# RESPONSE

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First, thanks very much to my commentators and interlocutors, and to the editors of the *European Journal for Philosophy of Religion*. I'm delighted to be a part of this symposium.

## AD MONTON

I'll start with some comments on Bradley Monton's stimulating piece. There is much to talk about here, but I'll concentrate on just three topics: 'Methodological Neutralism', 'Anti-realistic Science', and 'Simulation Science'.

'Methodological Neutralism', as Monton conceives it, consists of two parts: First, when giving arguments for or against research programmes, one should not assume the truth of one particular research programme – the arguments should strive to be neutrally evaluable by proponents of any research programme. Second, the neutrally evaluable arguments one should give should be scientific arguments (p. 49-50).

I'll comment just on the first part.

Christian scholars or scientists, I believe, should think of themselves as addressing at least two different audiences: on the one hand, the *Christian* scholarly or scientific community, and on the other hand the scholarly community at large. That is because Christian philosophers or scientists (more exactly, perhaps, the Christian philosophical or scientific community) should engage in two different projects. One project involves starting from, assuming, taking for granted the whole Christian story, and then working at the relevant philosophical or scientific questions from that perspective. Another way to put this: in any scholarly project, there is the relevant 'evidence base', as I call it: the

set of propositions to be taken for granted and appealed to in conducting the inquiry in question. I was thinking that for the project of Christian philosophy ('Augustinian Philosophy', as we could call it), the evidence base would include the main lines of the Christian story. (Here Monton (p. 45) slightly misunderstands me: he takes me to be suggesting that the evidence base for Augustinian philosophy will include the *evidence* for Christian belief; I was taking it to include Christian belief *itself*.)

My thought is that the intended audience here would be the Christian philosophical community, or the Christian academic community, or perhaps the Christian community as a whole; this would be fundamentally an *intramural* project. Of course others not within the walls might find these discussions of interest, and of course they would certainly be welcome to follow the discussions, and make their own contributions if they wish. But the intended audience is other Christians – maybe Christian philosophers, maybe Christian academics generally, maybe Christians generally. In *that* context, I should think it would be perfectly appropriate to assume the truth of a particular research program, or at least to assume the truth of Christian belief. I should think the same would go for atheists: they too could sensibly address some of their arguments and discussion just to other atheists. Again, non-atheists would presumably be welcome to listen in on the conversation, and even make their own contributions to it (as long as they didn't behave like trolls); but the fundamental audience would be other atheists.

Monton speaks of 'competition between research projects', and he thinks of Christian scholarship as a 'degenerating research project', which suggests that it is losing out in this competition. I'm not entirely sure how to understand this. Is the idea that we (we human beings) who engage in *different* research projects are also engaged in the *common* project of seeing which program will win? (What would constitute winning or losing?) I think another appropriate project here, for followers of any of the 5 projects he mentions, would proceed in a slightly different direction. Suppose I am convinced that Christianity is true (or, for that matter, that naturalism is true). I may then want to learn more about my world. In so doing, I will presumably want to use all that I know or think I know. So if, as I see it, I know that Christianity (or naturalism), is true I will include Christian belief (or naturalism) in the evidential base for the inquiries I carry out. Now under Monton's suggestion, I might do the same thing. I will have an evidential base for my inquiries, and if I am pursuing a Christian, (or naturalistic) project, my evidential base

for that project will include Christian belief (or naturalism). But I get the impression Monton thinks my aim (one of my aims?) in so doing is to take part in a sort of mega-project – trying to see which projects are degenerating and which project is the winner.

Perhaps this would be in the same spirit as the following. Monton mentions Thomas Nagel's suggestion for a research project as an alternative to Augustinian science and naturalistic science: Monton calls it 'teleological science'. Now Nagel is a bit hesitant and tentative about this alternative – or if *he* isn't, someone else might be. Such a person might be interested in working at this project, in part, as a means of coming to a judgment about the viability of its underlying metaphysical underpinnings. A naturalist or an Augustinian Christian might do the same sort of thing: work at naturalistic science or Augustinian science in the interests of coming to decide whether or not to adopt, or stick with, or reject the underling metaphysical underpinning – in the case of Augustinian science, Christian belief, and in the case of naturalistic science, naturalism. This seems to me to be very much in the spirit of Monton's suggestion.

Once again, however, there is quite another spirit in which to engage in such a program: you might be convinced that the underlying underpinning is correct. You might not be trying to discover *whether* it is, or to discover evidence for or against it; you might instead start from the assumption that it *is* correct, and try to learn more about the world, assuming that this perspective is correct. I think this is in fact how many naturalists do approach naturalistic scholarship. They are completely convinced of the truth of naturalism, and engage in scholarship, not to confirm or reject naturalism, but just to learn more about what the world is like, taking for granted that naturalism is the truth of the matter. (Of course this doesn't imply that a Christian or naturalist who adopts this posture would refuse to consider potential or actual defeaters of the metaphysical underpinning in question.)

The point would be this: in arguing against other projects, you could be addressing others who share your basic commitments; and in so doing you could perfectly sensibly presuppose the truth of your basic commitments. So my main point here, again, is that a Christian or naturalist scholar is a member of several different communities, and properly takes for granted different commitments in addressing these different communities.

In conclusion, a comment or two on a couple of the other large research programs Monton identifies. First, antirealist science. I said one sort of stance someone who pursues one of these programs might take, is that of assuming that the metaphysical foundation in question is correct or true, and then trying to learn more about the world, taking for granted the truth of that metaphysical foundation. But how would this work for antirealism? Monton doesn't identify the variety of anti-realism he has in mind; I take him to be thinking about *anti-realism with respect to truth*, the idea that there really isn't any such thing as truth understood the common sense way, as independent of what we think and how we act (at least for truths that aren't about what we think and how we act). Such anti-realisms tend to follow Richard Rorty in taking truth to be a social construction of some kind, in Rorty's words, 'what your peers will let you get away with saying'. How could we think of science or scholarship from this perspective? Would it be a matter of trying to find out what truths we have constructed in various areas? And would the truths about what truths we've constructed in various areas themselves be socially constructed, constructed by us? If so, is that a problem?

Second, simulation science. Apparently some people seriously believe we are (or at least might be) existing in, or living in, or elements in, a computer simulation (the 'simulation hypothesis'), where this simulation is perhaps being run by scientists from some advanced civilization. Perhaps these scientists are running computer simulations of entire universes, and you and I are people in such a universe. But what does this mean, and what would it be like to conduct science from this perspective?

First, what exactly is a computer simulation? What is its ontological status? Well, perhaps it's an event of a certain kind, an event consisting in the running of a program on a computer. And what sort of thing is a computer program? Something like a set of instructions to a computer, perhaps in a computer language like Fortran. We can think of that language, like other languages, in various ways – as sequences of abstract types, or as physical exemplifications of such types; but in any event the program is such that running it on a computer results in the computer's behaving in a certain way, doing the various things specified by that program. The running of such a program would presumably be a complex event – an event consisting in the occurrence of many component events or subevents. And if I am an element in a computer simulation, if I am an element in such an event, I am presumably then

myself an event. What kind of event? Presumably some kind of pattern of electrical activity – not an abstract pattern, but the exemplification of such a pattern in the activity of a concrete computer. It looks as if (on the simulation hypothesis) I would have to be an event consisting of the instantiation of certain patterns of electrical activity.

But is that the sort of thing I could be? I can think about the moon and make decisions; I can love and hate. Could a pattern of electrical activity do these things? It's hard to see how. Further, events seem to have essentially properties of the sort I seem to have accidentally. An event with which I am identical would have to consist in very many subevents – roughly 80 years worth. Now I could have died and gone out of existence at the age of 5 (I do accept the Christian hope of immortality, but that this hope is fulfilled is contingent). If I were an event, therefore, it would have to be possible for that event to exist even if very many of its subevents – presumably *most* of its subevents – had not existed. That seems to me to be false: events that consist in other events have essentially the property of consisting in those other events.

But perhaps the crucial factor here is the following.[1] Consider a simple simulation of a traffic accident: I say, 'Here's the black Buick' (holding up the salt shaker) and 'Here's the red Nissan' (holding up the pepper shaker); and 'Here's how they collided' (moving the salt shaker from left to right and the pepper shaker perpendicular to the path of the salt shaker). In the same way, a more elaborate representation of a Civil War battle might employ toy soldiers and toy cannons to represent the two armies and their armaments, maybe a light bulb to represent the sun (if the sun's light and direction was a factor in the battle), and perhaps still other objects. The key point here is that we use these things of one kind to *represent* things of another, in order to learn or demonstrate something about those things of the second kind.

And isn't this how it is with a computer simulation? We get the computer to do various things; we then take some of those events to represent a tornado and what the tornado does. But of course nothing the computer does actually is or generates a tornado.

Similarly, if these advanced alien scientists are running a computer simulation of a universe, they will take various activities of the computer to represent elements in a universe – you and I, perhaps. Naturally enough, however, these activities will not actually *be* or *constitute* you or

[1] My thanks to Harry Plantinga and Del Ratzsch for help here.

I or anybody else. So I don't see how you or I could be part of a computer simulation, although of course there could be computer simulations elements of which represent us, and represent us as doing this or that.

One final point. Suppose I *do* wind up thinking I am an element in a computer simulation. Now in such a simulation, the programmer gets to decide what happens. So if I am an element in a simulation, the programmer could be deciding what I think and whether I form true beliefs. Now suppose all I believe on this topic is that I and the rest of us are elements in such a simulation: I have no beliefs on the question of whether our programmer has made it the case that our beliefs are for the most part true, or whether our cognitive faculties are reliable. If I ask myself about the probability that our faculties *are* reliable, I'll presumably think it's pretty much an even bet. But how, then, should I think about the scientific enterprise? Suppose I think the aim of science is to learn about and discover truths about the world. Given that my beliefs are as likely to be false as true, I should presumably think this effort to discover truth is fundamentally futile. And even if I follow van Fraassen and think of science as an effort to come up with empirically adequate hypotheses (whether or not they are true), I'll have the same problem: my beliefs about whether a given hypothesis *is* empirically adequate are as likely to be false as to be true. So won't I properly think the whole scientific enterprise is an absurd undertaking, a fool's errand, a snipe hunt? Of course the same considerations apply to my reflections about the feasibility of the scientific enterprise, and to my reflections on *those* reflections, and so on. I have a sort of defeater for the whole intellectual or cognitive enterprise, and a defeater for *that* defeater, and a defeater for *that* defeater ...

The moral: if I think I am an element in a computer simulation, then (given that I do raise the question of the reliability of my cognitive faculties) I'll be able sensibly to engage in science only if I also think that the programmer (the Programmer?) has given me for the most part reliable faculties.

## AD VAN WOUDENBERG

I turn next to Rene van Woudenberg's careful and fruitful investigation of some of the meanings of the word 'chance', and how chance and design are related. As far as I can see, what van Woudenberg says is correct. That leaves me, as a commentator or respondent, in something of

a quandary; a responder is supposed to take issue with at least something the respondee has said. Since I am a follower of William of Ockham (*discidia non sunt multiplicanda praetor necessitatem*), I will not invent a disagreement, but instead talk about a couple of other issues with respect to chance and design.

In 'The Place of Chance in a World Sustained by God',[2] Peter van Inwagen suggests that a chance event is one that is not part of anyone's plan; it's an event that hasn't been planned or intended by anyone. Now van Inwagen's ideas as to what God's plan includes are rather restrictive. As he puts it, God's (eternal) plan is the sum total of what God has unconditionally decreed. And he suggests that very often God intends a certain result to occur, unconditionally decrees that it occur, but doesn't care in which particular *way* it occurs. Thus perhaps God intends that I have hair, or even a lot of hair, but doesn't care about the precise number of hairs I have. Perhaps the fact is I have 132,241 hairs on my head at present. If it isn't part of God's plan that I have that many hairs on my head at present, then that I *do* have that number of hairs now is a matter of chance (assuming that it wasn't part of anyone *else's* plan that I have 132,241 hairs). Van Inwagen also suggests that it may be a matter of chance that there be human beings. No doubt it was (is) part of God's plan that there be rational free creatures capable of loving each other and loving him: but perhaps God didn't care precisely what form such creatures would take. Perhaps dolphin-like creatures (or maybe even crocodilians?) would do just as well as hominids. Similarly, someone's dying in a car accident could be a matter of chance: perhaps it is not part of God's plan that Alice die in this way; assuming that it is not part of anyone else's plan either, that death would be a matter of chance. (Of course in another sense of 'chance' it might not have been a matter of chance: there might have been an explanation in terms of failed brakes, excessive speed, inattention and the like.)

Now if God intends that I have a lot of hair, then that I have a lot of hair is not a matter of chance; God unconditionally decrees that I have a lot of hair. What sort of form would such a decree take? Van Inwagen suggests that God might issue *disjunctive* decrees. He might say: *Let it be that A or B, and I really don't care which*. Perhaps God can also issue *indeterminate* or *vague* decrees: *Let it be that Alice have a lot of hairs, but*

[2] In *God, Knowledge, and Mystery: Essays in Philosophical Theology* (Ithaca: Cornell University Press, 1995), pp. 42-66.

*I don't care just how many (or how long)*. (This would be a vague decree, in contrast with a disjunctive decree like *Let Alice have n or n+1, or n+2, or ... n+n hairs*.)

These possibilities raise the question of what we might call *deep* chance. Suppose at creation God decrees: *Let there be about* $10^{80}$ *elementary particles, but I don't care exactly how many.* Now suppose exactly $10^{80}$ plus 17 show up. Then that there are just *that* many particles is a matter of deep chance. There is no explanation of it at all; it can't be explained in terms of earlier occurrences in the world, obviously, and also not in terms of God's will or decree; it simply happens, with no cause (i.e., there being *that* many as opposed to three fewer has no cause). Deep chance, so specified, stands in contrast to the sorts of chance van Woudenberg mentions. And of course an event's happening by deep chance is incompatible with its happening by design.

But is deep chance really possible? That's a good question. Leibniz, certainly no slouch, would have thought not – deep chance would violate the 'Principle of Sufficient Reason'. If there were such a thing as deep chance, furthermore, would it be *necessary* that there is? Presumably not: presumably God was not obliged to create anything at all; and if he had not created anything, there would have been no deep chance events. Would deep chance be inevitable if God did create? Again, presumably not: God could have issued maximally specific decrees, in which case there would again be no room for deep chance. Would deep chance be inevitable if God created free creatures – free human beings, for example?

As far as I can see, this too would not guarantee deep chance, at least if we make a small clarification or addition to van Inwagen's definition of chance. For suppose I freely buy a horse. Then God doesn't decree that I buy a horse, so that my having a horse is not part of God's plan. On the other hand, it's no part of *my* plan that, e.g., this horse's maternal grandfather preferred clover hay to alfalfa. So consider the conjunctive state of affairs consisting in my owning a horse whose maternal grandfather preferred clover to alfalfa hay. That state of affairs is not as such part of God's plan, and also not as such part of my plan – or presumably anyone else's plan. Nevertheless, of course, it might have been part of God's plan that this particular horse – call it 'Sam' – have a maternal grandfather of that sort. Hence, if we think of this state of affairs as a conjunctive state of affairs, one conjunct is part of my plan and the other part of God's plan. The definition of 'chance' should be such as to exclude such event or states of affairs as chance events.

Now return to the question of divine disjunctive decrees, and suppose God, as Christians think, is omniscient. Add that omniscience includes knowing what would happen if God issued a disjunctive decree: if God issued the decree

*Let it be that A or B, and I don't care which*,

God would know which of A or B would occur or be actual. (This sort of knowledge – knowledge of chance counterfactuals – would go middle knowledge one better). Suppose what God knows is that if he issues that decree, it is A that would occur. Under those conditions, would there really be any relevant difference between God's issuing the decree

*Let it be that A or B, and I don't care which*

and his issuing the decree

*Let it be that A*?

I'm not sure what to say here. If God knows that if he issues the disjunctive decree, it is A that will be actual, then if he *does* issue that decree, would it not be the case that he intends A? And if he intends A, will it not be the case that A does not occur by chance?

I'm not sure what to say; therefore I will leave this question as homework.

## AD HALVORSON

As far as I can see, Hans Halvorson and I have little to argue about. He comments on four issues; I'll say just a bit about each of those comments.

First, he says, 'Plantinga indicates that if God acts in history, then the laws of physics are not deterministic. But from the point of view of Reformed epistemology, the character of the law of physics should be irrelevant to one's warrant for believing that God has acted.' 'God has acted'; here I was thinking of 'special' divine action: i.e., action that goes beyond creation and conservation; so think of God's acting in history as special divine action. Miracles would be an example. Now Halvorson says that according to me, if God acts in history (if God acts in a way that goes beyond conservation and creation) then the laws of physics are not deterministic. I didn't intend to say that, and I'm inclined to doubt that it's true. First, what is it for the laws to be deterministic? Presumably the issue, here, is the issue between classical mechanics and quantum theory: a law is deterministic just if, given the appropriate input, the law's

output is a *particular* outcome – rather than, as in quantum mechanics, a distribution of probabilities over possible outcomes. But as far as I can see, it's entirely possible both that God acts specially in the world and that the laws have this deterministic character. The reason is that, as I see it, the natural laws should be thought of as with a proviso, so that the form of a law is

> When God is not acting specially in the world, *p*

where *p* would be the usual formulation of the law; for example,

> When God is not acting specially in the world, total energy is conserved.

But then of course special divine action is perfectly compatible with the laws being deterministic; for any time at which God acts specially is a time at which the antecedent of the laws is not fulfilled. So understood, the laws say nothing about what happens when God *is* acting specially in the world; hence they can hardly be taken to imply that God does not act specially in the world. Another way to put it: the laws, so conceived, do not themselves entail that their antecedents are satisfied.

We might ask instead whether special divine action is compatible with *determinism* (as opposed to the proposition that the laws are deterministic in the above sense). How shall we think of determinism? It's quite common, nowadays, to define determinism as the following proposition: given the natural laws and a true statement completely describing what happens at a particular time *t*, what happens at any other time *t** deductively follows:

> (D) For any times *t* and *t**, a complete description of the state of the universe at *t* conjoined with the natural laws entails a complete description of the state of the universe at *t**.

Let's take (D) as our account of determinism. Now I think we can see that determinism, thus specified, is compatible with special divine action. For suppose some form of occasionalism is true, so that God causes whatever happens in the (physical?) world. Then God's actions would certainly go beyond creation and conservation; but determinism (as specified by (D)) might still be true. For suppose the laws are true universal generalizations describing God's action in the world; it could be that these generalizations are rich enough so that their conjunction with a complete description of the universe at a time t is sufficient to entail a description of whatever happens at any other time. But then

determinism in the sense of (D) would be true, and it would also be true that God acts specially in the world. So determinism and divine special action are compatible.

Why is it tempting to think that determinism and special divine action are not compatible? I think this temptation arises from the following picture. Think of the world as something like a vast machine created by God, and created in such a way that it evolves according to laws that God sets for this vast machine. These laws therefore determine what happens in the universe. God upholds the universe in existence; but he doesn't, or at least ordinarily doesn't, directly cause what occurs in the world. Now take these laws to be deterministic, i.e., non-probabilistic: their predictions are specific states of affairs, not the distribution of probabilities over possible outcomes. Suppose further that (D) holds: the state of the universe at any time conjoined with the laws, entails the state of the universe at any other time. Then there would be no room for special divine action. For suppose God acted specially at a given time t. By (D), the complete description of the universe at t – call it '$U_t$' – is entailed by the laws together with the state of the universe at some previous time t*. But then if God acted specially at t, he would have to act in such a way as to make $U_t$ false. So determinism is incompatible with special divine action.

As we saw above, this picture is seriously misleading. That is because (as I said above) determinism in the sense of (D) is consistent with occasionalism, according to which God is *always* acting specially in the world. Perhaps occasionalism is true and God is the only causal agent in the physical universe. The laws, then, would be a description of what God does in the universe; how he treats it and how he acts in it. Those laws might be rich enough so that their conjunction with a complete description of the U at any time, entails a complete description of the universe at any other time. So determinism in this sense is certainly compatible with God's acting specially in the world – acting in ways that go beyond creation and conservation.

Given certain conceptions of natural law, furthermore, determinism is consistent with God's *sometimes* acting specially in the world, and sometimes not. It would be consistent with God's being the cause of some of what happens in the universe, and secondary causes (human beings, e.g.) being the cause of other things that happen. Footnote 24 of chapter 3 of WTCRL outlines the Humean/Lewisian conception of laws of nature, according to which the laws are exceptionless universal generalizations supervening on what in fact does happen in the universe.

Given such a conception of the laws, determinism would pretty clearly be compatible with God's only sometimes acting specially in the world.

Determinism so taken would also be compatible with human freedom, understood as the thought that at a given time *t* it is sometimes within the power of a person to perform a given action *A* and also within that person's power to refrain from performing *A*. For even if an exceptionless generalization entails that I don't (for example) raise my hand at a time *t*, it might still have been within my power to do so. (Of course if I *had* done so, that generalization would not have been exceptionless, and hence would not have been a law.) Given this conception of the laws of nature, therefore, compatibilism, the thought that human freedom and determinism are compatible, would obviously be the truth of the matter.

Now for a couple of desultory remarks on Halvorson's remaining three comments.

First. Halvorson says

> ... while I agree with Plantinga's hedging of the Newtonian laws, I don't like the idea that these laws are hedged because the universe is an 'open system' in the sense that local physical systems can be 'open'. Typically, by 'open system' we mean a subsystem of a larger *physical* system. But since God is not physical, the universe is not a subsystem of some larger physical system (p. 25).

Certainly physicists, when speaking of open systems, typically think of such a system as a subsystem of a larger physical system. But consider Halvorson's statement of the (Newtonian) law of conservation of energy: 'CE: When a system is causally closed, then its total energy is conserved.' Isn't it entirely consistent with Newtonian physics that there be causal influence from outside the physical universe? The claim that there is no such causal influence would presumably not be part of Newtonian physics as such (and of course Newton himself would not have endorsed such a statement); it would be more like a philosophical or theological add-on. Presumably Newtonian physics just doesn't address this topic. Why think CE really includes or entails, somehow, the proposition that the physical universe *is* causally closed? But if not, wouldn't it follow that special divine action in the world is not precluded by CE?

Second. I suggested that perhaps the GRW interpretation or version of quantum mechanics is the truth of the matter, and that God typically acts in the world by way of divine collapse causation. Halvorson has his doubts about this suggestion:

> But what would be the point of saying such a thing? Ideally relating theology to science would help theology to say truth things and to avoid saying false things. But the DCC story does not make any interesting predictions about what divine interventions did or did not occur. Thus while DCC provides an interesting 'just so' story attaching it to theology wouldn't make our theology anymore scientific (pp. 27-28).

Agreed. But I wasn't making this suggestion in order to make our theology more scientific. I was instead thinking about this question of intervention, and the way the members of the Divine Action Project were trying to come up with a version of divine action that was not interventionistic. I pointed out that it is exceedingly hard to see what intervention would *be*, given quantum mechanics. Even so, I suggested, perhaps there is a way of thinking about divine action in the world that would avoid what they take to be the difficulties or problems with intervention. The chief difficulty, I thought they thought, was that God would sometimes be treating his world in one way and other times treating it in a different way, if he sometimes intervened; this would reveal a sort of inconsistency. As Ernan McMullin put it, for God to intervene is for him to 'deal in two different manners' with the cosmos he has created. I suggested that Divine Collapse Causation would be a way in which God could act in the world without this alleged inconsistency: he is *always* acting in the world, and in that respect is not dealing in two different manners with his world.

Third. Halvorson proposes that the usual worries about divine action and the deliverances of current science is due to an inadequate philosophy of science, and in particular to reliance on the notion of a 'law of nature'. Here he quotes Reijer Hooykaas:

> Calvin, too, ... makes no essential distinction between ordinary events, belonging to the order of nature (the rising and setting of the sun) extraordinary events (great drought) and miraculous events. The term 'supernatural' is not used. ... He recognizes that God has instituted an order of nature and invested things with powers, but he reject the idea that only 'special' events require divine intervention. God's providence works in the most insignificant things: the sparrow in the roof, the lily of the field are under his personal care. (pp. 28-29)

This seems to me quite right. And indeed, it is one of the virtues of the DCC story that it precludes precisely the notion that only special events

require divine intervention or special divine action: nearly all events involve special divine action.

## AD BERGMANN

Michael Bergmann's admirable and densely reasoned piece asks whether I am a friend of evolutionary science. As he points out, this question is not entirely clear, and I'd like to add another question about the question. Suppose you are a friend of evolutionary science: does it follow that you *believe* current evolutionary theory – i.e., the current scientific theory of evolution? Well, suppose you are a friend of current physics: does it follow that you *believe* current quantum mechanics? I'd say not. I should think someone like Bas van Fraassen is indeed a friend of quantum mechanics, but I doubt that he believes it. What he believes instead (as I suppose) is that current quantum mechanics is empirically adequate or nearly so: that its predictions are for the most part borne out when tested by experiment.

Of course van Fraassen's brand of anti-realism could be mistaken; perhaps the job of science is to come up with theories that are *true*, not just empirically adequate. Even so, however, you might still be doubtful about the truth of a theory, but nonetheless count as a friend of science in the relevant area. For example, it seems that current quantum mechanics and current general relativity are hard to harmonize; you might therefore be doubtful about the truth of either or both of them, but still be an enthusiastic partisan of contemporary physics. So this question as to what counts as being friendly to science, or to a particular scientific theory, is multi-faceted and difficult. I shall therefore pursue it no further, but instead try to answer the three questions Bergmann asks.

First question:

'Am I right', says Bergmann, 'in saying that, in WTCRL, your answer to key question 1 is "maybe" and that you take both option 3a and option (3b) in response to question (3)?'

Here (to spare you some labour) is key question 1:

> (1) Do you think God is involved in some special, out-of-the-ordinary, non-routine way in the unfolding of evolutionary history?

And here are options (3a) and (3b):

> (3a) Given the evolutionary evidence, it *may, for all we know, be* prohibitively improbable that there is an evolutionary pathway (that

> would fit within the allotted time frame and involve only unguided mechanisms such as natural selection, spandrelism, and genetic drift) from simple unicellular life to some actual complex organisms we know of, in which case these organisms may be better explained by appeal to at least some special activity of God than by completely unguided naturalistic mechanisms.

and

> (3b) Religious evidence of some kind (e.g., sacred texts or religious experience) strongly suggests that God intentionally brought about humans in particular and that may, for all we know, have happened via God's being specially involved in the unfolding of evolutionary history.

By way of answer, first, along with most Christians I believe that God has created us human beings in his own image. This means at the least that God intended that there be creatures of a certain kind, and took action that he knew would result in the existence of creatures of that kind. Therefore it is not by unguided natural mechanisms that human beings have come to be. The process by which we have come to be is a *guided* process, where I'd count as *guided* a process God initially set in motion, and that required no further tinkering or special action on his part for it to issue in the outcome he originally intended. Now suppose God had created human beings in that fashion: he chose a set of initial conditions that he knew would lead to the existence of human beings, and set the process in motion, engaging in no further special action. Would that mean, according to Bergmann, that God has been involved in some special, our-of-the-ordinary, non-routine way in the unfolding of evolutionary history, as in question 1? No; Bergmann is talking here about the *unfolding* of evolution; not about the process by which the original conditions were set.

Given that qualification, however, I would indeed answer 'Maybe' to question 1. I would also endorse option 3b. As I say, it is part of Christian belief that God has created human beings in his image. He could have done so in several ways. (a) He could have created by way of divine collapse-causation; in this case he would be constantly and intimately involved in what happens in evolutionary history. However this, says Bergmann (p. 9), would not be a case of God's being involved in some special, out-of-the-ordinary, non-routine way in the unfolding of evolutionary history. (b) Perhaps he could have done so by establishing

the right initial conditions and the right laws, and let things go forward from there, without any further tinkering; this too would not be a case of God's being involved in some special, out-of-the-ordinary, non-routine way. (c) God could have created appropriate initial conditions and laws, set in motion a process, and then occasionally or often intervened, redirecting and guiding the process. This *would* be a case where God is involved in some special, out-of-the-ordinary, non-routine way in the unfolding of evolutionary history. Because it seems to me a real possibility, I'd answer question 1 with 'Maybe.'

But what about option 3a? This wouldn't be part of my reason for answering 'Maybe'. That is because I'm committed *ab initio* to the idea that if the living world has come to be by way of evolution, then it is by way of guided evolution. As far as I am concerned, our coming to be by way of unguided evolution is not one of the options. Still, we can speculate about the probabilities of the living world's having come to be by way of unguided evolution, by way of the processes Bergmann mentions. Of course one monkey wrench in the machinery here is that along with many other believers in God, I take God to be a necessary being. Now could God have brought it about that the living world came to be by way of unguided evolution? Again, this is a sizeable question that I can't enter into properly here. I'd say that this is perhaps barely conceivable, but it certainly isn't clearly possible.

Still, setting aside God's being a necessary being (pretending for the moment that atheism is possible) and setting aside also the difficulties in seeing how life could have come to be in the first place, how probable is it, given atheism, that the living world should have come to be (in the time available) by way of the naturalistic unguided processes that Bergmann mentions? I'd say it is extremely, enormously, overwhelmingly improbable. Thomas Nagel came to a similar conclusion in *Mind and Cosmos*; he went on to declare that this view is almost certainly false. For this he paid the expected price: fellow atheists (feeling betrayed?) suggested that Nagel is arrogant, dangerous to children, a disgrace, hypocritical, ignorant, mind-polluting, reprehensible, stupid, unscientific, and in general not a nice man. In a more restrained vein, however, several reviews chided him for failing to note that many scientific theories – general relativity and quantum mechanics come to mind – are monumentally improbable, at least from a common-sense perspective, but none the worse for that. This is indeed true. The crucial difference, however, is that there is solid *evidence* for these other theories. But where is the evidence for *atheistic*

evolution? Perhaps there is excellent evidence for universal common ancestry and for descent with modification.[3] Perhaps there is also reasonably good evidence for the thought that the main process driving descent with modification is natural selection working on genetic variation. But where is the evidence for the claim that this process is *unguided*?

As I say, Nagel goes on to declare that atheistic evolution is almost certainly false. What he means, I think, is that atheistic evolution is so enormously improbable that it isn't a real competitor; it isn't a real possibility; we have to look for some other theory. Here things get stickier. How improbable does a theory have to be, to be inadmissibly improbable, such that it isn't even in the running? And is atheistic evolution as improbable as that? I'm not sure I see any way of telling. What is clear, however, is that atheistic evolution is enormously less probable than the thought that the living world has been brought about by God.

Next, question (II): 'Do you think that your view on whether the evolutionary evidence supports EP makes you at least somewhat unfriendly toward evolutionary science?' EP, says Bergmann, is the claim that 'a not-too-long evolutionary pathway from unicellular life to the mammalian eye (in a system without any special divine tinkering) is not prohibitively improbable'.

Now my view is that the evolutionary evidence does not support EP. But does this make me unfriendly towards evolutionary science? In what way would that view plausibly be thought to be unfriendly to evolutionary science? Well, I suppose it would be unfriendly if it were part of current evolutionary science to assert that EP is true, or that the evidence supports EP. But *is* that part of current evolutionary science? I'd say not. Perhaps it is part of evolutionary science to assert that there is good evidence for the thought that the mammalian eye has come to be by way of evolution, and that there is a not-too-long evolutionary pathway from unicellular life to the mammalian eye that is not prohibitively improbable. But evolutionary science doesn't take a position on whether the whole process is guided or unguided. It doesn't take a position on whether God has guided this whole process by creating initial conditions and laws that would ensure the outcome he intends; and it also doesn't take a position on whether God from time to time takes special action in

[3] Although Steven Meyer's new book *Darwin's Doubt* (San Francisco: HarperCollins, 2013) proposes some good reasons for doubting universal common ancestry.

the process of evolution (i.e., engages in 'tinkering'). Therefore, it is no part of current evolutionary science to assert that there is a not-too-long evolutionary pathway – one that involves no divine tinkering – from unicellular life to the mammalian eye. And if that is so, then as far as I can see, evolutionary science doesn't take a position on whether the *evidence supports* the thought that there is such an evolutionary pathway.

Now perhaps most evolutionary scientists think the process of evolution is in fact unguided, and that EP is in fact true. Disagreeing with them on that point, however, doesn't mean that I am unfriendly to evolutionary science. Suppose most physicists thought that the laws of physics were set for the material universe by God, and suppose someone denied that: would that make such a person unfriendly to physics? I'd say not: it would only make her unfriendly to philosophical views held by most physicists. Similarly here: suppose most evolutionary scientists do in fact think this process is unguided, and that EP is in fact true. This opinion contains a philosophical or theological component with which I disagree. Even if most of the biological experts endorse this theological component, that doesn't convict me of being unfriendly to evolutionary science in disagreeing with them. It just makes me unfriendly to a philosophical or theological add-on those experts endorse. And their expertise, while admirable and extensive, does not extend to philosophy or theology.

Finally, question (III): 'Do you now disagree with your earlier claims (e.g., in 'When Faith and Reason Clash') suggesting that, in light of the evolutionary evidence, Darwinism is unlikely to be true?'

I made those earlier claims quite a long time ago, and I've been reading and thinking about this subject off and on from that time to this. Rightly or wrongly, my thinking has not changed much during that time. In 'When Faith and Reason Clash', I said I thought it was more likely than not that the common ancestry thesis was false. If I had to bet, I'd still bet on that horse, fortified, now, by the suggestive but not conclusive arguments against common ancestry offered by Stephen Meyer in *Darwin's Doubt*. I still see little reason to believe that universal ancestry is true (although since I am not a biologist, I take my failure to see such reason with a grain of salt). Perhaps God did it by way of common ancestry; perhaps not. Perhaps human beings are related in this way to simian forebears; but also, again, perhaps not. Perhaps God specially created a human pair ('Adam and Eve' as we may call them) at some time in the past; then they would not have had simian or nonhuman

ancestors, and the common ancestry thesis would be false. On the other hand, perhaps at the time of the most recent bottleneck in the lineage leading to contemporary humanity, God picked out a particular human pair and bestowed on them a property whereby they could be said to be in the divine image; if that property were heritable, and dominant, this pair would be ancestral to all contemporary human beings. That scenario, unlike special creation, is compatible with universal common ancestry. I really can't see any reason for thinking one of these scenarios much more likely than the other.

The main thing to see here, I think, is that we aren't obliged to have a firm opinion on this topic. The main lines and central tenets of Christian belief are clear; and the wise believer will invest considerably more credence in those central tenets than in propositions, like common ancestry or its denial, lying near the periphery.