coming years will allow for interdisciplinary work following up on these ideas. For example, scientifically, I believe this account of design could motivate further research into questions regarding the fine-tunedness of the genotype-phenotype map and fitness landscapes. Moreover, my own analysis focuses on the evolutionary mechanism of natural selection working on "random" mutations, since this has been the traditional basis of arguments for incompatibility. But with the extended evolutionary synthesis, the role of other explanations of evolution has arguably become greater, so there is room to analyze these in a teleological manner as well. The issue of the origin of life in relation to teleology also remains open for further exploration.

From the side of theology, I believe work could be done, for example, in relating particular design arguments with historical metaphysics and theology further. Why should we be content with just machine metaphors, as useful as they are, when the riches of historical theology are there to be applied to this issue? I see design discourse even as an area with potential for fruitful interreligious dialogue, comparing the design arguments of the likes of Maimonides, John of Damascus, al-Ghazali and Udayana. The old issue of the relationship between creaturely autonomy and divine action in evolution remains intriguing, although I see much leeway for proponents of design arguments to adopt different theories of the matter. Moreover, new developments in evolutionary biology also open up new ground for science engaged theology to occur. For example, the idea of a "library of forms" underlying the possibility of evolution seems (to me) to cry out for analysis in relation to theological ideas like St. Maximos' "logoi" underlying creation's order. As evolutionary science and the philosophy of biology continue to develop, there continues to be need for further theological

engagement with the ideas of these disciplines. I believe the contributions of my respondents here show many directions for potential further work, and thus wish to once again thank all participants for this stimulating discussion.

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