The Argument from Laws of Nature Reassessed

Richard Swinburne

[Swinburne, Richard, 2004/2008, "The Argument from Laws of Nature Reassessed" in (ed.) M. Stone, *Reason, Faith and History*: Essays in Honour of Paul Helm, Ashgate, 2008; and in (ed.) M.Ruse and W. Dembski, *Debating Design: From Darwin to DNA*, Cambridge University Press, 2004.]

I have campaigned for many years for the view that most of the traditional arguments for the existence of God can be construed as inductive arguments from phenomena to the hypothesis of theism (that there is a God) which best explains them.[1] Each of these phenomena gives some probability to the hypothesis, and together they make it more probable than not. The phenomena can be arranged in decreasing order of generality. The cosmological argument argues from the existence of the Universe; the argument from temporal order argues from its being governed by simple laws of nature; the argument from fine-tuning argues from the initial conditions and form and constants of the laws of nature being such as to lead (somewhere in the Universe) to the evolution of animal and human bodies. Then we have arguments from those humans being conscious, from various particular characteristics of humans and their environment (their free will, capacity for causing limited good and harm to each other and especially moulding their own characters for good or ill), various historical events (including violations of natural laws), and finally the religious experiences of so many millions of humans.

I assess these arguments as arguments to the existence of 'God' in the traditional sense of a being essentially eternal, omnipotent, omniscient, perfectly free and perfectly good. I argue that his perfect goodness follows from the other four properties. This is because being omniscient God will see which actions are good. To recognize an action as 'good' involves having some motivation to do it. Being perfectly free, God will (unlike ourselves) be subject to no irrational inclinations deterring him from pursuing the good and so he will be perfectly good.[2] God's omnipotence is his ability to do anything logically possible. God's perfect goodness is to be understood as his doing only what is good and doing the best in so far as that is logically possible and in so far as he has the moral right to do so. So he will inevitably bring about a unique best-possible world (if there is one), or one of a disjunction of equal best-possible worlds (if there are such). But if for every good possible world, there is a better, all that God's perfect goodness can amount to is that he will bring about a good possible world.[3] So God will bring about any state of affairs which belongs to the best or all the equal best of all

the good possible worlds. If there is some state of affairs which is such that any world is equally good for having it or not having it, then we can say that there is a probability of ½ that he will make it. God will exercise this choice among worlds (and so states of affairs) which it is logically possible for him to bring about and which he has the moral right to bring about.

The grounds for believing any scientific, historical or super-scientific explanatory theory to be true are, first, that it makes probable the observed data (when otherwise they would not be as probable); and, secondly, since there will always be an infinite number of mutually incompatible theories satisfying the first requirement- that the theory is simple and has small-scope. By the latter I mean that it tells you about less in less detail - the less you say the more likely you are to be right. However, in order to make my paper of reasonable length I shall simply contrast theism with naturalism with the latter understood as the view that there is a large extended physical universe and nothing non-physical. (I thus ignore theories intermediate between theism and naturalism such as polytheism). Naturalism is thus a theory of equal scope to theism - an all-embracing world theory - and so we can ignore the criterion of scope. So whether evidence makes it probable that theism is true depends on the relative simplicity of theism and naturalism, which determines their relative intrinsic probabilities (i.e. a priori probabilities on zero contingent evidence); and how probable it is on the respective hypotheses that you would find the phenomena which I cited in the first paragraph. Note at this state that while almost everyone can be got to agree that a simpler theory is as such more probable than a complex theory, rational people disagree about how much greater is the probability of a simpler theory - whether a simple theory is more probable than any one complex theory; or whether a very simple theory is more probable than the disjunction of a very large number of complex theories. I will come back to this point of how much weight is to be given to the criterion of simplicity in due course.

I have argued elsewhere that the hypothesis of theism is simpler than naturalism, and that the existence of a universe (entailed by naturalism) is fairly probable given theism. Thereafter, I claim each of the phenomena mentioned are improbable, given only naturalism and the phenomena mentioned in the previous argument. Thus the Universe being governed by simple laws of nature is improbable, given only naturalism; these laws being such as to lead to the evolution of animal and human bodies is improbable, given only naturalism and there being simple laws of nature - and so on. The argument then claims that if there is a God, these phenomena are much more to be expected than if there is no God; and hence they each increase (from its intrinsic probability) the probability that

there is a God. By how much they increase it, and how probable in the end they make it depends on the relative intrinsic probabilities of theism and naturalism, and on how probable they make the various phenomena.

Having now set the framework of the discussion, I shall concern myself in this paper only with the confirmatory force of the argument from laws of nature, that is with how much the Universe being governed by simple laws rather than being chaotic adds to the probability of theism. The argument from the regular behaviour of things – his way of putting an argument from simple laws of nature - constituted St Thomas Aquinas's 'fifth way' to prove the existence of God:

> The fifth way is based on the guidedness of things. Some things lacking awareness seek a goal - which is apparent from the fact that always or most usually they behave in the same way which leads to the best result. From this it is evident that it is not by chance but by intention that they reach their goal. Nothing however that lacks awareness tends to a goal except under the direction of someone with awareness and understanding; the arrow for example requires an archer. Everything in nature, therefore, is directed to its goal by someone with understanding and this we call 'God'.

Aquinas seems to suppose that his 'ways' are good deductive arguments; and that, I think cannot be. It is more profitable to investigate whether they are good inductive, that is probabilistic arguments. To see whether such an argument as the 5th way is a good probabilistic argument we must ask, first, how probable is it if there is a God, that any Universe would be governed by simple laws.

God, being omnipotent, can bring about any state. He is essentially good; so it is probable that he will bring about a state of affairs in so far as it is good. A major reason why God will bring about all the phenomena listed in my opening paragraph is that among the good worlds which a God has reason to make are ones in which there are creatures with a limited free choice between good and evil and limited powers to make deeply significant differences to themselves, each other, and their world by those choices (including the power to increase their powers and freedom of choice.) The goodness of significant free choice is, I hope, evident. We think it a good gift to give to our children that they choose their own path in life for good or ill, and influence the kinds of persons (with what kinds of character and powers) they and others are to be. But good though this is, there is the risk that the children will do evil and make themselves evil. Because of the evil they may do if God creates beings with the freedom to choose between good and evil, they must be finite, limited creatures. Even so, the risks are - as we know very well - considerable; and so, I suggest that God would not

inevitably bring about such a world. So I suggest that any world which God could make containing such creatures would be no worse for not containing such creatures. But I suggest that the converse also holds: any world which God could make to which you add such creatures would be none the worse for such an addition. If that is correct if follows that there is a probability of ½ that he will make such a world. But my arguments do not depend on giving such a precise or such a high probability to God (if there is a God) making such a world. All that I am claiming is that there is a significant probability that a God would create such a world.

Let us call creatures with limited powers of the above kinds free rational creatures. If humans have (libertarian) free will (as is not implausible)[7], evidently our world is a world containing such creatures. We humans make deeply significant choices, affecting ourselves, each other, and our world; and our choices include choices to take steps to increase our powers and freedom, and form our characters for good or ill. But our powers in these respects are limited ones. Our world is thus a world of a kind which God can (with significant probability) be expected to make. Free rational creatures will have to begin life with a limited range of control, and the power to choose to extend that range or - alternatively - not to bother to do so. That limited range is their bodies. In order for them to be able to extend their range of control, there must be some procedure which they can utilize - This bodily movement will have this predictable extra-bodily effect.; that one will have that effect. Hence the world must be subject to regularities, simple natural laws (either deterministic or probabilistic), which such creatures can choose to try to discover and then choose to utilize, to make differences to things distant in space and time. You can learn that if you plant seeds and water them, they will grow into edible plants which will enable you to keep alive yourself and others; or that if you pull the trigger of a gun loaded in a certain way and pointing in a certain direction, it will kill some distant person. And so on. We can choose whether to seek out such knowledge (of how to cure or kill) or not to bother; and we can choose whether to utilize this knowledge for good or ill. In a chaotic world, that would not be possible - for there would be no recipe for producing effects.

So given that there is a significant probability that a God would create free rational creatures, there is a significant probability that he will create this necessary condition for the existence of such creatures - a world regular in its conformity to simple natural laws by which a variety of different sorts of effects are produced, .It is not sufficient that there be natural laws; they must be sufficiently simple to be discoverable by rational creatures. This involves their being instantiated frequently, and that the simplest extrapolation from their past instantiations will often yield correct predictions. There

could be a world with a trillion unconnected laws of nature, each determining that an event of a certain kind would be followed by an event of a certain other kind, but where there were only one or two events of the former kind in the history of the Universe. No rational creature could discover such laws. Or there could be laws governing events of a type frequently instantiated, but of such enormous mathematical complexity that the simplest extrapolation from the past occurrences would never yield correct predictions. The laws must be sufficiently simple and frequently instantiated to be discoverable from a study of past history at least by a logically omniscient rational being (one who could entertain all possible scientific theories, recognize the simplest, and draw the logical consequences thereof). But the laws must also be such as to produce in different circumstances a variety of different sorts of effects, so that rational creatures have many different choices of which effects to produce in themselves, each other and the world.

Their utility to human beings is not, I should add the only reason why a God might make the physical world conform to natural laws. Conformity to such laws is often beautiful and a good in itself. The simple elegant motions of the stars and of all matter conforming to discoverable laws form a beautiful dance. Taking that into account, it is not, I suggest an exaggerated claim that we might well expect with the probability of the order of ½ that if there is a God the Universe will be governed by laws of nature.

I now seek to investigate further my claim that, given naturalism, even if there is a Universe, it is most unlikely that it would be governed by simple laws of nature. My argument in the past has been that if we are confined to scientific explanation, while we can explain lower level laws by higher level ones, there can be no explanation of the conformity of nature to the most fundamental laws. Yet this conformity consists simply in everything in the Universe behaving in exactly the same way. Such a vast coincidence of behaviour, as a vast brute fact would be a priori extremely improbable. Hence, while simple laws of nature are quite probable if there is a God, they are very improbable otherwise. So their operation is good evidence for the existence of God.

I stand by my argument that, given naturalism, it is vastly improbable that the Universe (that is, the one in which we live) would be governed by (simple) laws of nature. But I had not given proper attention in previous writings to the different philosophical accounts of what laws of nature are and phrased the argument in terms of these. Nor had I appreciated previously that the argument should be phrased as an argument from simple laws of nature (and so ones discoverable in the sense defined earlier), which produce a variety of different sorts of effect. I seek to remedy these deficiencies in the present paper, and in the course of it to show the

relevance to the argument of the Universe having a beginning (if it did have a beginning).

The argument is an argument from "the Universe" being governed by simple (i.e discoverable) laws of nature. By "the Universe" I mean that system of physical bodies spatially related to (i.e. at some distance in some direction from) ourselves. I do not rule out the possibility of there being other universes, systems of physical bodies not so related, and we will need to consider that possibility in due course. It is a well-justified extrapolation from study of the spatio-temporal region accessible to our telescopes, a region vastly wider than the region in which we live, that the whole spatial Universe is governed over all time by the same fundamental laws. They may be the laws of General Relativity, Quantum Theory and a few other theories; or the laws of a Grand Unified Theory, or the laws of a theory of everything. These fundamental laws entail the operation of less fundamental laws in particular circumstances-for example that all bodies of small mass near the surface of the Earth fall to that surface. Humans can discover these less fundamental laws fairly easily,and then use them to produce effects. But they can also choose whether to do science and try to discover more fundamental laws,and thereby extend their power over nature.

But what is meant by the claim that the Universe is so governed; what is the truth-maker for there being laws of nature? One view, originating from Hume's views on causation, is, of course, the regularity view. "Laws of Nature" are simply the ways things behave - have behaved, are behaving, and will behave. "All copper expands when heated" is a law of nature if and only if all bits of copper when heated always have expanded, now expand, and will expand. We need, however, a distinction between laws of nature, and accidental generalizations such as "all spheres of gold are less than one mile in diameter"; and we need to take account of probabilistic laws such as 'all atoms of C_{14} have a probability of decaying within 5,600 years, of ½". Regularity theory has reached a developed form which takes account of these matters, in the work of David Lewis.

For Lewis, "regularities earn their lawhood not by themselves, but by the joint efforts of a system in which they figure either as axioms or theorems.[10] The best system is the one which has (relative to rivals) the best combination of strength and simplicity. Strength is a matter of how much it successfully predicts (that is, that it makes actual many events, past, present or future -whether observed or not --- probable; and very few actual events improbable); simplicity is a matter of the laws fitting together, and, no doubt, each having internal simplicity in a way which Lewis does not, but presumably could, spell out. The true laws are the laws of the best system. So "all spheres of gold are less than one mile in diameter" is probably not a law, because it does not follow from the best system , as is

evidenced by the fact that it certainly does not follow from our current best approximation to the ultimate best system , a conjunction of Relativity Theory and Quantum Theory. Laws may be probabilistic as well as universal; if "there is a 90% probability of an A being B" is a consequence of some theory, it will confer strength on that theory in so far as 90% actual A's (past, present, and future) are B. Lewis's account of laws of nature is part of his campaign on behalf of "Humean Supervenience", that everything there is supervenes (logically) on "a vast mosaic of local matters of particular fact", which he interprets as a spatio-temporal arrangement of intrinsic properties, or "qualities".[11] Laws of nature and causation are for Lewis among the things thus supervenient.

Now there do seem to be overwhelming well-known objections to any Humean account, including Lewis's, if laws of nature are supposed to explain anything - and in particular to explain why one thing causes another, as Humeans suppose that they do. The reason why laws explain causation, according to Humeans, is because causality reduces to components which include laws of nature. Hume's famous regularity definition of a "cause" was as "an object precedent and contiguous to another, and where all the objects resembling the former are placed in a like relation of priority and contiguity to those objects that resemble the latter".[12] "Objects" for Humeans are events or states of affairs, and are constituted by instantiations of bundles of purely categorical properties (such as, perhaps, being 'square' or 'red') in contrast to dispositional properties whose nature it is to cause or to permit other objects to cause certain effects (such as is perhaps being 'soluble'). For a present day Humean such as Lewis, as I noted earlier, only certain kinds of regularities are laws and so function in an account of causation. Then the heating of a particular piece of copper causing its expansion is a matter of the former being followed by the latter, where there is a law that events like the former are followed by events like the latter. But since whether some lawlike statement constitutes a law depends, on this account, not merely on what has happened but on what will happen in the whole future history of the Universe, it follows that whether A causes B now depends on that future history. Yet, how can what is yet to happen (in maybe two billion years' time) make it the case that A now causes B, and thus explain why B happens? Whether A causes B is surely a matter of what happens now, and whether the world ends in two billion years time cannot make any difference to whether A now causes B and hence none of this can make any difference to what is the true explanation of why B occurs (viz, that A occurred and caused it) - though, of course, it might make a difference to what we justifiably believe to be the true explanation. (Put another way, that some proposed explanation is the simplest explanation of the data, past

and future is evidence that it is the true explanation; but it does not constitute it being the true explanation).

Further it is because of their role in causation, that laws of nature are said to generate counterfactuals. Suppose that I don't heat the copper; it is all the same fairly evidently the case that "if the copper had been heated, it would have expanded". But if a law simply states what does (or did or will) happen, what grounds does it provide for asserting the counterfactual? It would only do that if there were some kind of necessity built into it.

These seem to me conclusive objections to the regularity account. If, however, despite them, we were to adopt this account, the conformity of all objects to laws of nature being just the fact that they do so conform, would have no further cause except from outside the system. If there were no God it would be a highly improbable coincidence if events in the world fell into kinds in such ways that the simplest extrapolation from the past normally yields correct predictions. There are innumerable logically possible ways in which objects could have behaved today, very few of them being in approximate conformity with a simple extrapolation from the past. If, on the other hand, God causes the behaviour of physical things, then the coincidence is to be expected for reasons given earlier. We would, however, need to give some non-Humean account of God's intentional causation - otherwise its universal efficacy would itself constitute a brute coincidence!

So, dismissing Humean accounts of laws for good reason, let us consider alternative accounts of laws of nature, that is accounts which represent talk of "laws" as talk about a feature of the world additional to the mere succession of events, a feature of physical necessity which is part of the world. This feature of physical necessity may be thought of either as separate from the objects which are governed by it, or as a constitutive aspect of those objects. The former approach leads to a picture of the world as consisting of events (constituted perhaps by substances with their properties) on the one hand, and laws of nature on the other hand; and this approach can be developed so as to allow for the possibility of there being universes in which there are no events, but merely laws of nature.[13] Laws of nature are thus in some sense ontologically concrete entities. The version of this account which has been much discussed recently is the version which claims that laws of nature are logically contingent relations between universals - either Aristotelian instantiated universals (Armstrong) or Platonist not-necessarily-instantiated universals (Tooley). For Armstrong there being a fundamental law of nature that all F's are G consists in there being a connection of physical necessity between the universal F and the universal G. It being a fundamental law of nature that "all photons travel at 300,000 km/sec relative to every inertial reference

frame" consists in there being such a connection between the universal "being a photon" and the universal "travelling at 300,000 km/sec relative to every inertial reference frame". We can represent such a connection by N (F, G). This relation between universals is itself a (logically) contingently existing universal. The instantiation of F thus inevitably brings with it the instantiation of G. One can perhaps begin to make sense of this suggestion if one thinks of the causing of states of affairs as making properties, which are universals, to be instantiated; and this involving the bringing of them down to Earth from an eternal Heaven, together with whatever is involved with those universals - viz, other universals of (physical) necessity connected thereto. But for Armstrong, there is no such eternal Heaven - "there is nothing to the law except what is instantiated. The law ... has no existence except in the particular sequences."[14] But then - does the relation between universals exist before the law is instantiated for the first time, or not? If yes, there is an eternal Heaven in which it exists. If not, what causes it rather than some alternative to exist? Tooley thinks of the relations between universals as existing in an eternal Heaven prior to their instantiation in this world. This will meet the problem of why they are instantiated on the first occasion, and also allow from the plausible possibility of there being laws which are never instantiated:

> Imagine a world containing ten different types of fundamental particles. Suppose further that the behaviour of particles in interactions depends upon the types of the interacting particles. Considering only interactions involving two particles, there are 55 possibilities with respect to the types of the two particles. Suppose that 54 of these possible interactions have been carefully studied, with the result that 54 laws have been discovered, one for each case, which are not interrelated in any way. Suppose finally that the world is sufficiently deterministic that, given the way particles of the types X and Y are currently distributed, it is impossible for them ever to interact at any time, past, present, or future. In such a situation it would seem very reasonable to believe that there is some underived law dealing with the interaction of particles of types X and Y.[15]

If there is such a law, and it consists in a relation between universals, they can only be ones in a Platonist heaven.

But Platonist heavens are very mysterious. God, as an intentional agent, could exercise power over the Universe in the way in which we exercise it over our bodies.[16] If there is a God, his causal agency is of a familiar type. But how do universals act on the world? This is a very mysterious causal relation between the non-spatio-temporal world and our world for which we have no analogue.

If, despite this difficulty, we adopt a relation-between-universals theory, the question then is - if there is no God - why should there be any connections between universals at all, and why should there be universals instantiated frequently enough and the mathematical connections be sufficiently simple so as to yield a variety of discoverable regularities.

I suggest that a universe without connections between universals would be simpler than one with connections, for such relations with their causal consequences are mysterious additions to the world; and one with simpler patterns of connection would be simpler than one with such complicated patterns of connections that rational beings would not be able to infer the future behaviour of objects by means of the simplest extrapolation from their past behaviour. I repeat that among theories of the universe as a whole (which will thus have equal scope), simplicity is the sole indicator of intrinsic probability. It then follows that if we give it very great weight, it would be very probable that there would be no connections between universals at all - that the universe would be chaotic. Alternatively we may suppose merely that a simpler theory is somewhat more probable than a somewhat more complicated theory, and so that it is only somewhat less probable that there would be connections of particular kinds than that there would be no connections. But in that case, since there are a very large number of complex ways in which universals could be associated, and we are only giving simplicity a moderate weight, then it would be far more probable that one of the complex associations between universals would be the true one as that one of the simple associations would be the true one - there being so many (infinitely many) of the former. Either way, it is going to be improbable that in a Godless universe there will be simple connections between universals and so simple laws of nature.

The alternative to thinking of the physical necessity involved in laws of nature as separate from the objects governed by it, is to think of it as a constitutive aspect of those objects. The way in which this is normally developed is what we may call the substances-powers-and-liabilities account of laws of nature. The “objects” which cause are individual substances - this planet, those molecules of water. They cause effects in virtue of their powers to do so and their liabilities (deterministic or probabilistic) to exercise those powers under certain conditions, often when caused to do so by other substances. Powers and liabilities are thus among the properties of substances. Laws of nature are then just (logically) contingent regularities - not of mere spatiotemporal succession (as with Hume), but of causal succession, regularities in the causal powers (manifested and ummanifested) of substances of various kinds. That heated copper expands is a law is just a matter of every piece of

copper having the causal power to expand, and the liability to exercise that power when heated. As a matter of contingent fact substances fall into kinds, such that all objects of the same kind have the same powers and liabilities. The powers and liabilities of large-scale things (lumps of copper) derive from the powers and liabilities of the small-scale things which compose them (atoms: and ultimately quarks, electrons etc.). And, given a satisfactory theory integrating all science. all ultimate particulars will have exactly the same powers and liabilities (e.g. the power to cause an effect proportional in a certain way to their mass, charge, spin etc.), and the liability to exercise that under conditions varying with the mass. charge, spin etc., of other objects. This account of the ultimate determinants of what happens as merely substances and their causal powers and liabilities does provide explanation of what happens, and in familiar terms. (We ourselves have causal powers which we, unlike inanimate objects, can choose to exercise). It was the way of explaining things familiar to the ancient and medieval world, before "laws of nature" began to play their role in the sixteenth century. It was revived by Rom Harré and E.H. Madden in Causal Powers.[18] On this account, causation is an essential component of laws rather than laws being an essential component of causation.[19] Laws are simply regularities, not in the actual behaviour of substances (as with Hume), but in the causal powers and liabilities preserved by substances.

The question then becomes - why do all substances have similar powers and liabilities

to each other, for example some exactly the same as each other (e.g. the power to attract each other in accord with a force proportional to $mm`/r^2$, and the liability always to exercise that power), and some powers and liabilities a bit different so that substances fall into a small number of kinds (photons, protons etc.), making possible by means of different combinations the production of a whole variety of different sorts of effects? Unlike the other models which have no answer to the parallel question, this model has an answer to that question in terms of ancestry. A substance has the powers and liabilities it does because it was produced by another substance exercising (in virtue of some liability to do so) its power to produce a substance with just those powers and liabilities. If a proton is produced (together with an electron and a neutrino) by the decay of a neutron, then the proton's powers and liabilities are caused by the neutron, in virtue of its powers and liabilities. There are then different ways in which it could have come about that all substances fall into a small number of kinds in the way described, according to whether this process had a beginning and of what kind that beginning was.

Suppose, first, that the Universe did have a beginning, a 'Big Bang' of some sort. There are two different kinds of theories of a

beginning. The first state might have been a spatially extended state, or a spatially pointlike state. In the first case, we would still have a lot of substances, but perhaps crammed into a very small space. In terms of the Big Bang model, there would not have been literally a singularity; it would just have been that as you approach the first instant in the temporally backward direction, you would find denser and denser states; but it really all started in a very but not infinitely dense state. If that state was to give rise to our present universe of very few kinds of substance, it must itself have consisted of a very large number of substances of very few kinds. The alternative first state would be a literally pointlike one. In the first instant on this theory, there was an unextended point, endowed with the power to decay into innumerable substances of very few kinds, and the liability to exercise that power at some time or other. Suppose now that the Universe has an infinite age. The properties (of powers and liabilities) of every substance are then caused by those of a preceding substance. So there can only be many substances with exactly the same such properties (including the power to produce substances of the existing kinds) if there always have been.

Study of the present data of physics and cosmology will allow us to say roughly how probable on those data are the three different theories - on the basis of how probable it is that we would find these data given each of the theories, and of how simple are the different theories.

The issue for us, however, is not what are the posterior probabilities on the physical data that the different theories are true, but how probable is it a priori if there is no God that the true theory will be such as to lead to substances of a very few kinds. This will depend solely on the simplicity of the three theories, and the probability on each of these theories that substances of very few kinds would result. Simplicity I reemphasize is the sole relevant a priori criterion.[20] There is no doubt that the theory that the Universe began at a point is simpler than any particular theory (or, in my view, any disjunction of theories) that it began with many substances or that it always consisted of many substances. But if it did begin from an unextended point, the simplest theory of such a beginning would seem to be that it would have no power to produce extended substances. If it did have such a power it would seem simpler to suppose that it would have the power to produce just one similar extended substance. The theory that it would have the power to produce extended substances falling into few kinds, themselves having the power to produce more such substances; all with the liability to exercise these powers from time to time seems just one of a number of equally simple theories, less simple than the theory that the unextended point had no power or only the power to reproduce itself. And there will be an infinite number of more complex theories

of the liabilities possessed by the unextended point to produce particles which would not yield simple laws of nature. But any theory that at a beginning or always if there were many substances, they would all fall into kinds with identical powers and liabilities is a theory of very improbable coincidences. It cries out for explanation in terms of some single common source with the power to produce these coincidences. Just as we would seek to explain all the coins of the realm having an identical pattern in terms of their origin from a common mould, or all of many pictures having a common style in terms of their being pained by the same painter, so we should seek to explain all physical objects having the same powers in terms of their deriving them from a common source.

So again, if we give a lot of weight to simplicity, it will be very improbable that there will be the right sort of unextended point, let alone at the beginning or always many substances falling into kinds with identical powers and liabilities. But if we give rather less weight to simplicity, there are so many possible theories of an unextended point having the power to produce substances of innumerably different kinds, or theories of the universe beginning from or always having had such substances, that it remains very improbable that the universe would begin from the right kind of unextended point, or that there would be - uncaused by such a point - many substances falling into few kinds with identical powers and liabilities. Either way, on the substances - powers - and liabilities account of laws of nature, as on the universals account (and a fortiori on the Humean account) it is very improbable that there would be laws of nature sufficiently simple for rational beings to extrapolate from past to future with normal success.

Theism, however, leads us to expect that by one of these routes a universe will be produced in which substances of few kinds have all the same powers and liabilities, and will be conserved by God in this state. Either he will bring about an initial point of the right kind or a right arrangement of substances with the right powers and liabilities and conserve substances in subsequent existence with their resulting powers and liabilities; or he will always have kept in existence substances with the right powers and liabilities.

I have been assuming so far that there is only one Universe. But there may be many universes. If there were actually existing all possible universes, some of them (by a natural measure covering a small range) will be of exactly the kind one would expect God to produce. However it would be the height of irrationality to postulate innumerable universes just to explain the particular features of our universe, when we can do so by postulating just one additional entity - God. Science requires us to postulate the simplest explanation of the data, and one entity is simpler than a trillion. We would need to find new data in our universe best explained by postulating that

there are also other universes. Our only grounds for believing that there are other universes would be if extrapolating back from the present state of our Universe in accord with the mathematically simplest supposition about what are its laws, leads us to a state at which there was a Universe split, a state in which those laws will have dictated that another Universe would "bud off' from our Universe. But in that case the other Universe would be governed by the same fundamental laws as govern our Universe, and so we can consider the two universes (or however many universes we learn about) as one multiverse, and the whole preceding structure of argument gives the same results as before. So it does not affect the issue of why things are law-governed if we suppose (on good evidence) there is more than one Universe. And I have argued that whether talk of "laws" is talk of regular successions of events, of connections between universals determining the behaviour of substances, or of the powers and liabilities of substances, it is a priori improbable that a Godless Universe would be governed by simple laws but there is quite a significant probability that a God-created Universe would be governed by such laws. Hence the operation of laws of nature is evidence - one strand of a cumulative argument - for the existence of God.

NOTES

1. See especially my *The Existence of God*, revised edition, 1993, and the simpler version of this in *Is there a God?*, Oxford University Press, 1996. (See chapter 8 of the former and chapter 4 of the latter for the argument from laws of nature.) The present paper is a revised version of a paper originally published in (ed.) Martin Stone *Reason, Faith and History*: Essays in Honour of Paul Helm, Ashgate, 2002.
2. See, for example, my *The Coherence of Theism* revised edition, Clarendon Press, 1993, pp 149-52 and 207-9.
3. For a fuller account of what God's goodness must amount to when there is no best or equal best possible world, see my *The Christian God*, Clarendon Press, 1994, pp 65-71 and 134-6.
4. In Plantinga's terminology God can only weakly actualize such a world, not strongly actualize it. See Alvin Plantinga *The Nature of Necessitv*, Clarendon Press, 1974, p. 173.
5. For a full account of the criteria of simplicity and scope, see my *Epistemic Justification*, Clarendon Press, Chapter 4.
6. See *The Existence of God*, Chapter 5 and *Is There a God?*, Chapter 3.
7. For my arguments in favour of the view that we do have such free will, see my *The Evolution of the Soul*, Clarendon Press, revised edition, 1997, Chapter 13.
8. I have argued elsewhere (*The Existence of God*, pp. 141-2, and *Is There a*

God?, p. 43) that the hypothesis of the existence of one eternal, omnipotent, omniscient and perfectly free being is a far simpler hypothesis than any polytheistic hypothesis. But Mark Wynn has pointed out that there are very many different possible hypotheses, each postulating different numbers of gods with different powers, causing the existence and orderliness of the Universe; whereas there is only one hypothesis postulating one God of infinite power, causing the existence and orderliness of the Universe. Hence, he claims, although each of the former hypotheses might be less probable a priori than the hypothesis of theism, the disjunction of the former is plausibly more probable than the hypothesis of theism, as an explanation of the order of the Universe. (See his "Some Reflections on Richard Swinburne's Argument from Design", *Religious Studies* 29(1993), *325-35.)* But if the order of the Universe is to be explained by many gods, then some explanation is required for how and why they co-operate in producing exactly the same patterns of order throughout the Universe - something which would otherwise be a very considerable coincidence. This co-operation becomes a new datum requiring explanation for the same reason as the fact of order itself. The need for further explanation ends when we postulate one being who is the cause of the existence of all others, and the simplest conceivable such - I urge - is God.

9. I also ignore the claims of John Leslie and Hugh Rice, considered seriously by Derek Parfit, that there is at work an inanimate principle producing states of affairs because they are good. For my reasons for ignoring this see my "Response to Derek Parfit" in (ed.) P. Van Inwagen and D. W. Zimmerman *Metaphysics: The Big Questions*, Blackwell, 1998.

10. David Lewis *Philosophical Papers*, vol 2, Oxford University Press, "A Subjectivist's Guide to Objective Chance - Postscript", p. 122.

11. *Philosophical Papers*, vol 2, pp ix-x.

12. David Hume *A Treatise on Human Nature*, 1. 3. 14.

13. Thus "I hold ... that many empty [possible] universes exist. As I see it, there is a world devoid of all material objects and events in which the general principles of Newtonian mechanics are laws; there is another empty world in which the general principles of Aristotelian physics are laws" - John W. Carroll *Laws of Nature*, Cambridge University Press, 1994, p. 64 n 4.

14. D. M. Armstrong *A World of States of Affairs*, Cambridge University Press, 1997, p. 227.

15. Michael Tooley, "The Nature of Laws", *Canadian Journal of Philosophy* 7(1977), 667-98. See p. 669.

16. Or rather, since we do this by exercising power over our brains, in the way in which we exercise power over our brains. In so doing, we normally think of the power over the brain only in terms of the effect which it causes. But clearly we could, and some people do, train themselves to produce brain states of a kind defined by their internal nature - e.g. to produce "-rhythms - and not in terms of the effects which they normally cause.

17. op. cit. p. xii. A similar objection is raised in John Foster,"Regularities, Laws of Nature, and The Existence of God", *Proceedings of the Aristotelian Society* 101 (2000-1), pp 145-61 - see pp. 154-6.

18. Blackwell, 1975.

19. This allows the logical possibility of singular causation, that is causation which does not exemplify a pattern captured in a law. I have argued elsewhere that human agency is such causation. When, to take a simple example, I try to lift a weight and succeed, this cannot be represented as an instance of a lawlike succession in virtue of exemplifying some regularity of my trying lawlikely causing my success. This is because to try to do x just is to exert causal influence in favour of x occurring. 'Trying' isn't something separate from 'causing'; if it is successful, it just is causing. There is no law at work here connecting independent states. Or so I have argued. See my "The Irreducibility of Causation", *Dialectica* 51(1997), 79-92.

20. The other a priori criterion of choice between theories, scope, does not discriminate between these three theories. The scope of a theory is a matter of the more it tells you; and the greater the scope, the lower the prior probability. But each of the three theories are theories of equal scope - telling us all about the origin and nature of the universe.