**Intelligent Designs on Science:**
**A Surreply to Denis Alexander's Critique**
**of Intelligent Design Theory**

**Peter S. Williams (MA, MPhil)**

I am gratified that my paper 'Theistic Evolution & Intelligent Design in Dialogue'[1] has initiated a real life dialogue between these two fallible human attempts to understand origins. In 'Designs on Science,'[2] Cambridge University biologist Professor Denis Alexander takes issue with four claims that he finds, explicitly or implicitly, in my aforementioned paper. He summarizes these claims as follows:

1. The 'design inference' is not a theological or philosophical argument but is a 'scientific theory'
2. It is possible to define biological entities as 'irreducibly complex' in a meaningful fashion
3. The 'burden of proof' lies upon the evolutionary biologist to show how complex biological systems come into being
4. Proponents of ID do not perceive the world as a two-tier system of the 'natural' and the 'designed'[3]

Since Alexander disagrees with these claims, it appears that he must endorse something like the following claims:

1. Intelligent design theory is not science
2. It is not possible to define biological entities as 'irreducibly complex' in a meaningful fashion
3. The 'burden of proof' does not lie upon the evolutionary biologist to show how complex biological systems came into being
4. Proponents of ID perceive the world as a two-tier system of the 'natural' and the 'designed'

These claims happen to be presented in order of descending relevance and importance to intelligent design theory *per se*. The first claim must be rejected by all ID theorists, since all ID theorists by definition advocate intelligent design as a scientific theory. This is the only essential ID claim attacked by Alexander in 'Designs on Science'. The second claim must only be rejected by design theorists who wish to advocate a design inference from irreducible complexity. Many design theorists embrace irreducible complexity, but one need not embrace irreducible complexity in order to be a design theorist. The third claim must only be rejected by those design theorists who wish to place the burden of proof upon the evolutionary explanation rather than the design explanation in their arguments. Again, many design theorists argue that the presumption of truth is on their side; but intelligent design theory doesn't depend upon a presumption of truth. The fourth claim is only indirectly about ID, since this is a claim that must be rejected by those (like myself) who wish to interpret ID within the theological framework of monotheism. While a majority of design theorists identify the source of design with the God of a particular theistic religious tradition (Jewish, Christian, Muslim), intelligent design theory *per se* does not endorse such a specification. Design theorists as such may be perfectly happy to perceive the world

in terms of a 'two-tier system' if they are atheists, agnostics, Platonists, polytheists, Stoics, etc. As William A. Dembski comments: 'The ID movement is a big tent and all are welcome. Even agnostics and atheists are not in principle excluded... I've seen intelligent design embraced by Jews, Muslims, Hindus, Buddhists, agnostics and even atheists.'[4] Of course, if theism is true (as I believe) and if theism is incompatible with intelligent design theory (as Alexander believes), then ID and theism pose each to the other a serious external conceptual problem.

Since I am an ID theorist who rejects all four of Alexander's claims, I will critically examine Alexander's arguments regarding each claim in turn. In the course of this discussion I will also draw upon other writings by Alexander, especially his magnum opus on science and religion: *Rebuilding the Matrix* (Lion, 2001). There are, however, a number of preliminary issues I want to address before turning to Alexander's specific points of disagreement with ID.

# Prolegomena

According to Garrett J. DeWeese and J.P. Moreland: 'The central aspect of ID theory is the idea that the designedness of some things which are designed can be identified as such in scientifically acceptable ways.'[5] In its broad sense: 'Intelligent Design is simply the science of design detection - how to recognize patterns arranged by an intelligent cause for a purpose.'[6] We should distinguish, then, between intelligent design as a general approach to design detection (marrying empirical evidence with design detection criteria) and 'intelligent design theory' as a specific application of ID to the question of origins. Unfortunately, popular usage blurs this distinction, using 'intelligent design theory' and 'ID' interchangeably for both aspects. As William A. Dembski writes:

> Intelligent design studies the effects of intelligence in the world. Many special sciences already fall under intelligent design, including archaeology, cryptography, forensics, and SETI (the Search for Extraterrestrial Intelligence). Intelligent design is thus already part of science. Moreover, it employs well-defined methods for detecting intelligence. These methods together with their application constitute the theory of intelligent design [this is ID in the broad sense]. The question, therefore, is not whether intelligent design constitutes a genuine scientific theory but whether, as a scientific theory, it properly applies to biology [this is ID in the narrow sense]. Indeed, the only place where intelligent design is controversial is biology (even physicists are now comfortable talking about the design of the universe).[7]

Alexander's response to ID in the narrow sense bears out Dembski's analysis.

In terms of applying ID to origins, intelligent design theory (which, following convention, I will still shorten to 'ID') *essentially* consists of the following two claims (the first claim is essential to ID in the broad sense while the second is not):

> **ID Claim 1)** There exist one or more reliable tests for detecting intelligent design
> **ID Claim 2)** The cosmos exhibits empirical data that passes one or more tests for reliably detecting intelligent design

Design theorists have defended several methods of design detection, including specified complexity,[8] irreducible complexity[9] and Bayesian probability approaches.[10] Design theorists have proposed that intelligent design can be inferred from several facets of nature, including: cosmic fine-tuning,[11] the fine-tuning of our local cosmic habitat,[12] the origin of life,[13] irreducibly complex bio-molecular machines[14] and the Cambrian Explosion.[15]

One can see that *if* both of the above ID claims are correct, *then* we must draw the conclusion that:

> **Therefore)** The cosmos exhibits empirical data that passes one or more reliable tests for intelligent design

The soundness of this logically valid argument is what we might call the 'core claim' of intelligent design theory. ID theorists additionally claim that:

> **ID Claim 3)** Inferring intelligent design from empirical evidence using reliable tests can be regarded as a *scientific* enterprise (rather than a philosophical or theological enterprise).

The conjunction of the claim to scientific legitimacy with the above 'core claim' constitutes what DeWeese and Moreland call the 'central aspect' of intelligent design theory. As David DeWolf, John West, Casey Luskin and Jonathan Witt state: 'ID only claims that there is empirical evidence that key features of the universe… are the products of an intelligent cause.'[16] ID is philosophically minimalist, being neither 'creationism'[17] nor natural theology.[18] As Marcus Ross and Paul Nelson observe, ID is compatible with: 'all those teleological views that allow for the empirical detection of real design.'[19]

## Better to be unscientific and true than scientific but false

The third ID claim invites debate about how best to classify the core claim of intelligent design theory. However, this debate should not be confused with the debate about whether the core claim of ID is sound. The question of whether or not intelligent design theory is science is not the same question as whether or not the core claim of ID is sound, since arguments and theories may be the latter (may be true) without being the former (without being scientific), and vice versa. Anyone arguing that arguments cannot be true unless they are scientific would be advancing a self-contradictory position.

Whether or not ID may legitimately be regarded as science is an important question. Nevertheless, it is not the most crucial question. Rather, the most crucial question is whether the core claim of ID, represented in the above syllogism, is not merely logically valid (which it is), but sound (i.e. whether both premises are true). As Francis J. Beckwith argues:

> whether ID fits some a priori definition of 'science' or 'pseudo-science' is a red herring, for such definitions tell us nothing about whether a theory and/or explanation, such as ID, provides us with real knowledge of the order and nature of things.[20]

In Stephen C. Meyer's judgement: 'the question whether a theory is scientific is really a red herring. What we want to know is not whether a theory is scientific but whether a theory is true or false, well confirmed or not, worthy of our belief or not.'[21]

## Alexander's Minimal Commitment to ID's Core Claim

It seems clear from his writings that Alexander accepts a minimal version of the core ID argument, based wholly upon the 'anthropic' fine-tuning of the universe combined with an implicit use of specified complexity as a design detection criterion (the utility of specified complexity as a design detection criteria is, implicitly and even explicitly, common ground amongst ID proponents and scholars without the ID movement from both theistic and naturalistic perspectives[22]). At least implicitly speaking, Alexander accepts both premises of the core claim of intelligent design theory. Where Alexander parts company from ID is over the claims that anything besides the fine-tuning of the universe merits a design inference and that intelligent design theory (as distinguished from ID in its broad sense) is science. Nevertheless, it is important to note the existence of common ground between Alexander, ID in its broad sense, and the core claim of ID in its narrow sense.

In *Rebuilding the Matrix* Alexander observes that the search for extra-terrestrial intelligence: 'is based on the assumption that a single message from space will reveal the existence of intelligent life elsewhere in the universe.'[23] He quotes Norman L. Geisler with approval: 'even if the object of pursuit is the reception of only one message, nevertheless, the basis of knowing that it was produced by intelligence is the regular conjunction of intelligent beings with this kind of complex information.'[24] Although Alexander does not make it explicit, the 'kind of complex information' Geisler is talking about is complex *specified* information.[25] Alexander argues for design on the basis of the fine-tuning of cosmic constants in the big bang:

> we have argued that the universe has some very unusual properties that render conscious life possible – and that those properties are not unusual because we observe them but because the physical constants that make them unusual could, presumably, have been otherwise.[26]

Alexander's teleological argument is based upon the existence of 'unusual properties', i.e. an unlikely or *complex* set of physical properties, that are *specified* as the set of properties 'that render conscious life possible'. While Alexander doesn't use the *terminology* of specified complexity, his argument nevertheless *uses* specified complexity by appealing to the combination of complexity ('unusual properties') with a specification ('render conscious life possible'). Alexander's reliance upon specified complexity is emphasised by the fact that he quotes design-theorist and philosopher William Lane Craig in defence of the argument from fine-tuning: 'we should be surprised that we do observe basic features of the universe which individually or collectively are excessively improbable [complexity] and are necessary conditions of our own existence [specification].'[27] Craig explicitly advances the anthropic argument in terms of a design inference from specified complexity.[28]

Alexander paints two scenarios to push home the point that one cannot sidestep this argument by noting that we would not exist to be surprised by fine-tuning if that tuning were not as fine as it is. The first story involves a kidnapped accountant told that unless he wins the national lottery for ten consecutive weeks he will be killed, who is surprised to survive (at odds of around 1 in $10^{60}$), but who is told

that: 'he should not be surprised that such an unlikely event happened for, had it not, he would not have been alive to observe it.'[29] Clearly, the accountant is right to be surprised, and to suspect that there must be an explanation for his survival. The second story concerns a gambler who will be killed unless he gets ten coins-flips in a row to show heads: 'the fact of the gambler still being alive does not explain why he got ten heads in a row... What requires explanation is not that the gambler is alive and therefore observing something but rather that he is not dead.'[30] Indeed, what requires explanation, in both stories, is the occurrence of unlikely (i.e. complex) events that are also specified. Likewise, in the case of the anthropic argument, what requires explanation is that: 'our finely tuned universe is not just any old "something", but contains within it a planet full of people who postulate theories about cosmology and the meaning of the universe…'[31] Alexander rightly argues that an explanation of fine tuning, indeed *an explanation in terms of design*, is required not simply because the fine-tuning represents an *unlikely* (complex) set of constants, but because the particular constants that happen to exist are *specified* as necessary pre-conditions for the existence of complex life:

> The data pointing to a series of remarkably finely tuned constants [complexity] which have promoted the emergence of conscious life [specification] sit more comfortably with the idea of a God with plans and purposes for the universe than they do with the atheistic presupposition that 'it just happened'.[32]

Alexander deploys specified complexity as an argument for the conclusion that the data of cosmic fine-tuning demands an explanation rather than an evasion. He also uses specified complexity as a basis for inferring that the best explanation of cosmic fine-tuning is intelligent design; for the *reason* that the specified complexity of cosmic fine-tuning 'sits more comfortably with the idea of a God with plans and purposes for the universe than they do with the atheistic presupposition that "it just happened"'[33] is surely: 'the regular conjunction of intelligent beings with this kind of complex information.'[34]

I am happy to be able to share common ground with Alexander concerning specified complexity as a design detection criterion and its applicability to the fine-tuning of the cosmos. Nevertheless, in an excellent inaugural lecture for *Christians in Science* delivered at Southampton University, Alexander made it clear that he has: 'no problem with the language of design so long as its kept to the big picture [to] design which makes science possible [and which is seen in] the anthropic structure of the universe.'[35] This is as far as Alexander goes with the application of ID (in the minimal sense) to nature. He rejects the proposition that his design inference from the fine-tuning of the cosmos can be legitimately described as a scientific inference (perhaps because he infers specifically divine design rather than merely inferring intelligent design). He rejects the proposition that any aspect of creation besides cosmic fine tuning warrants a design inference by the same criteria of specified complexity; and he rejects the proposition that 'irreducible complexity' constitutes a reliable design detection criteria because he rejects the proposition that anything biological can be non-vacuously described as irreducibly complex.

However, just as Phillip E. Johnson has asked Darwinists 'What should we do if empirical evidence and materialist philosophy are going in different directions?'[36], so I would ask Alexander: 'What if empirical evidence which triggers a design inference, according to the criteria that he applies to 'the big picture' of fine-tuning,

were shown to exist within any of the *details* of that picture?' Which should we then deny: a) the empirical evidence, b) our shared design-detection criteria, c) the logical validity of the core ID argument, or d) objections to invoking the language of design within science? A positive assessment of the core claim of ID provides one with a powerful reason to reject objections to invoking the language of design within science. Suppose that the core claim of ID was sound, but we nevertheless wanted to say that ID was not science. Would we not then have a powerful case for diverting resources from university science departments to university departments of philosophy in order to further our understanding of origins? But surely this implausible consequence is a *reductio ad absurdum* of the position that the core claim of ID could be true without our counting intelligent design theory as science.[37] That is, the core claim of ID seems to entail (although not in a strict logical sense) the remaining element of the 'central aspect' of ID.[38] As Norman L. Geisler warns:

> Even if one… insists, for whatever reason, to exclude all but natural causes from the word science, that does not invalidate supernatural causes or their study. They simply move to another area of intellectual endeavour, be it 'philosophy' or whatever. Science is simply impoverished in its own search for truth.[39]

## Foundation's End

Alexander doesn't consider his design inference from cosmic fine tuning to be a scientific argument (he presumably considers it a philosophical argument) because he believes that: 'scientific theories operate at a different level from foundational questions such as "Why are scientific laws the way they are?"'[40] But just how 'foundational' a question is this? Not as foundational as: 'Why are there any scientific laws in the first place?' Yet it is due to the assumption that 'Why are scientific laws the way they are?' is a *foundational* question that Alexander thinks it is illegitimate to place a design inference from the laws of nature in the same (supposedly 'scientific') category as purported design inferences from other data (e.g. the origin of life).

'Science uncovers what the laws of the created order are and uses them', says Alexander, perhaps with the implication that science uses *only* such laws in its explanations: 'but the "why" question operates at a different kind of level.'[41] However, whether or not science operates at a different level from the question of why the laws of nature are fine tuned, and whether or not science only explains by discovering and using the laws of the created order, depends upon one's definition of science. If ID can be classed as science, then science does not necessarily explain by discovering and using the laws of the created order. Indeed, J.P. Moreland points out that: 'scientists do not always engage in explaining by reference to natural law… scientists sometimes explain something by appealing to a brute given that is not itself a scientific law and is not capable of being subsumed under more general law.'[42] Nor does science necessarily operate at a different level from the question of why the laws of nature are finely tuned. A design theorist can agree with Alexander that science operates at a different level to foundational metaphysical and theological explanations of reality, whilst simultaneously raising the bar on just how far scientific theorising can take us. For the ID theorist, science can explain why the laws of nature are fine tuned as they are, but it nevertheless cannot explain why laws of nature should exist in the first place. As William A. Dembski explains:

> We need here to draw a clear distinction between creation and design. Creation is always about the source of being of the world. Design is about arrangements of… materials that point to an intelligence. Creation and design are therefore quite different. One can have creation without design and design without creation… It is logically possible that God created a world that provides no evidence of his handiwork. By contrast, it is logically possible that the world is full of signs of intelligence but was not created. This was the ancient Stoic view, in which the world was eternal and uncreated, and yet a rational principle pervaded the world and produced marks of intelligence in it… Creation asks for an ultimate resting place of explanation – the source of being of the world. Design, by contrast, inquires not into the ultimate source of matter and energy but into the cause of their present arrangements, particularly those entities, large and small, that exhibit signs of intelligence… Design arguments can tell us that certain patterns exhibited in nature reliably point us to a designing intelligence. But there's no inferential chain that leads [directly] from such finite design-conducing patterns in nature to the infinite, personal, transcendent Creator God of Christianity.[43]

## Claim One: Intelligent design theory is not science

'The scientific frame of mind should not *legislate* what kind of explanations there can be. Rather, it should *look* for the best explanation possible.' – Norman L. Geisler[44]

Before considering the specifics of Alexander's attack on the scientific status of intelligent design theory it is worth noting that his general strategy - proposing necessary criteria for specifically *scientific* explanations and then judging a proposed explanation negatively with respect to those criteria - is deeply controversial. Paul K. Moser and David Yandell warn that anyone proposing demarcation criteria for science is entering the arena not of science but of philosophy: 'Sweeping metaprinciples about the nature of legitimate inquiry… are not the fruits of the empirical sciences; they rather issue from philosophy…'[45] According to philosopher of science Del Ratzsch: 'there is no universally accepted *formal* definition of *science*, and proposed definitions almost invariably run into nasty difficulties sooner or later. That makes reliance upon a definition of science a bit "iffy".'[46] As historian and philosopher of science Bruce L. Gordon explains:

> There is no consensus among philosophers of science as to what constitutes a proper scientific explanation or what criteria a theory must possess in order to be truly scientific. *Despite extensive attempts, criteria that indisputably demarcate science from non-science or pseudo-science have never been offered*. The failure of these efforts gives us a strong reason to suspect that no such criteria exist.[47]

Samir Okasha writes that: 'whether or not we accept Popper's negative assessment of Freud and Marx, his assumption that science has an "essential nature" is questionable.'[48] Martin Eger declares: 'Demarcation arguments have collapsed. Philosophers of science don't hold them anymore. They may still enjoy acceptance in the popular world, but that's a different world.'[49] Stephen C. Meyer observes that:

> most contemporary philosophers of science regard the question 'What methods distinguish science from non-science?' as both intractable and uninteresting… philosophers of science have increasingly realized that the real issue is not whether a theory is scientific but whether it is true or warranted by the evidence.[50]

Hence, as Francis J. Beckwith writes:

> one can raise the question of whether there are any… demarcation theories that are noncircular and at the same time may work legitimately to exclude ID. To my knowledge there are none. The overwhelming consensus in philosophy of science is that demarcation criteria are doomed to failure…[51]

With these warnings in mind, we can begin to consider Alexander's demarcation criteria.

## Alexander's Informal Criteria

Alexander complains that:

> It is not enough in this context to argue… that the 'design inference' can be justified as a scientific theory on the grounds that 'design inferences' are made in 'archaeology, cryptography and forensic science'. These are all examples where we already know that purposive human behaviours are involved, so we are not surprised at finding evidence for such behaviour. But these kinds of analogies are, I would suggest, simply irrelevant for understanding biological entities. The SETI example is likewise bogus – for analogies to work there must be at least some connection between the two entities being compared. But it is not [at] all obvious to me why the SETI programme should have anything to do with understanding the origins of the flagellum. This is comparing apples and oranges![52]

These comments appear in Alexander's paper before he formally argues against the scientific status of ID on the basis of two necessary conditions of scientific theory making not mentioned here. As such, I will consider these remarks as Alexander's *informal* attempt to establish the same conclusion concerning the scientific status of ID.

### *A Priori* and *A Posteriori* Evidence

Alexander grants that design inferences are legitimate scientific explanations as long as a) 'we already know that purposive human behaviours are involved'[53] and b) we are therefore 'not surprised at finding evidence for such behaviour.'[54] But of course, the archaeologist or forensic scientist does *not* know *a priori* that purposive human behaviours are involved in the explanation of their latest set of data (e.g. a flint, a corpse). They may well know that purposive human behaviour is a *possible* explanation of their latest find, inasmuch as they may know that humans existed at the time from which their latest find originates; but they may not and certainly need not know this. All the archaeologist or forensic scientist assumes (or at least all they

actually need to assume) is that intelligent design is a *possible* explanation for the things they see. These scientists infer design from empirical evidence *a posteriori*.

If an archaeologist infers intelligent design as the best explanation of a flint they will probably chalk that design up to purposive human behaviour. It is logically possible that the flint was chipped into an arrow head by a visiting alien, but in the absence of evidence for this explanation Occam's razor favours the terrestrial explanation because we have independent evidence for the existence of terrestrial designers. However, it is easy enough to imagine scenario's wherein it would clearly be legitimate to infer design quite apart from any prior or independent knowledge about the existence of any particular candidate designer/s. Suppose an archaeologist discovered an object that justified a design inference on account of its specified complexity – for example, a statue like those on Easter Island - but which was dated (by carbon dating, etc.) to a time long before hominids are currently thought to have existed on earth, or which is found lying in the sands of Mars when the first manned expedition arrives.[55] According to Alexander's informal criteria, the archaeologist in such a situation would have to conclude that since they *are* 'surprised' to see such evidence of design, and since they do not already know that intelligent agents existed at the time or place their find originated (indeed, since the prior evidence indicated that intelligent agents did not exist at this time or place), the obvious conclusion that the find is the result of intelligent design is *thereby* rendered non-scientific! This seems to me a *reductio* of Alexander's criteria; in which case design inferences cannot be excluded from science when we don't 'already know that purposive human behaviours are involved'[56] and we are therefore 'surprised at finding evidence for such behaviour.'[57]

**Analogy or Identity?**

Alexander treats the design inference from the details of nature as an argument by analogy with design inferences within sciences such as archaeology and SETI. He objects that this analogy is 'irrelevant' and 'bogus' for forming our scientific understanding of biological entities, because the analogy is non-existent (or at least, too weak to work):

> for analogies to work there must be at least some connection between the two entities being compared. But it is not [at] all obvious to me why the SETI programme should have anything to do with understanding the origins of the flagellum. This is comparing apples and oranges![58]

Let me attempt to explain what the SETI programme has to do with understanding origins (of the flagellum etc.). The design inference is not an argument by analogy of the sort described by Alexander. 'SETI', writes Alexander: 'is based on the assumption that a single message from space will reveal the existence of intelligent life elsewhere in the universe.'[59] As Geisler explains: 'even if the object of pursuit is the reception of only one message… the basis of knowing that it was produced by intelligence is the regular conjunction of intelligent beings with this kind of complex information.'[60] If some detail of the natural world, such as the fine tuning of the solar system, RNA, or a bio-molecular machine exhibits *exactly the same* property of complex specified information, then a standard inferential argument warrants positing exactly the same kind of cause: intelligent design. Even if the object of pursuit is a one-of-a-kind structure or event, 'the basis of knowing that it was produced by

intelligence' is not an argument by analogy with SETI, but: 'the regular conjunction of intelligent beings with this kind of complex information.'[61] Alexander cannot exclude intelligent design theory from science on the basis that its core claim lacks a sufficiently close analogical relationship with design inferences he admits are scientific, because intelligent design depends upon an inferential argument from *identical effects*: 'intelligence is a generic quality, one that leaves a signature that can be identified by techniques already heavily employed in such fields as cryptography, anthropology, forensics and computer science.'[62] ID claims that since specified complexity exhibited by situations where its cause is known on other grounds is always the product of intelligent design, discovering the *identical* property of specified complexity in situations where its cause is not known on other grounds is therefore best explained by an identical type of cause: intelligent design. As Norman L. Geisler explains:

> Archaeology posits an intelligent cause for pottery. Anthropologists do the same for ancient tools. Likewise, when [ID theorists] see the same kind of specified complexity in a simple one-cell animal, such as the first living thing is supposed to be, they too posit an intelligent cause for it.[63]

Alexander's informal attempts to exclude intelligent design theory from science are inadequate to the task. What of his formal attempt?

# Alexander's Formal Criteria of Scientific Theory Making

According to Alexander:

> the 'design inference' fails to count as a scientific explanation for anything… it fails to meet the most basic criteria of scientific theorising and practice.[64]

To substantiate this claim, Alexander advances two necessary conditions of scientific theory making.

## Alexander's First Rule of Science: Methodological Naturalism

Alexander's first necessary condition of 'biological explanations in science'[65] amounts to an endorsement on his part of hard-line 'methodological naturalism':

> An essential criterion for all such scientific theories is that they elucidate the properties of matter...[66]

Alexander also states that biological explanations 'relate to physical components in the actual world around us.'[67] In *Rebuilding the Matrix* he states that (within science): 'Questions about physical phenomena require physical answers.'[68] Of course, ID is concerned to elucidate the properties of matter and to pursuing physical explanations relating to physical components in the world around us. The problem is, this isn't *all* that ID attempts to do, whereas Alexander makes such activity 'essential' to scientific theory making.

Alexander does not deploy the *terminology* of 'methodological naturalism'; no doubt because he wishes to avoid any impression that science is *metaphysically* naturalistic, or implies a 'two-tier' worldview. However, as the established

terminology in the philosophy of science 'methodological naturalism' carries none of the associations that Alexander wishes to distance from himself. Indeed, the phrase 'methodological naturalism' was apparently coined by theistic evolutionist Paul de Vries in a 1983 conference paper subsequently published as 'Naturalism in the Natural Sciences,' *Christian Scholar's Review*, 15 (1986), 388-396. De Vries distinguished between 'methodological naturalism', as a disciplinary method that is *neutral* concerning God's existence and 'metaphysical naturalism', which 'denies the existence of a transcendent God.' Hence De Vries states that the goal of the natural sciences is: 'to place events in the explanatory context of physical principles, laws, fields… the natural sciences are committed to the systematic analysis of matter and energy within the context of methodological naturalism.'[69] Methodological naturalism (MN) has thus been defined as the idea that: 'scientific method requires that one explain data by appealing to natural laws and natural processes.'[70] However, the very *raison deter* of MN is to imply nothing about the ontological or metaphysical status of those 'properties of matter' and 'physical components in the actual world around us' mentioned by Alexander. Hence theistic evolutionist Nancy Murphy, a philosopher at Fuller Seminary, asserts: 'Science qua science seeks naturalistic explanations for all natural processes… Anyone who attributes the characteristic of living things to creative intelligence has by definition stepped into the arena of either metaphysics or theology.'[71]

However, as Del Ratzsch comments: 'appeal to definition cannot be the whole story.'[72] Despite its popularity among scientists, MN is a highly problematic and widely disputed philosophical rule. As DeWeese and Moreland report: 'The inadequacy of methodological naturalism [is] widely acknowledged by philosophers of science, even among those who are atheists…'[73] For example, philosopher of science Larry Laudan: 'rejects methodological naturalism as a demarcation criterion for science.'[74] According to Laudan:

> If we would stand up and be counted on the side of reason, we ought to drop terms like 'pseudo-science' and 'unscientific' from our vocabulary; they are just hollow phrases which do only emotive work for us.[75]

Elsewhere Laudan writes: 'There is no demarcation line between science and non-science, or between science and pseudoscience, which would win assent from a majority of philosophers.'[76] Hence Darwinist Michael Ruse acknowledges:

> It would indeed be very odd were I and others to simply characterize 'science' as something which, by definition, is based on (methodological) naturalistic philosophy and hence excludes God [or, therefore, intelligent design].[77]

Noted philosopher Willard Quine was a similarly pragmatic naturalist: 'If I saw indirect explanatory benefit in positing sensibilia, possibilia, spirits, a Creator, I would joyfully accord them scientific status too, on a par with such avowedly scientific posits as quarks and black holes.'[78] Likewise philosopher of science Philip Kitcher: 'Even postulating an unobserved Creator need be no more unscientific than postulating unobservable particles. What matters is the character of the proposals.'[79] Hence Moser and Yandell conclude: 'We find no basis in the empirical sciences for the kind of standard needed by methodological naturalists. The prospects for methodological naturalism… seem bleak now.'[80]

**The History of Science vs. Begging the Question**

'To redefine science so as to eliminate the possibility of an intelligent cause is contrary to the very commencement and character of modern science itself.' - Norman L. Geisler[81]

In his *Optiks*, Newton wrote that: 'the business of science is to deduce causes from effects, till we come to the very first cause, which certainly is not mechanical.'[82] Newton's first Rule of Reasoning in Philosophy (i.e. science), from volume two of the *Principia*, is that: 'We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances. To this purpose the philosophers say that Nature does nothing in vain, and more is in vain when less will serve…'[83] In other words, science is a search for the best (simplest adequate) explanation of material reality *simpliciter*, and that explanation may not be 'mechanical' in nature, but intelligent. As Stephen C. Meyer points out, 'Theoretically there are at least two possible types of causes: mechanistic and intelligent'[84] – and ruling out either type of cause *a priori* when arguing that the other type of cause is the best explanation of a given effect is simply to beg the question. Newton did not beg the question against intelligent causes, and hence felt free to argue in the *General Scholium* that: 'this most beautiful system of sun, planets, and comets could only proceed from the counsel and dominion of an intelligent and powerful Being.'[85] As Paul Nelson writes:

> The founders of western science did not know about DNA, but they certainly knew how to recognise design. Knowledge of intelligent causation (design) was not placed in a separate rank from knowledge of natural causation (physical regularities and chance events), such that knowing that a stone will fall to the ground when thrown counted as genuine *scientia*, whereas knowing that a letter had an author did not. The very suggestion would have been seen by such early giants of science as Robert Boyle or Isaac Newton as laughable.[86]

In *Rebuilding the Matrix*, Alexander asserts that 'there is nothing that scientists can describe which is not part of the nexus of the secondary causes that comprise God's actions'[87]; which is well and good except for the fact that it begs the question against the true explanation of anything described by scientists being God acting as a primary cause. Alexander states:

> The theistic claim is that the created order, complete with its biological diversity, has been brought into being and continues to exist by God's will. The claim says nothing about the mechanisms by which this has occurred in the past or continues to occur in the present. It is the task of biologists (and others) to elucidate such mechanisms.[88]

If 'mechanisms' is defined in a methodologically naturalistic manner that excludes primary actions performed by God (being equivalent to Newton's use of 'mechanical'), then Alexander's statement begs the question against Newton's first rule of natural philosophy and thereby divorces science from the pursuit of truth. As Alexander himself argues:

> The traditional Christian theist has a 'voluntaristic' doctrine of God, meaning that, unlike Plato's demiurge, God is free to act in any way he chooses, unrestricted and unfettered… this doctrine provided a powerful support for science in stimulating the early natural philosophers to investigate what God had actually done in the created order in contradistinction to the rationalistic scholastic philosophers who thought they could derive what God ought to have done from first principles. Therefore when it comes to scientific explanations and models of how things work, the theist need have no hidden theological investment in supporting one model over another… Scientists are meant to be empiricists not dogmatists.[89]

By rejecting methodological naturalism, ID rejects dogmatism and allows scientists to be empiricists.

**Defining Science Informally Without Begging the Question**

'Science is the search for truth.' – Linus Pauling

Turning from attempted formal definitions of science to *informal* definitions, Del Ratzsch takes a dim view of begging the question against supernatural causation:

> One such definition is that science is an attempt to get at the truth *no holds barred*. That is not likely to provide support for attempts to bar particular concepts. The scientific attitude has usually been characterized as a commitment to following the evidence wherever it leads. That does not look like promising ammunition for someone pushing an official policy of refusing to allow science to follow evidence to supernatural design no matter what the evidence turns out to be… [Such an approach] commits science to either having to deliberately ignore major (possibly even *observable*) features of the material realm or having to refrain from even considering the obvious and only workable explanation, should it turn out that those features clearly resulted from supernatural activity… any imposed policy of naturalism in science has the potential not only of eroding any self-correcting capacity of science but of preventing science from reaching certain truths. Any imposed policy of methodological naturalism will have precisely the same potential consequences.[90]

Applying this problem to the debate about evolution, philosopher Robert C. Koons comments:

> If one is absolutely committed to the materialistic model, then of course something like Darwinism must be the true explanation of life. However, this provides no reason whatsoever for those not so committed to limit the scope of scientific theorizing to models that would be acceptable to the committed materialist.[91]

Alexander's empiricist affirmation that 'The purpose of scientific theories in biology is to explain the relationships between all those components of the created order which comprise living matter',[92] is thus in tension with his dogmatic commitment to the methodologically naturalistic claim that 'An essential criterion for all such

scientific theories is that they elucidate the properties of matter...'[93] As Jay Wesley Richards argues: 'Methodological naturalism… contradicts the true spirit of science, which is to seek the truth about the natural world, no holds barred.'[94] I would encourage Alexander to reject the dogmatism represented by methodological naturalism and to consistently embrace the empiricism represented by his assertion (made in a letter to *The Guardian*) that: 'God can bring about his intentions any way he chooses, and all that scientists can do is try to describe how he did it.'[95]

## Methodological Naturalism and History: A Dilemma for Alexander

'There is no valid reason supernatural explanations should be excluded from an academic endeavour interested in finding and teaching the truth about our world.' – Norman L. Geisler[96]

As William P. Alston observes: 'There are Gospel critics who reject, on principle, any reports of divine intervention in the affairs of the world, anything that God is reported to have brought about other than what would have happened had only natural, this-worldly influences been involved.'[97] According to New Testament scholar R.T. France: 'the historical evidence [concerning Jesus] points to conclusions which lie outside the area which some modern scholars will allow to be "histocial".'[98] These are the very conclusions that apologists from the time of the apostles (e.g. John, Luke, Paul and Peter) to contemporary Christian scholars (e.g. Craig L. Blomberg, William Lane Craig, Norman L. Geisler, Gary R. Habermas and J.P. Moreland) believe can be legitimately supported by combining standard historiography with relevant evidence.[99] Hence William Lane Craig notes that:

> natural theologians who argue inductively must confront the same obstacle as Christian evidentialists do in history, namely, methodological naturalism. It is frequently asserted that the professional scientist or historian is methodologically committed to seeking only natural causes as explanations of their respective data, which procedure rules out inference to God as the best explanation.[100]

For example, according to Albert Schweitzer: 'the exclusion of miracle from our view of history has been universally recognized as a principle of criticism, so that miracle no longer concerns the historian either positively or negatively.'[101] Likewise, D.E. Nineham asserts:

> It is of the essence of the modern historian's method and criteria that they are applicable only to purely human phenomena, and to human phenomena of a normal, that is non-miraculous, non-unique, character. It followed that any picture of Jesus that could consistently approve itself to an historical investigator using these criteria, must *a priori* be of a purely human figure and it must be bounded by his death.[102]

More recently, the Jesus Seminar has contended that the historical Jesus must *by definition* be a non–supernatural figure.[103] In justifying this stance, the Seminar reference D.F. Strauss (the 19th century German Bible critic) according to whom God does not act directly within the world, but only indirectly through natural, secondary causes. Regarding the resurrection, Strauss stated that the hypothesis that God raised

Jesus from the dead: 'is irreconcilable with enlightened ideas of the relation of God to the world.'[104] As the Seminar explain:

> Strauss distinguished what he called the 'mythical' (defined by him as anything legendary or supernatural) in the Gospels from the historical… The choice Strauss posed in his assessment of the Gospels was between the supernatural Jesus - the Christ of faith - and the historical Jesus.[105]

The Seminar endorses Strauss's distinction between the historical Jesus and the Christ of faith as: 'the first pillar of scholarly wisdom.'[106] By adopting methodological naturalism as a necessary condition of historical theory making, the Jesus Seminar guarantee supernatural, miraculous explanations are *by definition* non-historical (although not necessarily non-factual), irrespective of the empirical evidence. On such a definition of history, arguing for the resurrection as the best explanation of the available evidence would be seen as a miracle-of-the-gaps argument. As William Lane Craig comments:

> If you *begin* by presupposing naturalism, then of course what you wind up with is a purely natural Jesus! This reconstructed, naturalistic Jesus is not based on evidence, but on definition. What is amazing is that the Jesus Seminar makes no attempt to defend this naturalism; it is just presupposed. But this presupposition is wholly unjustified.[107]

Since Christian theistic evolutionists are not *deistic* evolutionists, they believe in the historicity of biblical miracles – especially the resurrection – and discount accusations that such a belief is founded upon an argument from ignorance, or a 'gap' argument. For example, theistic evolutionist Keith Ward argues for belief in Jesus' Virgin birth on the basis of the biblical witness in Matthew and Luke, under-girded by the observation that:

> it is indeed irrational to deny the possibility of miracles. If there is a God, who creates and holds in being the whole of the natural world at every moment, then it is true that all the laws of physics and chemistry and so on must be held in being by him. We may well hope that he will continue to allow such laws to operate; otherwise we would never quite know what was going to happen next. But there is no reason at all why he might not sometimes do things which are not predictable from the laws of physics or biology alone. God can do what he wants with his own universe…[108]

Alexander likewise takes a pre-commitment to naturalism in history to task:

> The atheist who believes that the universe is essentially a closed system in which all matter 'obeys' deterministic laws is unlikely to be very open to the possibility that the material world occasionally behaves in an unexpected way… In contrast, the theist who believes that there is a creator-God who is actively sustaining every aspect of the created order will not be surprised if God occasionally chooses to act in an unusual way in a particular historical context… Ironically it is therefore the stance of the atheist that is likely to lead to a closed mind when it comes to the question of evidence for claimed miraculous events ('miracles do not occur by definition')… it is the stance of

> the theist that best exemplifies the general attitude which one hopes characterizes the scientific community as a whole, namely, an openness to the way that world actually is, rather than the attitude more typical of some forms of Greek rationalism, which already knew the answer before the investigation had even begun.[109]

As he says of the debate about historical miracles:

> it is noticeable that the debate on miracles that Hume generated, and which philosophers like Flew have continued, has tended to get bogged down in circular arguments and question-begging prior commitments to philosophical positions that have excluded the possibility of miracles by means of prior definitions.[110]

How can a scientific attitude of openness to the way the world actually is, rather than knowing the answer before investigation even begins, be endorsed regarding events within recorded history, but not regarding events before recorded history? Yet while Alexander does not side with the Jesus Seminar when it comes to recorded history – i.e. he is happy to appeal to God's actions as the best explanation of evidence in 'salvation history' (e.g. evidence concerning Jesus' resurrection) - he isn't happy to appeal to God's actions as the best explanation of evidence in natural history. But arguing for a historical miracle (like the resurrection) on the basis of evidence from human history whilst simultaneously endorsing a methodological rule against arguing for miracles, no matter what the evidence, from natural history, seems both inconsistent and arbitrary (why not reject methodological naturalism in science but endorse it in history?). William Lane Craig argues:

> It is frequently asserted that the professional scientist or historian is methodologically committed to seeking only natural causes as explanations of their respective data, which procedure rules out inference to God as the best explanation. It is puzzling that some methodological naturalists in science… nevertheless want to dismiss methodological naturalism when it comes to history and to affirm the historicity of the gospel miracles. One cannot, it seems to me, have it both ways.[111]

On what grounds can anyone consistently object to the methodologically naturalistic approach to history taken by D.F. Strauss and his followers whilst simultaneously taking a methodologically naturalistic approach to biological or pre-biological history? As Craig writes:

> it has been argued, even by Christian thinkers, that there is a sort of methodological naturalism which must be adopted in science and history. According to methodological naturalism, science and, by implication, history just doesn't deal with supernatural explanations, and so these are left aside… For my part, I see no good reason for methodological naturalism in either science or history.[112]

## Another Dilemma for Alexander

Here is another dilemma for Alexander. Would he say that the stone heads on Easter Island (or a similar item hypothetically discovered on Mars) should be explained only by elucidating the properties of matter? If not, then Alexander must say that science cannot say anything illuminating about the cause of the heads. In which case, either nothing illuminating can be said about the cause of the heads, or something illuminating can be said - but by a subject other than science. If, on the other hand, he would say that the heads can be explained by elucidating the properties of matter, then he has to say that they have a material cause. Does the obvious fact that the Easter Island heads are the result of intelligent design (they exhibit specified complexity) therefore count as a 'material' cause which elucidates the properties of matter? If it is, then 'intelligent design' cannot be discounted as a scientifically legitimate explanation according to Alexander's first rule of science. If not, then Alexander's definition of science unfortunately means that science is forever barred from knowing the true cause of the Easter Island heads, or any other example of intelligent design. In which case, science must excommunicate archaeology, cryptography, forensic science, fraud detection, parapsychology, psychology, sociology and SETI. These sciences all appeal to intelligence in the course of explaining data. But Alexander admits that these are scientific disciplines.

## HMN vs. SMN

One can distinguish between hard and soft versions of methodological naturalism.[113] Hard methodological naturalism (HMN) excludes all *intelligent* causation from scientific explanations - thereby exiling from science many fields of study currently considered scientific and ceding epistemological competency from science to philosophy. On the other hand, soft methodological naturalism (SMN) excludes *supernatural* causation from science, but does permit explanation in terms of *intelligence*. SMN has all of the pragmatic advantages and few if any of the problems associated with HMN; but of course, SMN permits ID to count as science just as effectively as the outright rejection of 'methodological naturalism' endorsed by contemporary philosophers of science. As William A. Dembski observes: 'detecting design... does not implicate any particular intelligence.'[114] Michael J. Behe explains:

> my argument is limited to design itself; I strongly emphasize that it is not an argument for the existence of a benevolent God, as Paley's was. I hasten to add that I myself do believe in a benevolent God, and I recognize that philosophy and theology may be able to extend the argument. But a scientific argument for design in biology does not reach that far. Thus while I argue for design, the question of the identity of the designer is left open... as regards the identity of the designer, modern ID theory happily echoes Isaac Newton's phrase, *hypothesis non fingo*.[115]

David DeWolf *et al* likewise affirm:

> Empirical science cannot determine whether the intelligent cause detected resides inside or outside of nature. That further determination requires more than empirical science. Far from merely being 'rhetorical,' this claim is central

> to the definition of intelligent design as a scientific theory… intelligent design does *not* require a supernatural entity…[116]

(In point of fact, philosophers of science have constructed thought experiments wherein the supernatural can be ruled in by science as the best explanation of certain data. However, this point applies only to very special circumstances, and not to the mere discovery of specified or irreducible complexity.[117])

SMN is not a necessary condition of 'science', but there are good practical reasons for agreeing to practice science within the bounds of SMN. Accepting SMN allows science to continue as a 'big tent' for people of widely differing worldviews. Rather than theists just doing 'theistic science' and atheists just doing 'science' (HMN definition), we can all co-operate in doing science (SMN definition). SMN allows Agnostics, Atheists, Buddhists, Christians, Deists, Jews, Mormons, Muslims, New Agers, Panentheists, Pantheists, Platonists and Raelians to all do science together – which is a good thing. Furthermore, SMN does not risk subverting the truth-seeking intent of science. SMN does limit the epistemological competency of science so defined, but it limits it less than does HMN. Whether an intelligent cause is supernatural or not (a question which SMN leaves to philosophers), it is still an *intelligent* cause, and hence still true to note it as such within scientific theory making. Hence DeWolf *et al* conclude: 'Intelligent design, properly conceived, does not need to violate methodological naturalism.'[118] (Of course, adopting SMN does not entail adopting intelligent design theory.)

## Alexander's Second Rule of Science: Testability

Alexander's second rule of science is that: 'there must be empirical evidence that can count for or against the theory, otherwise it remains vacuous.'[119] He also asserts that: 'The potential to be falsified is a necessary but not sufficient ground for something to count as a scientific theory.'[120] Alexander himself, in *Rebuilding the Matrix*, cautions that testability is not a criterion of science to be embraced naively:

> The idea of potential falsifiability by the methods of science provides a tidy and convenient borderline for differentiating science from non-science… This is not to say that the demarcation line between science and non-science is invariably a sharp one – and it is certainly not static… What counts as a scientific theory worthy of serious testing may also be controversial… it is simply not true that scientists give up their theories that easily after they have set up tests for the theory which have turned out not to support it. In practice the anomalous data are explained away, or reinterpreted or, more often, seen in retrospect not to provide a very good test of the theory.[121]

However, I need not rely upon such caveats, since ID is both testable and falsifiable.[122] In the course of discussing the concept of irreducible complexity, Alexander admits that: 'In this context it is indeed the case that the suggestion made by an ID proponent is falsifiable…'[123] He immediately cautions readers:

> before ID proponents jump on this as support for the idea that ID is a scientific theory after all, it is worth remembering that 'one swallow does not make a spring'. The potential to be falsified is a necessary but not sufficient ground for something to count as a scientific theory.[124]

Nevertheless, since Alexander admits that ID can be framed so that it doesn't contravene his second rule of science, it does seem strange that he takes the time not only to mention this criteria, but also to argue that: 'labelling a biological entity as "designed" leads to no experimental programme that could be utilized to test the hypothesis…'[125] There is a self-contradiction in Alexander's argument at this point. For example, Alexander brings up that organ much featured in 19th century natural theology, the eye:

> I find it intriguing that ID theorists do not present that highly complex structure, the eye, as an example of irreducible complexity; it was, after all, the example that Darwin felt was most difficult to explain by his theory. But we now know a lot about the evolution of the eye, and about how its components have evolved, so perhaps it is not surprising that ID proponents find it an awkward example for their purposes.[126]

ID proponents do not find the eye 'an awkward example for their purposes.'[127] They have no stake in the suggestion, made on their behalf here by Alexander, that the eye is IC (at least when taken as a whole).[128] Nevertheless, the point should be clear that *were* anyone to make the claim that the eye is IC when taken as a whole (a claim William Paley can be read as having made) that claim could be falsified. The claim that a given system is IC is clearly empirically falsifiable.

On the one hand Alexander wants to argue that ID makes 'vacuous'[129] claims that lead to 'no experimental programme that could be utilized to test the hypothesis'[130]; but on the other hand he suggests that ID claims are not only falsifiable in theory, but have been falsified in practice:

> IC is only used by ID proponents such as Behe and Dembski for those systems for which we don't yet know a detailed evolutionary pathway, or at least didn't at the time their particular book was written.[131]

Quite aside from any questioning of the accuracy, or significance, of Alexander's implication here (that claims to the effect that certain biological structures are IC have been falsified by the discovery of detailed evolutionary pathways of sufficient statistical plausibility), it should be obvious that this *is* the implication of what he writes. This being so, Alexander clearly makes the contradictory claims that designating things as IC is *not* experimentally testable, and that designating things as IC *is* experimentally testable. However, he can't have it both ways; and indeed, he explicitly admits that designating things as IC *is* experimentally testable: 'it is indeed the case that the suggestion made by an ID proponent is falsifiable…'[132] Likewise, Darwinist and ID critic Massimo Pigliucci affirms that: 'the concept of irreducible complexity is, in fact, falsifiable…'[133] Hence Alexander's second rule of science turns out to be a red herring that fails to support his view that ID is not science.

ID theorists do not use IC of *any and all* systems for which we do not know of detailed, sufficiently probable evolutionary pathways; but *of course* they only designate as IC systems concerning which we lack knowledge of such a pathway, for the simple reason that any system that could have evolved with sufficient probability via such a pathway provides no evidence of design. This is why the claim that a system is IC is falsifiable. As Dembski points out, to falsify the claim that a system is

IC one need only discover a sufficiently detailed and probable indirect evolutionary pathway to its existence:

> If it could be shown that biological systems that are wonderfully complex, elegant and integrated – such as the bacterial flagellum – could have been formed by a gradual Darwinian process (and thus that their specified complexity is an illusion), then intelligent design would be refuted on the general grounds that one does not invoke intelligent causes when undirected natural causes will do. In that case Occam's razor would finish off intelligent design quite nicely.[134]

As philosopher of science and ID critic Bradley Monton concludes: 'ID should not be dismissed on the grounds that it is unscientific.'[135]

# Claim Two: It is not possible to define biological entities as 'irreducibly complex' in a meaningful fashion

'Behe... does have a point concerning irreducible complexity...'
– Massimo Pigliucci[136]

Alexander's assertion (true or false) that the designation of certain biological systems as irreducibly complex has been falsified contradicts not only to his assertion that ID is not falsifiable, but the assertion that it is not possible to define biological entities as IC in a meaningful fashion. If it is not possible to define biological entities as IC in a meaningful fashion, how can anyone present empirical evidence showing that any given biological entity is not IC? If I claim that a biological system is 'snuguffly' – a word I have just invented – how could anyone meaningfully claim to show that the system in question is *not* 'snuguffly'? Showing that something is not 'snuguffly' assumes that something can be meaningfully defined as being 'snuguffly'. Likewise, the claim that something biological is not IC assumes that it is possible to define a biological system as IC in a meaningful fashion. Alexander's assertion that claims about irreducible complexity are falsifiable, contradicts his assertion that it is not possible to define biological entities as IC in a meaningful fashion.

## Making Warranted Claims about Irreducible Complexity

I propose that in order to make a warranted claim that a given biological system is irreducibly complex it is necessary and sufficient that we fulfil the following two conditions:

> **Condition 1)** Provide a sufficiently clear and coherent definition of 'irreducible complexity'
> **Condition 2)** Show that it is more reasonable than not to accept that something in the biological world falls under the definition of IC

Let us tackle these two conditions in turn.

**Condition 1)** Provide a sufficiently clear and coherent definition of 'irreducible complexity'

The general concept behind 'irreducible complexity' is not new. Paley pointed out that not only is a watch's purpose carried out by the complex sum of its many parts, but that purpose would not be carried out: '*if its different parts had been differently shaped from what they are, or placed after any other manner or in any other order than that in which they are placed*...'[137] As the twentieth century British philosopher A.E. Taylor argued, what makes an inference to design irresistible in the case of a watch is: 'the way in which *the various parts... are co-adapted to produce a unitary result, and a result which cannot be effected until they are all assembled in a definite way*.'[138] Taylor argued that: 'the thorough-going co-adaptation of the parts of organisms to contribute to *a unitary result which will only emerge when the organism is mature* may be ascribed to "prospective contrivance" with an even higher degree of probability.'[139]

Charles Darwin may even have been drawing upon Paley when he noted in the *Origin* that: 'If it could be demonstrated that any complex organ existed which *could not possibly have been formed by numerous, successive modifications*, my theory would absolutely break down.'[140] Darwin laid the bet that no such system would be discovered. Richard Dawkins places the same bet today when he acknowledges that Darwin's remark: 'is valid and very wise... his theory is indeed falsifiable... and he puts his finger on one way in which it might be falsified'.[141] Dawkins asserts that: 'not a single case is known to me of *a complex organ that could not have been formed by numerous slight [un-guided] modifications*. I do not believe that such a case will ever be found.'[142] (Like Darwin, Dawkins illegitimately raises the standard of proof required by his bet to a level that all but insures against his ever losing the bet.) Nevertheless, he concedes: 'If it is – it'll have to be a really complex organ, and... you have to be sophisticated about what you mean by "slight" – I shall cease to believe in Darwinism.'[143] Like Darwin then, Dawkins has a lot riding on the universal negative proposition that nothing in nature is irreducibly complex.

Evolutionary biologist and philosopher Massimo Pigliucci acknowledges that: 'irreducible complexity is indeed a hallmark of intelligent design.'[144] As atheist philosopher Daniel Dennett, who called IC systems 'the You-Couldn't-Get-Here-From-There Organ or Organism,'[145] admits:

> If there are *designs that cannot be approached by a gradual, stepwise redesign process in which each step is at least no worse for the gene's survival chances than its predecessor*, then the existence of such a design in nature would seem to require, at some point in its ancestry, a helping hand from a foresighful designer...[146]

Pigliucci likewise accepts that the existence of an IC system in nature would be evidence of intelligent design: 'irreducible complexity is indeed a valid criterion to distinguish between intelligent and nonintelligent design.'[147] However, like Darwin, Dawkins and Dennett, Pigliucci thinks that: 'there is no evidence so far of irreducible complexity in living organisms.'[148]

It would therefore seem that scholars of diverse metaphysical persuasions have a sufficiently clear grasp of the notion of an IC system to agree that if an IC system were found in the biological realm it would resist evolutionary explanation, and even that it would provide empirical evidence of intelligent design.

**Darwin's Black Box**

Biochemist Michael J. Behe put new life and specificity into the concept of irreducible complexity by improving the explicit definition of irreducible complexity and applying that definition at the bio-molecular level of cellular machinery unknown even in Taylor's generation.

Behe's most notable presentation of irreducible complexity is *Darwin's Black Box: the Biochemical Challenge to Evolution* (1996/2006), where he defined irreducible complexity as follows:

> By *irreducibly complex* I mean a single system composed of several well-matched, interacting parts that contribute to basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning.[149]

In other words, a single system, one performing a given basic function, is 'irreducibly complex' if and only if it consists in a set of several, well-matched, mutually interacting, non-arbitrarily individuated parts such that each part in this set is indispensable to maintaining the system's basic function.[150] This fulfils the first condition required for the meaningful assertion of IC within biology.

**Condition 2)** Show that it is more reasonable than not to accept that something in the biological world falls under the definition of IC

A review of Behe's analysis of, and design inference from, the bacterial flagellum will not only demonstrate that it is more reasonable than not to accept that something in the biological world falls under the definition of IC, but will be a useful backdrop when answering Alexander's third objection to ID (concerning the proper burden of proof regarding ID claims):

> The flagellum includes an acid powered rotary engine, a stator, O-rings, bushings and a drive shaft. The intricate machinery of this molecular motor requires approximately fifty proteins. Yet the absence of any one of these proteins results in the complete loss of motor function.[151]

The flagellum is clearly: 'a single system composed of several well-matched, interacting parts that contribute to basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning.'[152] One can see from a conceptual analysis that a rotary motor without a propeller, or a drive shaft, or a motor, just won't function: 'Because the bacterial flagellum is necessarily composed of at least three parts – a paddle, a rotor, and a motor – it is irreducibly complex.'[153] Furthermore, experiments have confirmed that eliminating any of the many proteins that form the flagellum results either in the non-appearance of the flagellum or the appearance of a non-functioning machine.

## IC and Intelligent Design

To define a system as IC is not to argue for design by definition, but to lay the foundation for an argument to design. Behe's first point is that if a system is IC then it is impossible to evolve that system via a direct evolutionary pathway: 'An irreducibly

complex system cannot be produced directly... by slight, successive modifications of a precursor system, because any precursor to an irreducibly complex system that is missing a part is by definition non-functional.'[154] Behe admits that: 'although irreducible complexity does rule out direct routes, it does not automatically rule out indirect ones.'[155] However, he argues that the more complex the IC system in question is (i.e. the more necessary parts it contains): 'the more unlikely the indirect routes become.'[156]

Behe does *not* move directly from the unlikelihood of an evolutionary explanation of an IC system to the hypothesis of intelligent design. Rather, he notes that:

> irreducibly complex systems such as mousetraps and flagella serve both as negative arguments against gradualistic explanations like Darwin's and as positive arguments for design. The negative argument is that such interactive systems resist explanation by the tiny steps that a Darwinian path would be expected to take [because direct routes are impossible and indirect routes unlikely]. The positive argument is that their parts appear arranged to serve a purpose, which is exactly how we detect design.[157]

Hence Behe defends his argument against the charge that it is an argument from ignorance:

> there is a *structural reason* - irreducible complexity - for thinking that Darwinian explanations are unlikely to succeed. Furthermore… irreducible complexity is a hallmark of intelligent design... Truncating my case for intelligent design and then saying I commit the fallacy of *argumentum ad ignorantium* is not, in my opinion, fair play.[158]

The inference to intelligent design from irreducible complexity is the default explanation intuitively speaking, and it is supported by a standard inference from the fact that whenever we know the causal history of an IC system it turns out to have originated by intelligent design. The lack of Darwinian explanations for IC systems constitutes a failure to rebut the inference from irreducible complexity to intelligent design (bear this point in mind for later). Indeed, irreducible complexity is simply a concrete type of specified complexity (the criteria Alexander implicitly applies to the fine tuning of the cosmos):

> The irreducibly complex systems Behe considers require numerous components specifically adapted to each other and each necessary for function. On any formal complexity-theoretic analysis, they are complex in the sense required by the complexity-specification criterion. Moreover, in virtue of their function, these systems embody patterns independent of the actual living systems. Hence these systems are also specified in the sense required by the complexity-specification criterion.[159]

**How the Flagellum Evolved?**

Since anything IC cannot be explained in terms of direct evolutionary pathways, any proposed explanation that does not posit intelligent design must be framed in terms of

an indirect evolutionary pathway. Alexander, like fellow Christian biologist Dr Kenneth R. Miller, argues for an indirect explanation in the case of the flagellum by pointing to the existence of the type III secretory system (TTSS). The TTSS is coded for by about ten genes, each of which is homologous to genes in the bacterial flagellum. Miller sees the TTSS as a functional evolutionary precursor of the flagellum capable of being selected for on its own functional merits and then augmented to produce the flagellum. As Behe comments:

> Miller's argument is that because the flagellum is more complex than we thought, that because it can act both as a protein pump as well as an outboard motor, then it is not irreducible. If the motor gets broken, remaining pieces may still act as a pump. That's like arguing that because, in addition to wheels and a motor, a car has a fuel pump, then it isn't irreducible either. If the tires are flat, the fuel pump can still work. Therefore we can imagine that the car could have been put together in small random steps. Such is the rigor of Darwinian thought.[160]

However, as Dembski points out:

> At best the TTSS represents one possible step in the indirect Darwinian evolution of the bacterial flagellum. What's needed is a complete evolutionary path and not merely a possible oasis along the way. To claim otherwise is like saying we can travel by foot from Los Angeles to Tokyo because we've discovered the Hawaiian Islands.[161]

Two final points nail shut the coffin of the TTSS scenario. The first is that: 'The type III system itself is [IC], perhaps with ten IC components.'[162] The second is that the best current molecular evidence: 'points to the TTSS evolving from the flagellum and not vice versa.'[163] As the eminent Yale biochemist Robert Macnab wrote with reference to the TTSS and the flagellum in the *Annual Review of Microbiology* 2003: 'nature has found two good uses for this sophisticated type of apparatus. How they evolved is another matter, although it has been proposed that the flagellum is the more ancient device...'[164]

University of Rochester biologist H. Allen Orr (a critic of Behe) acknowledges:

> it will do no good to suggest that all the required parts of some biochemical pathway popped up simultaneously by mutation. Although this 'solution' yields a functioning system in one fell swoop, it's so hopelessly unlikely that no Darwinian takes it seriously... we might think that some of the parts of an irreducibly complex system evolved step by step for other purposes and were then recruited wholesale to a new function. But this is also unlikely.[165]

Nevertheless, the current favourite among indirect explanations advanced for IC systems is Orr's second option of wholesale co-option from other functions, for as Alexander observes: 'as soon as you have a multi-component system, then of course the chances of it coming into being all at once as a fully functioning system are remotely small…'[166] While the TTSS contains around ten proteins homologous to proteins in the flagellum, the flagellum has another thirty or so proteins, which are

unique to it. As Scott Minnich, Professor of Biology at the University of Idaho, and an expert on the flagellum, says:

> With a bacterial flagellum, you're talking about a machine that's got forty structural parts. Yes, we find ten of them are involved in another molecular machine, but the other thirty are unique. So where are you going to borrow them from? Eventually you're going to have to account for the function of every single part as if originally having some other purpose. I mean you can only follow the argument so far, until you run into the problem that you're borrowing from nothing...[167]

Dembski supposes, purely for the sake of argument, that we discover several molecular systems 'that jointly took into account all the flagellar proteins'.[168] Those proteins would be 'similar but, in all likelihood, not identical to the flagellar proteins (strict identity would itself be vastly improbable)'.[169] Such a hypothetical situation, designed to maximize the chances of an indirect explanation by co-option, 'raises the question how those several molecular machines can come together so that proteins from one molecular machine adopt proteins from another molecular machine to form an integrated functional system like the flagellum'.[170] As Minnich says: 'even if you concede that you have all the parts necessary to build one of these machines, that's only part of the problem. Maybe even more complex is the assembly instructions.'[171] Dr John Bracht, managing editor of the journal *Progress in Complexity, Information and Design*,[172] explains:

> biological functionality is turning out to be much more highly specified and precise than we had originally envisioned... biology is really a science of engineering, where the constraints for bio-functionality are extreme – to the point that nearly every molecular interaction is remarkably precise and tightly controlled. Molecular biology is much like a jigsaw puzzle where each piece must be specifically shaped to fit with the other pieces around it...[173]

Applying these observations to the proposed construction of the flagellum by co-option, Bracht writes:

> The problem is that the proteins which are to become the flagellum are coming from systems that are distinctly non-flagellar in nature... and being co-modified from their original molecular interactions into an entirely new set of molecular interactions. Old interfaces and binding sites must be removed and new ones must be created. But given the sheer number of flagellar proteins that must co-evolve... the Darwinian explanation is [very unlikely and therefore] really no different from appealing to a miracle.[174]

Dembski observes that: 'the only evidence we have of successful co-option comes from engineering and confirms that intelligence is indispensable in explaining complex structures like... the bacterial flagellum,'[175] and he concludes:

> We can do the probabilistic analysis at the level of individual proteins... Or we can do it at higher levels of organization like functional subsystems [like TTSS]... But all such probabilistic analyses still point up vast improbabilities.[176]

Dembski summarises the argument for design from IC systems:

> we can show conclusively that direct Darwinian pathways are causally inadequate to bring them about and that indirect Darwinian pathways are utterly without empirical support in bringing them about. Conversely, we do know what has the causal power to produce irreducible complexity – intelligent design.[177]

Intelligent design looks like the best explanation for IC systems such as the flagellum, and evolutionists appear to be betting in the face of some long odds: 'Like compulsive gamblers who are constantly hoping that some really big score will cancel their debts, evolutionary biologists live on promissory notes that show no sign of being redeemable...'[178] If biologists can meet the burden of proof by discovering or constructing detailed, testable, indirect Darwinian pathways of sufficiently high probability that account for the emergence of systems like the bacterial flagellum, 'then more power to them',[179] says Dembski (the assertion that a given system is IC is a falsifiable claim): 'But until that happens, evolutionary biologists who claim that natural selection accounts for the emergence of the bacterial flagellum are worthy of no more credence than compulsive gamblers who are forever promising to settle their accounts.'[180]

## Alexander's Straw Men

Alexander erects and then attacks a straw man definition of irreducible complexity. He asserts that:

> The whole point of the mousetrap analogy [which is not an analogy, but a concrete illustration] is to suggest that complex systems can only function if all the components are in place, and that the separate components of the system have no independent function.[181]

This is a straw man on two counts.

First of all, Alexander reduces irreducible complexity to mere complexity. Behe does *not* suggest that: 'complex systems can only function if all the components are in place'.[182] Rather, Behe defines any system that is *both* complex *and* which can only function if all the components are in place as 'irreducibly complex'. Alexander blows away his straw man of irreducible complexity by observing that: 'all biological phenomena are highly complex.'[183] However, there is a distinction between being 'highly complex' and being 'irreducibly complex'. Dembski contrasts 'irreducible complexity' with 'cumulative complexity':

> Irreducible complexity may be contrasted with *cumulative* complexity. A system can be defined as cumulatively complex if the components of the system can be arranged sequentially so that the successive removal of components never leads to the complete loss of function… it is clear that the Darwinian selection mechanism can readily account for cumulative complexity.[184]

Having first ignored the 'irreducible' component of IC, Alexander proceeds to misrepresent it. Behe does *not* affirm that an irreducibly complex system is one in which, as Alexander writes: 'the separate components of the system have no independent function.'[185] Attributing this assumption to Behe allows Alexander to dispatch Behe's claim that the flagellum is IC simply by pointing to the existence of the Type III secretory system. However, Behe's definition of irreducible complexity simply does not make the assumption Alexander attributes to it (and Behe's argument for design explicitly allows for the fact that the separate components of a system may exhibit independent functionality). As Behe comments: 'there's no reason that individual components of an irreducibly complex system could not be used for separate roles, or multiple separate roles, and I never wrote that they couldn't.'[186]

## Alexander's argument for the vacuity of irreducible complexity

Alexander thinks that he 'could easily argue that all [biological systems] fall within the ID criteria used to identify them as an "irreducibly complex" system…'[187] Why does he take this as evidence against ID, rather than as increased evidence for ID? Alexander argues that: 'IC can readily be argued for every known biological phenomenon, so the notion is vacuous as an explanation for anything.'[188] In other words, Alexander proposes a necessary condition for the use of IC in a biologically meaningful fashion: that IC applies to *some but not all* biological systems. He argues that IC fails to satisfy this criteria; not because it fails to apply to any biological systems, but precisely because *it applies to them all*: 'The notion of IC in biology is… evacuated of any useful meaning once one realises that all biological phenomena without exception can be press-ganged into the necessary criteria.'[189] We can formalize Alexander's argument for the vacuity of IC as follows:

1) If a concept applies to all biological systems, it is evacuated of any useful meaning
2) The concept of irreducible complexity applies to all biological systems
3) Therefore the concept of irreducible complexity is evacuated of any useful meaning

This is a logically valid argument. Unfortunately for Alexander, both premises are false (moreover, Alexander himself is committed to the falsity of both premises).

It simply isn't true that if a term applies to all biological phenomena then it is vacuous.[190] For example, if his criterion of meaning were true, Alexander's observation that 'all biological phenomena are highly complex'[191] would be vacuous and without meaning. Alexander is surely right to think that 'complex' is a term that can be meaningfully applied to the biological world, even if it applies to all biological phenomena. But in that case, Alexander is clearly wrong to advance the premise that a concept applicable to all biological systems is evacuated of meaning. Alternatively, if complexity is a concept that cannot be applied to all biological phenomena, then neither can irreducible complexity be applied to all biological phenomena (since complexity is a necessary, although not sufficient, condition of irreducible complexity) and Alexander's criterion of meaning becomes irrelevant to the debate about IC.

Alexander claims that IC applies to all biological systems on the basis of a straw man definition of IC. With the real definition of IC in hand, we can see that IC does not apply to all biological systems. In fact, we can quote Alexander to show that

IC does *not* apply to all biological systems. Recall, for example, Alexander's discussion of how the eye is not a good 'example of irreducible complexity', despite Darwin's own misgivings, because: 'we now know a lot about the evolution of the eye, and about how its components have evolved…'[192] Alexander also writes that: 'if you didn't know anything at all about the evidence for evolution, then you would have to describe virtually everything in a cell as IC.'[193] But of course, 'virtually everything' entails 'not everything'.

In short, once we have disregarded Alexander's straw man of IC, we have a sufficiently clear and coherent definition of 'irreducible complexity'. Since Alexander's argument for the vacuity of IC is unsound, and since it is more reasonable than not to accept that the flagellum is IC, I conclude that it is possible to define and designate a biological system as IC in a fashion that is both meaningful and warranted. Moreover, I contend that the warranted designation of a biological system as IC justifies a design inference.

## Claim Three: The 'burden of proof' does not lie upon the evolutionary biologist to show how complex biological systems came into being

'I have learned from my own embarrassing experience how easy it is to concoct remarkably persuasive Darwinian explanations that evaporate on closer inspection.'
– Daniel Dennett[194]

Judge John Jones asserts that: 'the ID argument is dependent upon setting a scientifically unreasonable burden of proof for the theory of evolution…'[195] While I would dispute the claims that ID is *dependent* upon assigning the burden of proof to evolution, that ID theorists *incorrectly* assign the burden of proof to evolution when they do so, or that the burden of proof assigned to evolution by ID theorists is *unreasonable*, Professor Alexander both agrees with Judge Jones' sentiments and objects to talking about proof in the first place. He takes exception to the suggestion: 'that the "burden of proof" lies upon the evolutionary biologist, whereas the ID proponent simply has to point out that certain biological systems are very complex and that there is current scientific ignorance about how they came into being.'[196]

As we have seen, ID advances inferential *arguments* for concluding that certain biological systems are best explained by intelligent design. These arguments involve design detection criteria (e.g. specified complexity, irreducible complexity) more stringent than the pejorative, straw man requirement that 'biological systems are very complex and that there is current scientific ignorance about how they came into being.'[197] These stringent design detection criteria are married with falsifiable, but well-founded and meaningful claims about empirical evidence. Faced with such an argument, the evolutionary hypothesis should need to verify itself by falsifying the claims of ID theory in the very process of showing that what it claims to be the case actually is the case. However, once the rule of hard-line 'methodological naturalism' is accepted ID is excluded *a priori*, the mere possibility of some sort of evolutionary explanation becomes the only scientific game in town and is thereby established by deduction from first principles without the necessity of supporting evidence. Such armchair natural philosophy is the only explanation for an aversion to the claim that the burden of proof lies upon the evolutionary biologist to show how complex

biological systems came into being with reference to the explanatory resources permitted by HMN.

According to the theory of evolution, biological systems evolve through the incremental accumulation of beneficial mutations. Richard Dawkins explains why: 'The larger the leap through genetic space, the lower the probability that the resulting change will be viable, let alone an improvement. [Hence] evolution must in general be a crawl through genetic space, not a series of leaps.'[198] He describes this gradual approach to obtaining biological complexity as 'Climbing Mount Improbable.'[199] Nevertheless, Dawkins assumes that evolution must be true because it is the only theory able to fill in the explanatory gap left by the exclusion of design. He is therefore content to say that even though we have no idea what path organisms took up Mount Improbable, *they must have done so*: 'however daunting the sheer cliffs that the adaptive mountain first presents, graded ramps can be found the other side and the peak eventually scaled'[200] How does Dawkins know that these graded ramps (which must be circuitous in the case of IC systems) can be found in advance of showing what they are (without even looking for them)? Because Dawkins' justification for this assumption is philosophical: 'Without stirring from our chair, we can see that it must be so',[201] explains Dawkins, 'because nothing except gradual accumulation could, in principle, do the job...'[202] (Of course, this assertion is false because an intelligent agent could, in principle, do the job.) Dawkins deduces the existence of graded paths up Mount Improbable from his prior belief in *metaphysical* naturalism, but the prior assumption of *methodological* naturalism does equally well at leaving the existence of such unverified paths the only *scientifically* permissible explanation of origins. Writing in *The Independent* Brian Josephson, a professor of physics at Cambridge University, complained about Dawkins' question-begging approach to biology:

> In such books as the *Blind Watchmaker*, a crucial part of the argument concerns whether there exists a continuous path, leading from the origins of life to man, each step of which is both favoured by natural selection, and small enough to have happened by chance. It appears to be presented as a matter of logical necessity that such a path exists, but actually there is no such logical necessity; rather, commonly made assumptions in evolution require the existence of such a path.[203]

The assumption of metaphysical *or* methodological naturalism ensures that scientific explanations of origins are a question-begging exercise in averting the oft-touted scientific requirement for empirical verification (and thereby excluding the equally often touted possibility of empirical falsification). As John Angus Campbell, perhaps the world's leading authority on the rhetoric of Darwin's *Origin*, explains:

> What is most revolutionary about Darwin's *Origin* is not simply his case for natural selection… or his case for evolution itself. The other, and equally important, revolution going on within his argument for species change is his case for naturalism, which slides insensibly between an innocent methodological precept and a prior metaphysical commitment… The first step in Darwin's case for metaphysical naturalism… was taken in his flyleaf citations, all of which identified the ordinary mode of divine activity with natural laws. Implicitly and in chapter 2 explicitly, Darwin was laying the foundations for a revolutionary philosophy of science… when Darwin was

> having a difficult time with an explanation or when he was particularly keen on the reader's realizing the consequences of a refusal to accept an explanation, he would sometimes draw on the reader's partial commitment to naturalism to negotiate yet further commitments. At some points Darwin would simply equate naturalistic explanations – evolutionary case histories with the blanks filled in by an 'it must have been' story-line – with reality itself.[204]

As historian of science Neal Gillespie comments:

> It is sometimes said that Darwin converted the scientific world to evolution by showing them the process by which it had occurred. Yet the uneasy reservations about natural selection among Darwin's own contemporaries… suggests that this is too simple a view of the matter. It was more Darwin's insistence on totally natural explanations than on natural selection that won their adherence.[205]

Hence Darwinist Michael Ruse admits: 'I think that philosophically one should be sensitive to what I think history shows, namely, that evolution… involves making certain a priori or metaphysical assumptions, which at some level cannot be proven empirically.'[206]

Alexander reveals the a priori methodological roots of his own aversion to assuming the burden of proof in biology:

> Compared with the actual explanations offered by biologists, which relate to physical components in the actual world around us, the 'inference to design' does no explanatory work… but simply makes a rather unsatisfactory way of flagging up current areas of scientific ignorance.[207]

First, biologists have not actually offered anything approaching an actual explanation for any IC system. Cell biologist Franklin Harold admits: 'there are presently no detailed Darwinian accounts of the evolution of any biochemical or cellular system, only a variety of wishful speculations.'[208] Second, not all explanations offered by biologists are framed in terms of the physical components in the world around us, unless one is going to de-frock design theorists like Michael Behe and Scott Minnich from the priesthood of science by definitional dictate. Third, Alexander would not accuse the inference to design of doing 'no explanatory work' if it were made in fields such as archaeology or SETI. Would a SETI researcher who received a signal like the one in Carl Sagan's novel *Contact* and who inferred intelligent design be accused of giving an explanation that: 'does no explanatory work… but simply makes a rather unsatisfactory way of flagging up current areas of scientific ignorance'? Making the same accusation in the field of biology requires justification to avoid the charge of employing a double standard. Fourth, of course the hypothesis of intelligent design does 'explanatory work'. Intelligent design is a perfectly satisfactory explanation given in all sorts of situations, scientific or otherwise, every day. The only question is whether design is the *best* explanation in any given situation. Fifth, the only way to guarantee that the lack of explanations consistent with HMN for IC systems is a sign of current 'scientific ignorance' is to assume that explanations inconsistent with HMN are impossible. And that means assuming that metaphysical naturalism is true.

## Concerning Proof

Alexander takes exception to the terminology of 'proof', writing that: 'The word "proof" may be popular in mathematical and philosophical circles, but is rarely used by biologists.'[209] Why can't the ID claim that the burden of proof is properly assigned to the evolutionary hypothesis be one of those 'rare' uses of the word by biologists? After all, Michael Behe is a biologist, and *he* uses the phrase 'burden of proof'.[210] Moreover, Alexander seems to conflate the mathematical concept of proof with the philosophical concept of proof. A proof in mathematics is: 'a formal series of statements showing that if one thing is true something else necessarily follows from it.'[211] Mathematical proofs are rigorous arguments that unequivocally establish a mathematical theorem. A proof in philosophy, by way of contrast, can refer to any logically valid argument with premises that are anything from indubitable to merely more plausible than their denial. Hence, in his discussion of theistic proofs philosopher Stephen T. Davies writes that:

> a theistic proof whose premises are either true or known to be true has a chance of being a powerful argument. But I believe a theistic proof can be a successful argument even if it is not possible to show [indubitably] that its premises are true. If it is possible to show that the premises are either acceptable in themselves… or more acceptable than their denials… then an otherwise impeccable theistic proof [i.e. one that is formally and informally valid] can be considered successful.[212]

Biologists may not use the word 'proof' very often, but the concept of giving a valid argument for a given conclusion or hypothesis on the basis of claims about reality that are meant to be at least more plausible than their denial cannot be exactly foreign to them.

## Concerning the Burden of Proof

'Evolution is not intuitive.' – Cornelius Hunter[213]

We have already reviewed arguments to the effect that the evolutionary hypothesis is betting in the face of long odds when it comes to systems that exhibit irreducible complexity. Some biologists claim that an indirect evolutionary pathway can account for such systems. Establishing the existence of a statistically plausible indirect evolutionary pathway is both necessary and sufficient to falsify the claim that the flagellum is IC. To date, no such pathway has been proposed, and so the claim that the flagellum is IC stands.

However, it *should* be enough merely to observe that biological systems give the initial impression of design. Stephen C. Meyer observes that: 'Charles Darwin himself and contemporary neo-Darwinists such as Francis Ayala, Richard Dawkins, and Richard Lewontin acknowledge that biological organisms appear to have been designed by an intelligence.'[214] Secular humanist Richard Norman acknowledges the 'apparent design'[215] of nature. Richard Dawkins go so far as to *define* biology as: 'the study of complicated things that give the appearance of having been designed for a purpose.'[216] Writing in *Skeptical Inquirer*, associate professor of psychology at Emory University, Scott O. Lilienfeld, argues that:

> it is Darwinian evolution, not ID, that is glaringly inconsistent with common sense… Indeed, from the vantage point of commonplace intuition, it is far more plausible to believe that complex biological structures like the peacock's tail… were shaped by a teleological force than by… processes of mutation and natural selection operating over millions of years.[217]

As an ID critic, Lilienfeld goes on to suggest that:

> The foremost obstacle standing in the way of the public's acceptance of evolutionary theory is not a dearth of common sense. Instead, it is the public's erroneous belief that common sense is a dependable guide to evaluating the natural world… [After all] science is replete with hundreds of examples demonstrating that common sense is frequently misleading.[218]

However, it would be erroneous to extrapolate from the fact that science has shown common sense to be misleading on some, or even many occasions, to an epistemological principle stating that we should always assume that things in the natural world are *not* the way they appear to be unless we are shown otherwise. For how could we be shown otherwise except by arguments with premises that asked to be accepted at face value? As C.D. Broad observed:

> The practical postulate which we go upon everywhere else is to treat cognitive claims as verdical unless there be some positive reason to think them delusive. This, after all, is our only guarantee for believing that ordinary sense-perception is verdical. We cannot prove that what people agree in perceiving really exists independently of them; but we do always assume that ordinary waking sense-perception is verdical unless we can produce some positive ground for thinking that it is delusive in any given case… When there is a nucleus of agreement between the experiences of men in different places, times, and traditions, and when they all tend to put much the same kind of interpretation on the cognitive content of these experiences, it is reasonable to ascribe this agreement to their all being in contact with a certain objective aspect of reality unless there be some positive reason to think otherwise.[219]

Richard Swinburne has strongly defended the rational necessity of placing the burden of proof upon those skeptical of perceptual claims:

> It is a basic principle of knowledge... that we ought to believe that things are as they seem to be, until we have evidence that we are mistaken... If you say the contrary – never trust appearances until it is proved that they were reliable – you will never have any beliefs at all. For what would show that appearances were reliable, except more appearances?[220]

Alexander endorses the principle of credulity for identical reasons in the context of discussing the believability of reported miracles:

> Scientists see no need to practice a paranoiac form of suspicion in which people are thought to lie upon every possible occasion. In fact, no society could possibly survive for long based on such a supposition, let alone scientific practice. All societies operate on the assumption that most people

> tell the truth most of the time, and it is this assumption which also makes historical research feasible. The historian does not have to lapse into gullibility to maintain that it is safest to assume that someone is recounting the truth unless there are good historical grounds for thinking otherwise.[221]

Of course the appearances of common sense can be overthrown, by sufficient appearances to the contrary which are themselves accepted on the basis of the principle of credulity. The point is that the appearances of common sense properly carry the presumption of truth, and claims to the contrary therefore properly bear the burden of proof. As Robert C. Koons writes:

> The burden is on Darwin and his defenders to demonstrate that it is really possible for at least some of the complex organs we find in nature to be formed in this way: that is, by some specific, fully articulated series of slight modifications… the inference from complex, interdependent functionality to intelligent agency is the natural, default position. Darwinian biologists and their pupils overlook this fact at their own cognitive peril.[222]

The evolutionary biologist advances the hypothesis that nature itself produced these apparently designed biological organisms. This hypothesis is advanced as either a simpler adequate explanation compared to design (by evolutionary ateleologists like Dawkins), or as a necessary complication of the design explanation (by evolutionary teleologists like Alexander). Either way, Occam's razor demands that the burden of proof therefore belongs upon the shoulders of the evolutionary biologist to show that evolution is, or must feature in, the best explanation.

According to Koons, Darwin implicitly recognized in the *Origin of Species* that his extrapolation from micro-evolution to macro-evolution bore the burden of proof:

> the argumentative structure of the book concedes that the presumption of reason lies with intelligent creation. Moreover, Darwin recognized that he could not yet shift the burden of proof [on evidential grounds]. He was concerned, quite justifiably, with providing enough provisional evidence to create an atmosphere of open-mindedness. He hoped to convince biologists that his theory shouldn't be dismissed out of hand but should instead be given a fair chance by being given the chance to be fleshed out with specific hypotheses that could then be tested against the relevant evidence. At this task, I believe he was entirely successful.[223]

Like Neal Gillespie, molecular biophysicist Cornelius Hunter characterizes Darwin's rhetorical methodology in the *Origin* as convincing readers to shift the burden of proof under which his theory struggled:

> How could Darwin convince the world that evolution could create complexity? He had no strong scientific evidence showing that evolution could create complexity, so he shifted the burden of proof. Rather than requiring evidence showing that evolution could create complexity, Darwin suggested that there was no *counterevidence*. He allowed that if the skeptic could find a complex organ that evolution *could not* produce, then the theory would be disproven… Darwin made things easy on his theory by inverting the

> question. Rather than asking the question 'How much positive evidence is there that complexity can arise on its own?' he asked 'Is there negative evidence to disprove the idea?'… Darwin's argument was not in the scientific spirit, for one does not propose an unlikely and unproven theory and justify it because it cannot be disproven.[224]

To justify a hypothesis on the grounds that it hasn't been disproved is to advance a 'proof by ignorance'[225], an informal logical fallacy 'in which lack of known evidence against a belief is taken as an indication that it is true.'[226] Nigel Warburton explains: 'Although no one has provided conclusive evidence that there is no life after death it would be extremely rash to treat this as a conclusive proof that there is.'[227] Likewise, to conclude from a lack of proof for evolutionary limiting factors that *therefore* natural selection can and does explain how irreducibly complex new biological systems, or new organs and body plans have come into existence, is a mistake. At most, such a lack of evidence allows one to say that natural selection *might* explain how new systems and such came into existence *if there are in fact no limiting factors*; advancing Darwin's theory as *a possibility worth investigating*. As Koons says:

> No reasonable person could, after reading the *Origin*, deny that this was a theory worthy of being taken seriously. At the least it justified an investigation into whether the evolutionary mechanism proposed was really adequate to its appointed task, and whether sufficient circumstantial evidence could be found substantiating that the mechanism of natural selection had in fact been at work.[228]

However: 'The bare possibility that a non-teleological explanation of apparent design might exist is not by itself sufficient to warrant real doubt about the reality of design, any more than the bare possibility that you and I are brains in a *Matrix*-like vat is sufficient to warrant scepticism about the deliverances of our five senses.'[229] As Warburton points out:

> Part of the temptation to believe that proof by ignorance is real proof may stem from the fact that in some courts of law a defendant is presumed innocent until proven guilty. In other words, lack of evidence against someone is taken as proof, for the purposes of the court, that they did not commit the crime. However, as many cases of guilty people being freed because of lack of evidence show, this isn't really a proof of innocence, but merely a practical, if imprecise, way of protecting innocent people from wrongful conviction.[230]

Indeed, Darwin's core argument relies upon our accepting macroevolution as being innocent until proved guilty; whereas *this protection should in fact be extended to belief in design*:

> Design sceptics, in common with other sceptics from antiquity to the modern day, attempt an illegitimate shift in the burden of proof. The skeptic attempts to rebut a successful design inference by merely *raising the possibility* that the appearance of design may be illusory, challenging the defender of the inference... to prove that the sceptical scenarios could *not* have happened. The appropriate response to such sceptical challenges is to place the burden of proof where it belongs: the skeptic must provide substantial and specific

> grounds for doubting the soundness of the design inference in the particular case in question.[231]

I agree with Koons that, with respect to the grander claims of explanatory adequacy made for Darwin's theory (e.g. the ability of evolution to account for specified and/or irreducible complexity):

> the burden of proof was never met, and the presumption of design never rebutted… The task… of describing in sufficient detail specific Darwinian pathways leading to the origin of specific forms of biological function, remains an unfulfilled dream.[232]

However, whether or not the proper burden of proof has in fact been met by the theory of evolution, the point here (which Alexander denies) is that *evolution must meet such a burden of proof* because, as even Dawkins admits, the supposed results of natural selection: 'overwhelmingly impress us with the appearance of design…'[233] Michael J. Behe hits the nail on the head:

> A crucial, often-overlooked point is that the overwhelming appearance of design strongly affects the burden of proof: in the presence of manifest design, the onus of proof is on the one who denies the plain evidence of his eyes. For example, a person who conjectured that the statues on Easter Island or the images on Mount Rushmore were actually the result of unintelligent forces would bear the substantial burden of proof the claim demanded. In those examples, the positive evidence for design would be there for all to see in the purposeful arrangement of parts to produce the images. Any putative evidence for the claim that the images were actually the result of unintelligent processes (perhaps erosion shaped by some vague, hypothesized chaotic forces) would have to clearly show that the postulated unintelligent process could indeed do the job. In the absence of such a clear demonstration, any person would be rationally justified to prefer the design explanation.[234]

Behe's point, which follows from the principle of credulity and Occam's razor, stands irrespective of whether or not one conceives of the unintelligent natural forces of erosion and so forth as intelligently designed and sustained secondary causes.

## Claim Four: Proponents of ID perceive the world as a two-tier system of the 'natural' and the 'designed'

'God can act as much through ordinary events as through extraordinary events...'
– William A. Dembski[235]

Professor Alexander must be one of the few people who think that genuine scientific evidence of intelligent design garnered from nature would actually *contradict* theism. Perhaps Richard Dawkins *et al* should take note, embrace ID and wield it in defence of atheism.

Suppose Alexander is right to claim that proponents of ID perceive the world as a two-tier system of the 'natural' and the 'designed'. Suppose that proponents of ID *necessarily* perceive the world in this way. Suppose also that perceiving the world in

this way is incompatible with theism. In that case (and in that case only) theistic ID proponents face a problem, a problem which can be solved either by renouncing ID or by renouncing theism. Which renunciation it would make most sense to make would of course depend upon the relative epistemological standing of theism and intelligent design theory. If I were placed in the hypothetical situation of choosing between ID and theism I would side with belief in God rather than belief in ID, since it is my conviction that belief in God is supported by more and stronger reasons than belief in ID. In such a situation I would simply revert to my former position on origins, namely, theistic evolution. However, it is also my conviction that such a situation of forced choice is purely hypothetical. Dawkins could embrace ID, but he could no more use it as a valid argument against theism than he can use evolution for the same end (neither evolution nor ID entail atheism).

## False Negatives and the Causal Background

The failure of some set of data to trigger a design inference according to a given design detection criterion does not imply that the data in question is not the product of design. It simply means that we cannot substantiate the claim that the data in question is the product of design from the application of design detection criterion to the data in question. We may or may not be able to substantiate such a claim by alternative means. As Dembski writes:

> When the complexity-specification criterion fails to detect design in a thing, can we be sure that no intelligent cause played a role in its formation? No, we cannot. To determine that something is not designed, this criterion is not reliable. False negatives are a problem for it. This problem of false negatives, however, is endemic to design detection in general.[236]

Likewise, Behe notes:

> You cannot tell just by looking at something that it has not been designed – anything might have been designed. The coats on the rack in a restaurant may have been arranged just so by the owner before you came in. The trash and tin cans along the edge of a highway may have been placed by an artist trying to make an environmental statement… The upshot of this conclusion – that anything could have been purposively arranged – is that we cannot know that something has not been designed.[237]

Hence *there is nothing intrinsic to the scientific process of inferring design as the best explanation for some empirical data that metaphysically divides reality into the designed and the not designed*. The design inference is logically compatible with the acceptance of such a metaphysical distinction, but it is also logically compatible with its wholehearted rejection. Nor is this a simple either/or choice, as Dembski points out: 'Note that there is no strict either-or here, as in natural causes *verses* design; at issue is whether natural causes are supplemented or unsupplemented by design.'[238] That is, whether or not 'natural causes' are themselves considered to be the product of design (scientifically detectable or otherwise), one can still ask whether objects or events which supervene upon those causes are best explained with reference to design:

> Design arguments can focus on whether the universe as a whole is designed. Alternatively, they can focus on whether instances of design have occurred within an already given universe. The universe provides a well-defined causal backdrop… Although one can ask whether that causal backdrop is itself designed, one can ask as well whether events and objects occurring within that backdrop are designed. At issue here are two types of design: first, the design of the universe as a whole and, second, instances of design within the universe.[239]

Any ID theorist who accepts the design inference from cosmic fine-tuning necessarily believes that the whole 'causal background' of material reality is designed (interestingly, many theistic evolutionists make a design inference from cosmic fine-tuning, although they do not consider such an inference to be scientific in nature). If an ID theorist *additionally* accepts a design inference from some event or object that occurs within the context of that backdrop (e.g. the fine-tuning of our galactic habitat, the origin of life, the miracles of the Exodus, fulfilled biblical prophecy), then it seems illegitimate to affirm that the necessary implication of accepting the latter inference is that they perceive the world as a two-tier system. While an ID theorist who makes both types of inference need not be a theist, as far as I can tell design theorists who are theists make design inferences in both categories. Moreover, design proponents who are theists will attribute the causal background of material reality to an act of creation *ex nihilo*, explaining why there are (and continue to be) any physical laws and objects at all with reference to God. As design theorist and Christian J.P. Moreland explains concerning a theistic understanding of intelligent design theory:

> God is constantly active in sustaining and governing the universe. Nature is not autonomous… the model merely recognizes a distinction between primary and secondary causes (however much this needs further refinement) and goes on to assert that (at least) the former could have scientifically testable implications…[240]

## Intelligent Design Naturalism

However, proponents of ID are a metaphysically diverse group, and some do indeed embrace a 'two-tier' system. For example, Raelians – an atheistic, metaphysically naturalistic religious movement founded by Claude Vorilhon (a.k.a. Rael) in 1973[241] – believe that:

> life on Earth is not the result of random evolution, nor the work of a supernatural 'God'. It is a deliberate creation, using DNA, by a scientifically advanced people [called the Elohim] who made human beings literally 'in their image' - what one can call 'scientific creationism.'[242]

Writing in the foreword to Rael's book *Intelligent Design*: *Message from the Designers* (2005), journalist Anthony Grey appeals to ID in support of Raelianism: 'Quickly becoming known in short as ID, "intelligent design" is now beginning to be studied and developed in some respected universities.'[243] Raelians interpret the scientific theory of ID *within a metaphysically naturalistic worldview* (just as other atheists accept the scientific theory of evolution and interpret it within a

metaphysically naturalistic worldview). Faced with the question 'Who created the Elohim?', Raelians are forced by their commitment to metaphysical naturalism to embrace the existence of an infinite regress or 'cycle of life':

> If we believed in God, we might ask 'Who created God'. If we believed in evolution and the 'Big Bang' we might ask 'where did this matter and energy come from that created the big-bang?' For the Elohim, it is the same - they were created by people coming from the sky as were their creators. It's an infinite cycle of life. One day scientists from earth will also go to another planet and populate it.[244]

While accepting an infinite regress makes belief in intelligent design formally consistent with metaphysical naturalism, doing so raises its own philosophical problems.[245] My purpose in referring to Raelianism is simply to demonstrate the fact that *some* proponents of ID do indeed perceive the world as a two-tier system of the 'natural' and the 'designed'. However, while ID is married to a 'two-tier' view by some of its proponents, it certainly does not *require* us to accept such a marriage. Theists who adopt ID do not need to adopt the Raelians' 'two-tier' view if the universe.

## It Depends What You Mean By…

Unfortunately, things are a little more complicated than the above argument makes them appear, because 'a two-tier system' could be understood in more than one way. In the Raelian case it would clearly refer to a system positing a *metaphysically* naturalistic view of the universe while excluding the assumption, made by most naturalists (e.g. Dawkins), that explanations in terms of intelligence must be ultimately reducible to explanation in terms of matter plus time plus chance. ID is compatible with, but does not entail, such a two-tier system (just as evolution is compatible with, but does not entail, atheism). On the other hand, 'a two-tier system' *could* be understood to refer to a system positing a theistic view of the universe whilst differentiating between explanations which appeal to the inherent capacities of the creation (which may or may not be conceived of as intelligently guided in an undetectable manner) and explanations in terms of primary causation (in the former case, the relevant distinction would be that between detectably and non-detectably designed things). ID theorists who are theists are free to adopt either theistic interpretation (not that this is an either/or choice).[246] Indeed, whichever interpretation of ID a Christian ID proponent adopts – and even if they remain agnostic about which interpretation is best – they must at least reject the metaphysically naturalistic interpretation of ID. This being so, it is misleading to attribute belief in 'a two-tier system' to theistic ID proponents without qualification. Indeed, (without getting side-tracked into a debate over the various meanings of 'miracle'[247]) a theistic interpretation of ID would do well to redeploy theistic evolutionist Michael Poole's description of miracles as instances wherein: 'it is the *mode*, not the *fact* of God's activity, that is different.'[248] As Norman L. Geisler says: 'in a theistic universe, where everything is dependent on God's continual sustaining causality, there is no contradiction in affirming that by 'natural' we mean the way God operates *generally* and by 'miracle' we mean the way he operates on *special* occasions.'[249]

## Hermeneutical Rectitude

Alexander takes ID proponents who are theists to task for the: 'bad habit of using the word "natural", "naturalistic" and "naturalism" in ways quite different from the ways in which those words are normally employed in philosophical discourse…'[250] He references the Oxford Dictionary, where he finds 'naturalism' defined in its philosophical sense as: 'view of the world that excludes the supernatural or spiritual.'[251] Passing over the terms 'natural' and 'naturalistic', Alexander proceeds to advance his argument about non-standard language by quoting design theorist Phillip E. Johnson:

> It is conceivable that God for some reason did all the creating by apparently *naturalistic* processes, perhaps the better to test our faith, but surely this is not the only possibility. My writings, and those of colleagues like Michael Behe, argue that design is detectably present in biology, that naturalistic substitutes like the blind watchmaker mechanism are inadequate and contrary to the evidence, and that theists who believe that God is real should not assume that he never played a detectable role in biological creation.[252]

The italics in the first sentence are actually added by Alexander (as he himself notes). Unfortunately these italics detract from the importance of the preceding word, 'apparently'. However, there is a significant difference between 'apparently naturalistic' and 'naturalistic'. Nor is 'naturalistic' the same term as 'naturalism' (a term that does not feature in the quoted passage). After all, Johnson (a Christian) clearly does not intend to make the contradictory assertion that God could have created using a metaphysically naturalistic process.

In fact, if anyone is using terminology in a philosophically non-standard sense here, it is actually Alexander. He seems to attach metaphysically naturalistic meaning to every use of the terms 'natural', 'naturalistic', etc., regardless of context. Of course, if Alexander thinks that design theorists are using such words in a non-standard sense, he should not critique them on the basis of interpreting those terms in what he takes as being their standard sense. Indeed, the hermeneutical principle of charity requires that we automatically disassociate the *metaphysically naturalistic* associative meaning of terms such as 'natural' and 'naturalistic' from the use of such terms by theists. And this means that we must, if at all possible, interpret the use of such terms in this context in ways that do not contradict a theistic metaphysic (and so do not support allegations of 'two-tier' system building).

For example, scientist turned theologian Alister E. McGrath is a theistic evolutionist. He asserts that: 'science can work only with naturalistic explanations; it can neither affirm nor deny the existence of God.'[253] Clearly, to read McGrath as endorsing metaphysical naturalism, or a 'two-tier system' of *metaphysically* naturalistic explanations (in 'science') and non-naturalistic explanations (in theology), because he uses the phrase 'naturalistic explanations', would be to seriously misread him. McGrath affirms:

> God is the cause of all things. Yet God's causality operates in a number of ways. While God must be considered capable of doing certain things directly, God delegates causal efficacy to the created order… Events within the created order can exist in complex causal relationships, without in any way denying their ultimate dependency upon God… The critical point to appreciate is that

> the created order thus demonstrates causal relationships which can be investigated by the natural sciences. These causal relationships can be investigated and correlated – for example, in the form of the 'laws of nature' – without in any way implying, still less necessitating, an atheist worldview. To put this as simply as possible: God creates a world with its own ordering and processes.[254]

(McGrath warns that a potential theological weakness of this approach is 'that the self-regulation of the natural order could lead to God being completely marginalized in any account of the world.'[255] Allowing God's capacity to do things 'directly' within the created order to enter into one's account of the world may avoid this weakness.) In which case, the attempt to show that theistic proponents of intelligent design theory endorse a 'two-tier system' on the basis of their use of identical terminology to that used by McGrath, clearly falls short of hermeneutical rectitude. Alexander repeatedly mentions 'natural selection' in his paper, and elsewhere he writes about 'broad generalizations that describe the properties of matter which can be labelled as "laws of nature"'[256], but it would be wrong to take any of this as evidence that *he* is committed to a 'two-tier system'.

## C.S. Lewis on Nature

In his *Studies in Words*, second edition, (Cambridge University Press, 1967), C.S. Lewis traces the developing meaning of 'nature':

> By far the commonest native meaning of *natura* is something like sort, kind, quality, or character. When you ask, in our modern idiom, what something 'is like', you are asking for its *natura*… In nineteenth century English the word 'description' itself ('I do not associate with persons of that description') is often an exact synonym for *natura*.[257]

In this sense, to give a 'natural' or 'naturalistic' explanation is to give it an explanation in terms of 'some idea of a thing's *natura* as its original or "innate" character.'[258] To give such an explanation is clearly not anti-theistic. Indeed, in this sense, we could give a literally 'natural' or 'naturalistic' explanation of God's actions (e.g. 'God performed action X because he had promised to perform it and is by nature true to his word'), no less than the actions of an atom. In a related explanatory sense: 'The nature of anything, its original, innate character, its spontaneous behaviour, can be contrasted with what it is made to be or do by some external agency. A yew tree is *natural* before the topiarist has carved it; water in a fountain is forced upwards against its *nature*…'[259] It is not 'natural' for a yew tree to form itself into the complex and specified shape of an animal or chess piece, but this is something that experience tells us is easily accomplished by intelligent design. When we see a yew tree that exhibits such specified complexity, we naturally infer intelligent design.

Lewis explains that the distinction between natural and non-natural (i.e. supernatural) explanations arose out of the development of Greek thought:

> The pre-Socratic Greek philosophers had had the idea of taking all the things they knew or believed in – gods, men, animals, plants, minerals, what you will – and impounding them under a single name; in fact, of regarding Everything as a thing, turning this amorphous and heterogeneous collection of things into

> an object or pseudo-object. And for some reason the name they chose for it was *phusis*… A comparatively small number of speculative Greeks invented *Nature* – Nature with a captital… From *phusis* this meaning [everything] passed to *natura*… Parmenides and Empedocles [materialists] had thought that they were giving, in principle, an account of everything. Later thinkers denied this; but in the sense that they believed in realities of a quite different order from any that their predecessors took account of. They expressed this not in the form '*physis* contains more than our ancestors supposed', but in the form (explicitly or implicitly), 'there is something else besides *physis* [i.e. the non-physical or super-natural].' The moment you say this, *physis* is being used in what I call its demoted sense. For it had meant 'everything' and you are now saying there is something in addition to it.[260]

Hence, Lewis notes, 'Aristotle criticised thinkers like Parmenides because "they never conceived of anything other than the substance of things perceivable by the senses."'[261] In the same vein, Lewis observes that:

> Christianity involves a God as transcendent as Aristotle's, but adds (this was what it inherited from Judaism and could also have inherited from Plato's *Timaes*) the conception that this God is the Creator of *physis*. *Nature* (d.s.) *demoted* is now both distinct from God [mono-theism is not pantheism] and also related to him as artefact to artist, or as servant to master… [mono-theism is not deism][262]

Christians believe in a transcendent, supernatural God who is the sustaining creator of a nature (d.s.) with its own innate character, a nature (d.s.) that can be said to achieve certain ends simply in virtue of its divinely given and sustained character or *natura* (e.g. Jesus says that: 'All by itself the soil produces grain...' in Mark 4:28), but which can only attain ends beyond those reasonably attributed to its *natura* with the assistance of some external agency. The external agency in question may be God's (as when God rescues the children of Israel from slavery in Egypt), or it may be a finite agency, whether human (e.g. a potter who forms clay into a pot), or angelic (e.g. an angel who rolls away a tomb stone). As Nancy R. Pearcey and Charles B. Thaxton explain:

> In the days of the church fathers, the conception of God's transcendent power *over* and His immanent power *in* creation was balanced and complementary. It was understood that God had transcendent power to act in the world at His will and pleasure; but He had also created the natural world to proceed in regular, consistent patterns that he set up in the beginning and upholds through His immanent presence. This was sometimes described in the language of primary and secondary causes. As Anglican theologian E.L. Mascall says, 'The main tradition of classical Christian philosophy, while it insisted on the universal *primary causality* of God in all the events of the world's history [in God's sustaining in existence the natural world he has created], maintained with equal emphasis the reality and the authenticity of *secondary causes*.' Theologian Thomas Torrance sums up this balanced view as the 'contingent order' of creation. Contingency means the creation is not autonomous. It is not self-originating or self-sustaining; it was created by God and depends continually upon Him. On the other hand, God does not work in the world by

> perpetual miracle. He has set up a network of secondary causes that act in a regular and consistent pattern. That is, creation has a real order. Hence the phrase, contingent order.[263]

It is not my place to defend everything said by Johnson *et al* (Johnson is a lawyer and not a philosopher, and I would certainly not claim to be comfortable with the detail of the way he expresses himself on all occasions). However, the crucial point made by Johnson is that while 'theistic evolution' is a possible theistic perspective on origins, theists should not simply assume that intelligent design plays no *detectable* role in biological creation. Theistic evolutionists assume that God created and sustains the cosmic backdrop wherein evolution happens, and they may additionally assume that God 'guided' the process of evolution, but in either case they assume that intelligent design played no scientifically detectable role in biological creation (this is what distinguishes them from naturalists who simply assume that intelligent design played *no role* in biological creation). ID theorists *do not* make this assumption (neither do they make the opposite assumption), and it seems to me that theists *should not* make this assumption. As Moreland notes:

> Christian theism holds that secondary causality is God's usual mode and primary causality is infrequent, comparatively speaking. This is why Christianity, far from hindering the development of science, actually provided the womb for its birth and development. Armed with the primary/secondary causal distinction, Christian scientists did not abandon a search for natural (secondary) causes simply because they believed in primary causes as well. The postulation of a primary cause must be justified – it cannot be claimed whilly-nilly…[264]

Nevertheless, neither should the postulation of primary causation be *excluded* whilly-nilly for a theist's account of history. Alvin Plantinga recommends that Christians approach the question of origins with nothing besides the mere *doctrine* of creation and an open mind:

> a Christian (naturally) believes that there is such a person as God, and believes that God has created and sustains the world. Starting from this position… we recognize that there are many ways in which God could have created the living things he has in fact created; how, in fact, did he do it? Did he create matter, with its nature and it ways of working, in such a way that he could foresee that the result of its working in those ways would eventually be life, and then the various kinds of plants and animals, and then finally human kind? Or did he do something special in the creation of life? And did he do something special in the creation of his image bearers, human beings? And did he perhaps do something special in the creation of some other kinds of creatures? Did it all happen just by way of the working of the laws of physics, or was there further divine activity (activity not restricted to the upholding of matter in existence and concurring in the causal transactions expressing its nature)? That's the question, and the way to try to answer it, so it seems to me, is to ask two others: first what is the antecedent probability of his doing it the one way rather than the other? And second what does the evidence at our disposal suggest? Can we see how it could or would have happened just by the workings of the laws expressing the behaviour and activity of matter? (…the

> second sort of consideration is more important than the first.) Starting from the belief in God, we must look at the evidence and consider the probabilities as best we can.[265]

The question posed by ID is whether non-intelligent natural causes (which the theological interpretation classes as 'secondary causes' belonging to the 'contingent order' of creation) offer sufficient explanatory resources to account for examples of specified and/or irreducible complexity within nature (assuming that such examples can be found). The answer posited by ID is that while natural causes offer insufficient explanatory resources in such carefully defined cases, intelligent design offers precisely the required explanatory resources, and is therefore the better (and best) scientific explanation. Just as a topiarist is to be inferred from the fact that a yew tree exceeds its *natura* when it looks like a giraffe (exhibiting specified complexity), so intelligent design is to be inferred from the fact that the specified complexity of life capable of undergoing evolution by natural selection exceeds the *natura* of its physical substrate.[266] Theists will naturally interpret such signs of design within their own theological framework – most likely classifying the design inference in terms of a special (scientifically detectable) *mode* of divine primary action. As Stephen C. Meyer explains:

> design cannot be inferred for every effect, even if intelligent design is a possible cause for all effects… Intelligent design is not always the best explanation for a variety of reasons. Human action or special (that is, detectable) divine action may not have played a crucial role in certain natural events; intelligent design, whether human or divine, may not always be detectable even when it has played a causal role; natural objects and processes have real causal powers (even for theists who accept God's sustaining governance of nature) that may be clearly evident in a given phenomenon. Thus, at least as for those scientists who seek the best explanations, intelligent design cannot be invoked as a theory of everything. It may function as a possible theory of everything, but it can function as the best explanation or best theory only of some things. Intelligent design need be neither vacuous nor unconstrained.[267]

**Collins, Miller and Primary Causation**

Interestingly, prominent Christian scientists without the intelligent design movement have recently signalled their willingness to consider divine intelligent design to explain what we know about the origin of life. During a keynote address given at the 2002 American Scientific Association meeting in Malibu, Dr Francis Collins, director of the human genome project, was lukewarm towards irreducible complexity, but had this to say about the origin of life:

> Another issue, however - one where I am very puzzled about what the answer will be - is the origin of life. Four billion years ago, the conditions on this planet were completely inhospitable to life as we know it; 3.85 billion years ago, life was teeming. That is a very short period - 150 million years - for the assembly of macromolecules into a self-replicating form. I think even the most bold and optimistic proposals for the origin of life fall well short of achieving

> any real probability for that kind of event having occurred. Is this where God entered? Is this how life got started? I am happy to accept that model, but it will not shake my faith if somebody comes up with a model that explains how that the first cells formed without divine intervention.[268]

Collins tentatively posits intelligent design on the basis that the origin of life is both complex ('even the most bold and optimistic proposals for the origin of life fall well short of achieving any real probability') and specified ('self-replicating form' is a functionally given specification). Like Alexander, then, Collins (at least implicitly) endorses the 'core claim' of ID. Unlike Alexander, Collins is willing to infer design from an aspect of nature besides the fine tuning of the cosmos as a whole (indeed, Collins doesn't mention the fine tuning argument in his paper). It is unclear whether Collins considers the hypothesis that the origin of life was the result of intelligent design to be a *scientific* hypothesis – although he gives no indications to the contrary.

Even more recently, after a talk given by Dr Kenneth R. Miller before around four hundred staff and students at Texas Tech University in March 2006[269], the following question was reportedly asked: 'couldn't the origin of life be the point at which God's involvement in creation was direct?'[270] According to William A. Dembski:

> As this question was posed, at least a third of the students in the crowd nodded their heads yes. The professors in the crowd just looked confused; and scared. To my surprise however, Dr. Miller said, 'absolutely!' That made the professors look even more confused.[271]

# Conclusion

'Alexander's criticisms of ID are off the mark.' – William A. Dembski[272]

ID has been attacked, not only by naturalists like Dawkins, but also by Christians from both the 'traditional creationist' and 'theistic evolutionist' camps. As Paul Nelson observes:

> Some prominent traditional creationists [e.g. Henry Morris] are unhappy with what they perceive to be the dangerously wide content of ID… other Christian critics [e.g. Howard Van Till] have taken just the opposite tack, stressing that the ID community is little more than 'creationism in designer clothing'...[273]

At first glance, young earth creationists like Morris and theistic evolutionists like Van Till hold widely differing views: 'A greater contrast in scientific perspectives is hard to imagine. And neither Morris nor Van Till has much, or any, interest in talking to his counterpart, whom each sees as hopelessly in error and doing severe damage to the cause of Christianity.'[274] Nevertheless, there is an underlying unity, not least in the fact that Morris and Van Till both affirm the first article of the apostle's creed:

> A cynic might say that, given the very different meanings they attach to those twelve words, the intersection of their joint affirmations is empty – but the cynic would be wrong. There is more than enough content in the first article to distinguish its affirmation from the naturalism held by most scientists.

> However much Morris and Van Till may despise each other's positions, both believe that the universe was designed by God, and brought into existence by him for his pleasure and purposes.[275]

There is another significant point of commonality between Morris and Van Till: 'Both these critics of ID have settled views on which scientific narrative of design is true: six-day, young earth creationism for Morris; the 'fully-gifted' evolutionary scenario for Van Till.'[276] The commonality here is obviously not in the 'narrative of design'[277] adopted, but in an underlying similarity of *methodological approach*. In both cases the methodological approach is one that (to a greater or lesser extent) determines the narrative of design *a priori*: Morris begins with a particular, dogmatic interpretation of what certain biblical texts mean – an interpretation usually, but perhaps inaccurately, described as a 'literal' interpretation - and proceeds on the basis that scientific evidence must (at least ultimately) harmonize with that narrative. Van Till begins with a particular, dogmatic interpretation of the scientific enterprise – an interpretation that embraces methodological naturalism – and precedes on the basis that scientific evidence must (at least ultimately) harmonize with some methodologically naturalistic narrative or other. Such dogmatism is, in both instances, questionable.

I would encourage both traditional creationists and theistic evolutionists to consider Paul Nelson's insightful observation: 'That theological commonality – namely, God is the author of the universe, however he chose to act – has a secular counterpart in the philosophy of science: *intelligent design is possible*.'[278] Affirming the mere possibility of intelligent design – conversely, rejecting HMN – is not to constrain one's scientific narrative of design *a priori*, like traditional creationists and theistic evolutionists. Rather, it is to de-constrain science, liberating it to construct a narrative of design (or to play a role in constructing a narrative of design) *a posteriori*. Theists who embrace intelligent design theory join Morris and Van Till in affirming the first article of the apostle's creed, but they refrain from endorsing either of their constraining *a priori* approaches to the narrative of design. Hence, as a matter of first principle, Nelson affirms:

> God could have created everything in six, 24-hour days – or not. *The fundamental point is to allow for the possibility of design*. But the *scientific narrative* of design – when God acted, and how – might be best captured by any number of competing theories. We would have to see. That narrative would have to be discovered… Because of God's freedom to create as he pleases, design might be true, but traditional creationism false… other theories of God's action… are possible within the larger box of design.[279]

Nelson mentions both 'progressive creation and theistic evolution'[280] as possible narratives of design. Recalling our three essential ID claims, it should be obvious that one can be an ID theorist and accept the explanatory adequacy of macroevolution, as long as one seeks to justify this acceptance without reference to methodological rules (like HMN) that effectively predestine one's acceptance of the theory. While design theorists typically reject the grander explanatory claims of evolution, entry to the ID 'Big Tent' could hardly be refused to someone endorsing a scientific inference to intelligent design – perhaps on the combined basis of specified complexity exhibited in both cosmic and local fine tuning and in the origin of life – simply because they didn't accept ID arguments from the Cambrian explosion or irreducible complexity.[281]

Alexander is no ID theorist, but he does share some significant common ground with Christian proponents of ID (besides our common grounding in the apostle's creed). He seems to have no problem with intelligent design in the *broad* sense (the sense that encompasses design detecting sciences from archaeology to SETI); and he accepts a minimal version of the core intelligent design theory argument, implicitly embracing specified complexity as a criterion of design detection and applying it to the fine tuning of the cosmos to infer intelligent design (which he attributes to God). In common with theistic ID proponents Alexander rejects a 'two-tier' worldview of metaphysically naturalistic causes occasionally supplemented by intelligent causation. However, this is the limit of Alexander's agreement with ID and its appropriation by Christian theists.

Alexander disagrees with the essential design theoretic claim that intelligent design theory is scientific. He sets forth two necessary conditions of scientific theory making by which to condemn ID: methodological naturalism and testability. However, a) demarcation arguments are widely regarded as philosophically suspect by philosophers of science, b) Alexander admits that ID makes falsifiable empirical claims, and c) it is only an implausible hard-line methodological naturalism that is incompatible with ID.

Alexander disagrees with the widespread (but not essential) ID claim that it is possible to define biological entities as 'irreducibly complex' in a meaningful fashion, although this is a claim accepted by evolutionists from Darwin to Dawkins. However, Alexander critiques a straw man definition of irreducible complexity and presents an unsound argument for the vacuity of IC as a concept (an argument that relies upon two false premises).

Alexander disagrees with the widespread (but not essential) ID claim that the 'burden of proof' lies upon the evolutionary biologist to show how complex biological systems come into being via the resources permitted by HMN. However, Occam's razor and the principle of credulity (a principle endorsed by Alexander) clearly indicate that the presumption of truth rests with design rather than with evolution, as many evolutionists admit.

Alexander thinks that proponents of ID perceive the world as a two-tier system of the 'natural' and the 'designed'. However, this generalization is false. Some non-theistic ID theorists do indeed perceive the world as a two-tier system (just as some evolutionists perceive the world as metaphysically naturalistic); but while ID is logically compatible with belief in a two-tier system, it is equally compatible with the rejection of a two-tier system (just as evolution is compatible with theism). The design detection criteria used by design proponents can rule design in as the best explanation of data, but cannot rule design out. Design theorists who are theists clearly do not believe in a 'two tier system' that is incompatible with theism, and Alexander's attempt to paint them as doing so is both hermeneutically uncharitable and liable to tar Alexander and other theistic evolutionists with the same brush.

Alexander unfortunately has his sights set upon a straw man of intelligent design theory, which he dismisses (with good intentions) on the basis of several fallacious or otherwise unsound arguments. Having cleared away these misunderstandings and mistakes, one hopes that Alexander (and other theistic evolutionists) might be willing to reassess their engagement with intelligent design theory, starting with the essential question of whether hard-line methodological naturalism is really an essential precondition of scientific theory making. Scientists operating without the constraining chains of hard-line methodological naturalism are free to disagree about the best methods of design detection, and free to disagree about

whether intelligent design is the best explanation of the empirical evidence on any given occasion, but most of all they are free to let the evidence speak for itself. As Paul Nelson concludes:

> In short, humility on all sides is in order – but also joyful confidence… The promise of the big tent of ID is to provide a setting where Christians (and others) may disagree amicably, and fruitfully, about how best to understand the natural world… Christians must continue to struggle to understand the relationship of science and faith. The existence of a research community where design is taken seriously, and where all inquirers are welcome [as long as they accept the *possibility* of design], means that the ongoing struggle need not be solitary. It may even turn out to be a tremendous adventure.[282]

**The Alexander-Williams Debate on Intelligent Design Theory**

Denis Alexander, 'Creation and Evolution?' @
www.bethinking.org/resource.php?ID=193

Peter S. Williams, 'Theistic Evolution & Intelligent Design in Dialogue' @
www.bethinking.org/resource.php?ID=216&TopicID=2&CategoryID=1

Denis Alexander, 'Designs on Science' @
www.bethinking.org/resource.php?ID=260&TopicID=2&CategoryID=1

**Watch**

Robert C. Koons, 'Science & Religion: Concord not Conflict' @
http://webcast.ucsd.edu:8080/ramgen/UCSD_TV/7828.rm

ID Debate: Stephen C. Meyer vs. Peter D. Ward @
www.discovery.org/scripts/viewDB/index.php?command=view&id=3456&program=DI%20Main%20Page%20-%20News&callingPage=discoMainPage

*A Rotary Nano-Machine* @
www.nanonet.go.jp/english/mailmag/2004/files/011a.wmv

Scott Minnich, 'Paradigm of Design: The Bacterial Flagellum' @
http://webcast.ucsd.edu:8080/ramgen/UCSD_TV/8547.rm

*Unlocking the Mystery of Life* (Illustra Media, 2002) @
www.theapologiaproject.org/media/unlocking_the_mystery_of_life.ram

*The Privileged Planet* (Illustra Media) @
www.theapologiaproject.org/media/the_privileged_planet.ram

**Recommended Reading**

Michael J. Behe, 'Whether Intelligent Design is Science' @
www.discovery.org/scripts/viewDB/filesDB-download.php?command=download&id=697

Michael J. Behe 'Philosophical Objections to Intelligent Design' @
www.arn.org/docs/behe/mb_philosophicalobjectionsresponse.htm

Michael J. Behe, 'Answering Scientific Criticisms of Intelligent Design' @ www.discovery.org/scripts/viewDB/filesDB-download.php?id=60

Michael J. Behe, 'The Lamest Attempt Yet to Answer the Challenge Irreducible Complexity Poses for Darwinian Evolution' @ www.arn.org/docs/behe/mb_lamestattempt.htm

Michael J. Behe, 'A True Acid Test: A Response to Ken Miller' @ www.arn.org/docs/behe/mb_trueacidtest.htm

Michael J. Behe, 'The Pilgrim's Regress: A Review of *The Ancestor's Tale*' @ www.arn.org/docs/behe/mb_ancestorstalereview_0506.htm

Michael J. Behe & David W. Snoke, 'Simulating evolution by gene duplication of protein features that require multiple amino acid residues', *Protein Science*, September 2005, @ www.proteinscience.org/cgi/content/abstract/ps.04802904v1

William A. Dembski, 'In Defence of Intelligent Design' @ www.designinference.com/documents/2005.06.Defense_of_ID.pdf

William A. Dembski, 'Is Intelligent Design Testable?' @ www.discovery.org/scripts/viewDB/index.php?command=view&id=584

William A. Dembski, 'Still Spinning Just Fine: A Response to Ken Miller' @ www.designinference.com/documents/2003.02.Miller_Response.htm

William A. Dembski, 'Irreducible Complexity Revisited' @ www.designinference.com/documents/2004.01.Irred_Compl_Revisited.pdf

William A. Dembski, 'Hume, Reid, and Signs of Intelligence' @ www.designinference.com/documents/2005.11.Hume_and_Reid.pdf

William A. Dembski, 'Naturalism's Argument from Invincible Ignorance: A Response to Howard Van Till' @ http://acs.ucsd.edu/~idea/dembskivantill.htm

William A. Dembski, 'Nature's Formal Economy' @ www.meta-library.net/id-wd/natur-frame.html

William A. Dembski, 'Denis Alexander on ID' @ www.uncommondescent.com/index.php/archives/84

Stephen C. Meyer, 'The Scientific Status of Intelligent Design' @ www.discovery.org/scripts/viewDB/index.php?command=view&id=2834&program=CSC%20-%20Scientific%20Research%20and%20Scholarship%20-%20History%20and%20Philosophy%20of%20Science

Stephen C. Meyer, 'DNA and Other Designs' @ www.discovery.org/scripts/viewDB/index.php?command=view&id=200

Scott A. Minnich & Stephen C. Meyer, 'Genetic Analysis of Coordinate Flagellar and Type III Regulatory Circuits in Pathogenic Bacteria' @ www.discovery.org/scripts/viewDB/index.php?command=view&id=2181

Bradley Monton, 'Is Intelligent Design Science? Dissecting the Dover Decision' @ http://philsci-archive.pitt.edu/archive/00002583/01/Methodological_Naturalism_2.pdf

Paul Nelson, 'Intelligent Design', *Nucleus* (January 2005) @ www.cmf.org.uk/printable/?context=article&id=1303

Alvin Plantinga, 'Methodological Naturalism? Part 1' @ www.arn.org/docs/odesign/od181/methnat181.htm

Alvin Plantinga, 'Methodological Naturalism? Part 2' @ www.arn.org/docs/odesign/od182/methnat182.htm

Jay W. Richards & Guillermo Gonzalez, 'Scientists Should Keep an Open Mind' @ www.discovery.org/scripts/viewDB/index.php?command=view&id=3040

Howard Taylor, 'Rebuilding the Matrix: A Critical Review of Denis Alexander's Book' @ www.apologetics.fsnet.co.uk/rebuilding-the-matrix.htm

James E. Taylor, 'Miracles and Historical Investigation' @ http://home.sandiego.edu/~baber/SCP2006/papers/Taylor.pdf

Jonathan Wells, 'Abusing Theology: Howard Van Till's "Forgotten Doctrine of Creation's Functional Integrity"' @ www.arn.org/docs/odesign/od191/abusingtheology191.htm

Peter S. Williams, 'If SETI is Science and UFOlogy Is Not, Which Is Intelligent Design Theory?' @ www.arn.org/docs/williams/pw_setivsufology.htm

Denis Alexander, *Rebuilding the Matrix*, (Lion, 2001)

Francis J. Beckwith, *Law, Darwinism, And Public Education*, (Rowman & Littlefield, 2003)

Michael J. Behe, *Darwin's Black Box*, 10th anniversary edition, (Free Press, 2006)

Michael J. Behe, William A. Dembski & Stephen C. Meyer, *Science and Evidence for Design In The Universe*, (Ignatius, 1999)

John Angus Campbell & Stephen C. Meyer (ed.'s), *Darwinism, Design, & Public Education*, (Michigan State University Press, 2003)

William A. Dembski, *The Design Revolution: Answering the Toughest Questions about Intelligent Design*, (IVP, 2004)

William A. Dembski, *No Free Lunch*: *Why Specified Complexity Cannot be Purchased without Intelligence*, (Rowman & Littlefield, 2001)

William A. Dembski (ed.), *Uncommon Dissent*: *Intellectuals Who Find Darwinism Unconvincing*, (ISI Books, 2004)

David DeWolf, John West, Casey Luskin & Jonathan Witt, *Traipsing Into Evolution*: *Intelligent Design And The Kitzmiller vs. Dover Decision*, (Discovery Institute, 2006)

Bruce L. Gordon, 'Is Intelligent Design Science?', in William A. Dembski & James M. Kushiner (ed.'s), *Signs of Intelligence*: *Understanding Intelligent Design*, (Brazos, 2001)

Cornelius Hunter, *Darwin's Proof*: *The Triumph of Religion over Science*, (Brazos Press, 2003)

J.P. Moreland, *Christianity and the Nature of Science*, (Baker, 1989)

J.P. Moreland (ed.), *The Creation Hypothesis*, (IVP, 1994)

J.P. Moreland & John Mark Reynalds (ed.'s), *Three Views on Creation and Evolution*, (Zondervan, 1999)

Nancy R. Pearcey & Charles B. Thaxton, *The Soul Of Science*: *Christian Faith and Natural Philosophy*, (Crossway Books, 1994)

Fazale Rana & Hugh Ross, *Origins of Life*, (NavPress, 2004)

Del Ratzsch, *Science & Its Limits*: *The Natural Sciences in Christian Perspective*, (Apollos, 2000)

---

[1] Peter S. Williams, 'Theistic Evolution & Intelligent Design in Dialogue' @ www.bethinking.org/resource.php?ID=216&TopicID=2&CategoryID=1/ www.arn.org/docs/williams/pw_createdorevolved.htm

[2] Denis Alexander, 'Designs on Science' @ www.bethinking.org/resource.php?ID=260&TopicID=2&CategoryID=1

[3] *ibid*.

[4] William A. Dembski, 'Preface', *Darwin's Nemesis*: *Phillip Johnson and the Intelligent Design Movement*, (Downers Grove: IVP, 2006), p. 17 & 20. After all, Buddha reportedly asserted that: 'Everything possessing form exists thanks to the mind.' - Giuseppe Sermonti, *Why is a Fly not a Horse*?, (Discovery Institute Press, 2005), p. 118.

[5] Garrett J. DeWeese & J.P. Moreland, *Philosophy Made Slightly Less Difficult*, (Downers Grove: IVP, 2005), p. 142.

[6] Intelligent Design Network @ www.intelligentdesignnetwork.org/

[7] William A. Dembski, 'On the Scientific Status of Intelligent Design' @ www.designinference.com/documents/2002.03.kennedy_on_ID.htm

[8] cf. William A. Dembski, 'The logical underpinnings of intelligent design', in William A. Dembski & Michael Ruse (ed.'s), *Debating Design*: *From Darwin to DNA* , (Cambridge University Press, 2004) @ www.designinference.com/documents/2002.10.logicalunderpinningsofID.pdf; William A. Dembski, 'Reinstating design within science' in *Darwinism, Design, & Public Education*, (East Lansing: Michigan State University Press, 2003); William A. Dembski, 'Naturalism and Design' in William Lane Craig & J.P. Moreland (ed.'s), *Naturalism*: *A Critical Analysis*, (London: Routledge, 2000); William A. Dembski, *The Design Inference*, (Cambridge University Press, 1999)

[9] cf. Michael J. Behe, *Darwin's Black Box*, 10th anniversary edition, (London: Free Press, 2006); Michael J. Behe, 'Design in the details: The origin of biomolecular machines' in John Angus Campbell and Stephen C. Meyer (ed.'s) *Darwinism, Design, & Public Education*, (East Lansing: Michigan State University Press, 2003); William A. Dembski, 'Irreducible Complexity Revisited' @ www.designinference.com/documents/2004.01.Irred_Compl_Revisited.pdf

[10] cf. Robin Collins, 'The Fine Tuning Design Argument' @ http://home.messiah.edu/~rcollins/finetech.htm; Robin Collins, 'A Scientific Argument for the Existence of God: The Fine-Tuning Design Argument' in Michael J. Murray (ed.), *Reason for the Hope Within*, (Grand Rapids: Eerdmans, 1999); Robert C. Koons, 'Are Probabilities Indispensable to the Design Inference?' @ www.utexas.edu/cola/depts/philosophy/faculty/koons/ontocomplex.pdf

[11] cf. Robin Collins, 'God, Design, and Fine-Tuning' @ http://home.messiah.edu/~rcollins/finetune/anth.htm.htm; Robin Collins, 'The Fine Tuning Design Argument' @ http://home.messiah.edu/~rcollins/finetech.htm; Robin Collins, 'Design and the Many-Words Hypothesis' @ http://home.messiah.edu/~rcollins/muv2.htm; Robin Collins, 'Does the Man-Worlds Hypothesis Really Explain the Fine-Tuning?' @ http://home.messiah.edu/~rcollins/MU.htm; Robin Collins, 'Hume, Fine-Tuning and the "Who Designed God?" objection' in James F. Sennett & Douglas R. Groothuis (ed.'s), *In Defence of Natural Theology*: *A Post-Humean Assessment*, (Downers Grove: IVP, 2005); Robin Collins, 'The teleological argument' in Paul Copan & Paul K. Moser (ed.'s), *The Rationality of Theism*, (London: Routledge, 2003); Robin Collins, 'A Scientific Argument for the Existence of God: The Fine-Tuning Design Argument' in Michael J. Murray (ed.), *Reason for the Hope Within*, (Grand Rapids: Eerdmans, 1999); William Lane Craig, 'Review: The Design Inference – Eliminating chance through small possibilities' @ www.leaderu.com/offices/billcraig/docs/design.html; William Lane Craig & Walter Sinnot-Armstrong, *God*? *A Debate Between a Christian And An Atheist*, (Oxford University Press, 2004); J.P. Moreland & William Lane Craig, *Philosophical Foundations for a Christian Worldview*, (Downers Grove: IVP,

2003); Robert C. Koons, 'Post-Agnostic Science: How Physics is Reviving the Argument from Design' @ www.arn.org/docs/koons/rk_postagnosticscience.htm

[12] cf. Guillermo Gonzalez and Jay Richards, *The Privileged Planet*: *How Our Place in the Cosmos Is Designed for Discovery*, (Washington, DC: Regnery, 2004); *The Privileged Planet*, (Illustra Media) @ www.theapologiaproject.org/media/the_privileged_planet.ram

[13] cf. Dean Kenyon, *The Origin of Life* @ http://webcast.ucsd.edu:8080/ramgen/UCSD_TV/6470oriLif.rm; Charles B. Thaxton, The *Origin of Life II* @ http://webcast.ucsd.edu:8080/ramgen/UCSD_TV/6464OnTheOriLif.rm; Charles B. Thaxton, 'A New Design Argument' @ www.arn.org/docs/thaxton/ct_newdesign3198.htm; Charles B. Thaxton, Walter L. Bradley & Roger L. Olsen, *The Mystery of Life's Origin: Reassessing Current Theories*, (Addison, TX: Lewis & Stanley, 4th ed., 1992); Stephen C. Meyer, 'DNA and the Origin of Life: Information, Specification and Explanation', in John Angus Campbell & Stephen C. Meyer (ed.'s), *Darwinism, Design, & Public Education*, (East Lansing: Michigan State University Press, 2003); Stephen C. Meyer, 'DNA by Design: An Inference to the best Explanation for the Origin of Biological Information', *Rhetoric and Public Affairs*, 1, no. 4 (1999) @ www.discovery.org/scripts/viewDB/filesDB-download.php?id=100; Stephen C. Meyer, 'Teleological Evolution: The Difference it Doesn't Make' in Phillip E. Johnson, Denis O. Lamoureux *et al*, *Darwinism Defeated*? *The Johnson-Lamoureux Debate on Biological Origins*, (Vancouver: Regent College Publishing, 1999) @ www.arn.org/docs/meyer/sm_teleologicalevolution.htm; Ø. A. Voie, 'Biological function and the genetic code are interdependent', *Chaos, Solutions and Fractals*, 2006, Vol 28(4), p. 1000-1004; *Unlocking the Mystery of Life* (Illustra Media, 2002) @ www.theapologiaproject.org/media/unlocking_the_mystery_of_life.ram

[14] cf. Michael J. Behe, *Darwin's Black Box*, 10th anniversary edition, (London: Free Press, 2006); Michael J. Behe, 'Design in the details: The origin of biomolecular machines' in John Angus Campbell and Stephen C. Meyer (ed.'s) *Darwinism, Design, & Public Education*, (East Lansing: Michigan State University Press, 2003); Michael J. Behe, 'The Modern Intelligent Design Hypothesis', *Philosophia Christi*, Series 2, vol. 3, no. 1 (2001); Michael J. Behe & D.W. Snoke, 'Simulating Evolution by Gene Duplication of Protein Features That Require Multiple Amino Acid Residues', *Protein Science*, 13 (2004); William A. Dembski, *No Free Lunch: Why Specified Complexity Cannot be Purchased without Intelligence*, (Oxford: Rowman & Littlefield, 2001); Scott Minnich & Stephen C. Meyer, 'Genetic Analysis of Coordinate Flagellar and Type III Regulatory Circuits', *Proceedings of the Second International Conference on Design & Nature*, Rhodes Greece, (ed.) M.W. Collins and C.A. Brebbia (WIT Press, 2004) @ www.discovery.org/scripts/viewDB/filesDB-download.php?id=148; William A. Dembski, 'Still Spinning Just Fine: A Response to Ken Miller' @ www.designinference.com/documents/2003.02.Miller_Response.htm; William A. Dembski, 'Irreducible Complexity Revisited' @ www.designinference.com/documents/2004.01.Irred_Compl_Revisited.pdf; Mike Gene, 'Evolving the Bacterial Flagellum Through Mutation and Cooption, Parts 1-VI' @ www.idthink.net/biot/index.html; Scott Minnich, 'Paradigm of Design: The Bacterial Flagellum' @ http://webcast.ucsd.edu:8080/ramgen/UCSD_TV/8547.rm; *Unlocking the Mystery of Life*, (Illustra Media, 2002) @ www.theapologiaproject.org/media/unlocking_the_mystery_of_life.ram

[15] cf. Stephen C. Meyer, 'The Origin of Biological Information and the Higher Taxonomic Categories', *Proceedings of the Biological Society of Washington*, 117(2) (2004) @ www.discovery.org/scripts/viewDB/index.php?command=view&id=2177&program=CSC%20-%20Scientific%20Research%20and%20Scholarship%20-%20Science; Stephen C. Meyer, Marcus Ross, Paul Nelson & Paul Chien, 'The Cambrian Explosion: Biology's Big Bang', in John Angus Campbell & Stephen C. Meyer (ed.'s), *Darwinism, Design, And Public Education*, (East Lansing: Michigan State University Press, 2003) @ www.discovery.org/articleFiles/PDFs/Cambrian.pdf

[16] David DeWolf, John West, Casey Luskin & Jonathan Witt, *Traipsing Into Evolution*: *Intelligent Design And The Kitzmiller vs. Dover Decision*, (Seattle: Discovery Institute, 2006), p. 30.

[17] John G. West, 'Intelligent Design & Creationism Are Just Not The Same' @ www.discovery.org/scripts/viewDB/index.php?command=view&id=1329

[18] cf. William A. Dembski, 'Is Intelligent Design a Form of Natural Theology?' @ www.designinference.com/documents/2001.03.ID_as_nat_theol.htm

[19] Marcus Ross & Paul Nelson, 'A Taxonomy of Teleology', in William A. Dembski (ed.), *Darwin's Nemesis*: *Phillip Johnson and the Intelligent Design Movement*, (Leicester: IVP, 2006), p. 274.

[20] Francis J. Beckwith, *Law, Darwinism, And Public Education*, (Oxford: Rowman & Littlefield, 2003), p. 96.

[21] Stephen C. Meyer, 'The Scientific Status of Intelligent Design' in Michael J. Behe, William A. Dembski & Stephen C. Meyer, *Science and Evidence for Design In The Universe*, (San Francisco: Ignatius, 1999), p. 193.
[22] Among theists without the ID movement, specified complexity (or something very like it) is (at least implicitly) utilized as a design detection criterion by: Denis Alexander, Francis Collins, Roger Forster & Paul Marston, Basil Mitchell, Keith Ward and Colin Humphreys. cf. Denis Alexander, *Rebuilding the Matrix*, (London: Lion, 2001); Francis Collins, 'Faith and the Human Genome' @ www.asa3.org/ASA/PSCF/2003/PSCF9-03Collins.pdf; Roger Forster & Paul Marston, *Reason, Science & Faith*, (Crowborough: Monarch, 1999); Colin Humphreys, *The Miracles of Exodus*: *A Scientist's Discovery of the Extraordinary Natural Causes of the Biblical Stories*, (London: Continuum, 2003); Basil Mitchell, *The Justification of Religious Belief*, (London: Macmillan, 1973); Keith Ward, *God, Chance & Necessity* (Oxford: OneWorld, 1996) & *God, Faith & The New Millennium*, (Oxford: OneWorld, 1999). Among atheists without the ID movement, specified complexity (or something very like it) is utilized (at least implicitly) as a design detection criterion by: Richard Dawkins, Massimo Pigliucci and Carl Sagan. cf. Richard Dawkins, OP-ED, *Free Inquiry*, October/November 2004, Vol. 24 No. 6, 11-12; Richard Dawkins, *Climbing Mount Improbable*, (London: Viking, 1996); Massimo Pigliucci, 'The Provine-Scott discussion at the RET: Methodological vs. Philosophical Naturalism' @ www.rationalists.org/rc/1998_spring/provine-scott.htm, 'Design Yes, Intelligent No' in *Darwin, Design, And Public Education*, *op cit*; Carl Sagan, *The Demon Haunted World*, (London: Headline, 1996)
[23] Denis Alexander, *Rebuilding the Matrix*, (Oxford: Lion, 2001), p. 448.
[24] Norman L. Geisler, *Miracles and the Modern Mind*, (Grand Rapids, Michigan: Baker, 1992), p. 79-80, quoted by Alexander, *Rebuilding the Matrix*, p. 448.
[25] cf. Norman Geisler & Peter Bocchino, *Unshakeable Foundations: Contemporary Answers To Crucial Questions About The Christian Faith*, (Minneapolis: Bethany House, 2001), Chapter 6, 'Questions About The Origin of Life'.
[26] cf. Alexander, *op cit*, p. 421-422.
[27] William Lane Craig, 'Barrow and Tipler on the Anthropic Principle vs. Divine Design', *British Journal of the Philosophy of Science* 39, (1988), quoted by Alexander, *Rebuilding the Matrix*, p. 420.
[28] cf. William Lane Craig, 'Review: The Design Inference – Eliminating chance through small possibilities' @ www.leaderu.com/offices/billcraig/docs/design.html; William Lane Craig & Walter Sinnot-Armstrong, *God*? *A Debate Between a Christian And An Atheist*, (Oxford University Press, 2004).
[29] Alexander, *op cit*, p. 421.
[30] *ibid*.
[31] *ibid*, p. 422.
[32] *ibid*, p. 424.
[33] *ibid*.
[34] Geisler, *Miracles and the Modern Mind*, *op cit*, p. 80, quoted by Alexander, *Rebuilding the Matrix*, p. 448.
[35] Denis Alexander, 'Beyond Belief? Science & Religion in the 21st Century', Southampton University, 8th May 2006, 'Question and Answer Session' @ www.ciscentralsouth.org.uk/media/DenisAlexander_questions.vbr.mp3
[36] Phillip E. Johnson, *Defeating Darwinism by Opening Minds*, (Downers Grove: IVP, 1997), p. 114.
[37] '*Reductio ad absurdum* is a mode of argumentation that seeks to establish a contention by deriving an absurdity from its denial, thus arguing that a thesis must be accepted because its rejection would be untenable.' - *The Internet Encyclopedia of Philosophy* @ www.iep.utm.edu/r/reductio.htm cf. Wikipedia @ http://en.wikipedia.org/wiki/Reductio_ad_absurdum
[38] It is of course not the case that a negative appraisal of the scientific status of ID therefore necessarily entails a negative appraisal of the core claim of ID, since it may equally well entail the need to embrace the proposed *reductio*.
[39] Norman L. Geisler, *Baker Encyclopedia of Christian Apologetics*, (Grand Rapids: Baker, 1999), p. 570.
[40] Alexander, 'Designs on Science', p. 2.
[41] Alexander, 'Designs on Science', p. 2.
[42] J.P. Moreland, *Christianity and the Nature of Science*, (Grand Rapids: Baker, 1998), p. 24.
[43] William A. Dembski, 'An Information-Theoretic Design Argument', in Francis J. Beckwith, William Lane Craig & J.P. Moreland (ed.'s), *To Everyone An Answer*: *A Case for the Christian Worldview*, (Downers Grove: IVP, 2004), p. 78-79.

[44] Norman L. Geisler, *Christian Apologetics*, (Grand Rapids: Baker, 1995), p. 272.
[45] Paul K. Moser & David Yandell, 'Farewell to philosophical naturalism', in William Lane Craig & J.P. Moreland (ed.'s), *Naturalism*: *A Critical Analysis*, (London: Routledge, 2000), p. 11.
[46] Del Ratzsch, *Science & Its Limits*: *The Natural Sciences in Christian Perspective*, (Leicester: Apollos, 2000), p. 122.
[47] Bruce L. Gordon, 'Is Intelligent Design Science?', in William A. Dembski & James M. Kushiner (ed.'s), *Signs of Intelligence*: *Understanding Intelligent Design*, (Grand Rapids: Brazos, 2001), p. 201.
[48] Samir Okasha, *Philosophy of Science*: *A Very Short Introduction*, (Oxford University Press, 2002), p. 16.
[49] Martin Eger, quoted by Stephen C. Meyer, 'The Use And Abuse of Philosophy of Science' @ www.discovery.org/scripts/viewDB/index.php?command=view&id=1761
[50] Stephen C. Meyer, 'The Methodological Equivalence of Design & Descent' in J.P. Moreland (ed.), *The Creation Hypothesis*, (Downers Grove: IVP, 1994), p. 75.
[51] Beckwith, *Law, Darwinism, And Public Education*, *op cit*, p. 96.
[52] Alexander, 'Designs on Science', p. 2.
[53] *ibid*, p. 2.
[54] *ibid*.
[55] cf. the 1950 movie 'Rocketship X-M' (Dir. Kurt Neumann) for a dramatized example of such a situation.
[56] Alexander, 'Designs on Science', p. 2.
[57] *ibid*.
[58] *ibid*.
[59] Denis Alexander, *Rebuilding the Matrix*, *op cit*, p. 448.
[60] Norman L. Geisler, *Miracles and the Modern Mind*, (Grand Rapids, Michigan: Baker, 1992), p. 79-80, quoted by Alexander, *Rebuilding the Matrix*, p. 448.
[61] Geisler, *ibid*, p. 79-80, quoted by Alexander, *Rebuilding the Matrix*, p. 448.
[62] Christopher Michael Langan, 'Cheating the Millennium: The Mounting Explanatory Debts of Scientific Naturalism' in William A. Dembski (ed.), *Uncommon Dissent*, (ISI Books, 2004), p. 235.
[63] Geisler, *Baker Encyclopedia of Christian Apologetics*, *op cit*, p. 569.
[64] Alexander, 'Designs on Science', p. 2.
[65] *ibid*, p. 1.
[66] *ibid*. J.P. Moreland points out that: 'some people in the history of science (scientists with views akin to those of George Berkley [1685-1753] and Ernst Mach [1838-1916], including some contemporary physicists (e.g., some who study quantum physics) do not believe that matter exists, but their studies of space, time, and so forth surely count as science.' - *Christianity and the Nature of Science*, (Grand Rapids: Baker, 1989), p. 27.
[67] Alexander, 'Designs on Science', p. 5.
[68] Alexander, *Rebuilding the Matrix*, *op cit*, p. 281.
[69] Paul de Vries, 'Naturalism in the Natural Sciences,' *Christian Scholar's Review*, 15 (1986), 388-396.
[70] Garrett J. DeWeese & J.P. Moreland, *Philosophy Made Slightly Less Difficult*, (Downers Grove: IVP, 2005), p. 133.
[71] Nancy Murphy, 'Phillip Johnson on Trial: A Critique of his Critique of Darwin', *Perspectives on Science and Christian Faith*, 45, no 1 (1993), p. 33.
[72] Del Ratzsch, *Nature, Design and Science*: *The Status of Design in Natural Science*, (State University of New York Press, 2001), p. 94.
[73] DeWeese & Moreland, *ibid*, p. 146.
[74] Bradley Monton, 'Is Intelligent Design Science? Dissecting the Dover Decision' @ http://philsci-archive.pitt.edu/archive/00002583/01/Methodological_Naturalism_2.pdf
[75] Larry Laudan, 'The Demise of the Demarcation Problem', in Michael Ruse (ed.), *But is it Science*?, (Amherst: Prometheus, 1983), p. 349.
[76] Larry Laundan, *Beyond Positivism and Relativism*, (Boulder: Westview Press, 1996), p. 210.
[77] Michael Ruse, *Can a Darwinian be a Christian*?, (Cambridge University Press, 2004), p. 101.
[78] Willard Quine, 'Naturalism; or, Living within One's Means', *Dialectica* 1995, vol. 49.
[79] Philip Kitcher, *Abusing Science*, (MIT Press, 1983), p. 125.
[80] Paul K. Moser & David Yandell, 'Farewell to philosophical naturalism', in William Lane Craig & J.P. Moreland (ed.'s), *Naturalism*: *A Critical Analysis*, *op cit*, p. 17.
[81] Geisler, *Baker Encyclopedia of Christian Apologetics*, *op cit*, p. 570.
[82] Nancy R. Pearcey & Charles B. Thaxton, *The Soul Of Science*: *Christian Faith and Natural Philosophy*, (Wheaton, Illinois: Crossway Books, 1994), p. 72

[83] Newton, *Principia*, volume 2; quoted by Michael Friedlander, 'Intelligent Design and the Workings of Science', *Skeptical Inquirer*, volume 30, issue 3.
[84] Stephen C. Meyer, 'The Methodological Equivalence of Design and Descent', J.P. Moreland (ed.), *The Creation Hypothesis*, (Downers Grove: IVP, 1994), p. 97.
[85] Nancy R. Pearcey & Charles B. Thaxton, *The Soul Of Science*: *Christian Faith and Natural Philosophy*, (Wheaton, Illinois: Crossway Books, 1994), p. 72. For a contemporary presentation of the design argument from the fine-tuning of our solar habitat, cf. Guillermo Gonzalez & Jay Richards, *The Privileged Planet*: *How Our Place in the Cosmos is Designed for Discovery*, (Regnery Publishing, 2005).
[86] Paul Nelson, 'Intelligent Design', *Nucleus* (January 2005) @ www.cmf.org.uk/printable/?context=article&id=1303
[87] Alexander, *Rebuilding the Matrix*, *op cit*, p. 436.
[88] *ibid*, p. 340.
[89] *ibid*, p. 341 & 444.
[90] Del Ratzsch, *Science & Its Limits*: *The Natural Sciences in Christian Perspective*, (Leicester: Apollos, 2000), p. 123-124.
[91] Robert C. Koons, 'The Check Is in the Mail: Why Darwinism Fails to Inspire Confidence', William A. Dembski (ed.), *Uncommon Dissent*, (Wilmigton, Delaware: ISI Books, 2004), p. 14.
[92] Alexander, 'Designs on Science', p. 1.
[93] Alexander, 'Designs on Science', p. 1.
[94] Jay Wesley Richards, 'How Phil Johnson Changed my Mind' in William A. Dembski (ed.), *Darwin's Nemesis*: *Phillip Johnson and the Intelligent Design Movement*, (Leicester: IVP, 2006), p. 58.
[95] Denis Alexander, 'Science in search of God; Face To Faith', *The Guardian* (London) August 25, 2001 @ www.jodkowski.pl/nr/DAlexander.html
[96] Geisler, *Baker Encyclopedia of Christian Apologetics*, *op cit*, p. 570.
[97] William P. Alston, 'Biblical Criticism and the Resurrection' in Stephen Davis, Daniel Kendall & Gerald O'Collins (ed.'s), *The Resurrection*, (Oxford University Press, 1998), p. 182.
[98] R.T. France, *The Evidence for Jesus*, (London: Hodder & Stoughton, 1986), p. 167.
[99] cf. James E. Taylor, 'Miracles and Historical Investigation' @ http://home.sandiego.edu/~baber/SCP2006/papers/Taylor.pdf; Craig L. Blomberg, *The Historical Reliability of the Gospels*, (Leicester: IVP, 1987); William Lane Craig, 'Contemporary Scholarship and the Historical Evidence for the Resurrection of Jesus' @ www.leaderu.com/truth/1truth22.html; William Lane Craig, *The Son Rises*: *The Historical Evidence for the Resurrection of Jesus*, (Eugene: Wipf and Stock, 2000); Norman L. Geisler, *Baker Encyclopedia of Christian Apologetics*, (Grand Rapids: Baker, 1999); Gary R. Habermas, 'The Facts Concerning the Resurrection' @ www.ankerberg.com/Articles/_PDFArchives/editors-choice/EC3W0302.pdf; Gary R. Habermas, *The Historical Jesus*: *Ancient Evidence for the Life of Christ*, (Joplin: College Press, 2001); R. Douglas Geivett & Gary R. Habermas (ed.'s), *In Defence of Miracles*: *A Comprehensive Case for God's Action in History*, (Leicester: Apollos, 1997); J.P. Moreland, *Scaling the Secular City*, (Grand Rapids: Baker, 1987)
[100] William Lane Craig, 'A Classical Apologist's Response' in Steven B. Cowen (ed.), *Five Views on Apologetics*, (Grand Rapids: Zondervan, 2000), p. 124.
[101] Albert Schweitzer, *The Quest of the Historical Jesus*, 3rd ed., trans. W. Montgomery, (London: Adam & Charles Black, 1954), p. 11 0-111.
[102] D. E. Nineham, 'Some Reflections on the Present Position with regard to *The Jesus of History*', *CQR* 166 (1965) p. 6-7.
[103] cf. William Lane Craig, 'Christ and Miracles' in Francis J. Beckwith, William Lane Craig & J.P. Moreland (ed.'s), *To Everyone An Answer*: *A Case for the Christian Worldview*, (Downers Grove: IVP, 2004), p. 139-143; William Lane Craig, 'Rediscovering the Historical Jesus: Presuppositions and Pretensions of the Jesus Seminar' @ www.leaderu.com/offices/billcraig/docs/rediscover1.html; Michael J. Wilkins & J.P. Moreland (ed.'s), *Jesus Under Fire*: *Modern Scholarship Reinvents the Historical Jesus*, (Grand Rapids: Zondervan, 1995).
[104] David Friedrich Straus, *The Life of Jesus, Critically Examined*, trans. George Eliot (ed.), with an Introduction by Peter C. Hodgson, Lives of Jesus Series, (London: SCM Press, 1973), p. 736.
[105] R. W. Funk, R. W. Hoover, and the Jesus Seminar, 'Introduction' to *The Five Gospels*, (New York: Macmillan, 1993), p. 3.
[106] *ibid*, p.2-3.
[107] William Lane Craig, 'Rediscovering the Historical Jesus: Presuppositions and Pretensions of the Jesus Seminar' @ www.leaderu.com/offices/billcraig/docs/rediscover1.html

[108] Keith Ward, 'Evidence for the Virgin Birth' in Gillian Ryeland (ed.), *Beyond Reasonable Doubt*, (The Canterbury Press Norwich, 1991), p. 60.
[109] Alexander, *Rebuilding the Matrix*, *op cit*, p. 444.
[110] Alexander, *Rebuilding the Matrix*, *op cit*, p. 450.
[111] William Lane Craig, 'A Classical Apologist's Response' in Steven B. Cowen (ed.), *Five Views on Apologetics*, (Grand Rapids: Zondervan, 2000), p. 124.
[112] William Lane Craig, *Reasonable Faith*, (Wheaton: Crossway Books, 1994), p. 190.
[113] A proposal I first made in 'Reviewing the Reviewers: Pigliucci *et al* on Darwin's Rotweiller & the public understanding of science' @ www.arn.org/docs/williams/pw_pigliucci_reviewingreviewers.htm
[114] William A. Dembski, 'Skepticism's Prospects for Unseating Intelligent Design' @ www.designinference.com/documents/2002.06.Skepticism_CSICOP.htm
[115] Michael J. Behe, 'The Modern Intelligent Design Hypothesis', *Philosophia Christi*, Series 2, Volume 3, Number 1, 2001, p. 165
[116] David DeWolf, John West, Casey Luskin & Jonathan Witt, *Traipsing Into Evolution*: *Intelligent Design And The Kitzmiller vs. Dover Decision*, (Seattle: Discovery Institute, 2006), p. 31-33.
[117] cf. Bradley Monton, 'Is Intelligent Design Science? Dissecting the Dover Decision' @ http://philsci-archive.pitt.edu/archive/00002583/01/Methodological_Naturalism_2.pdf; William A. Dembski, 'On the Very Possibility of Intelligent Design' in J.P. Moreland (ed.), *The Creation Hypothesis*, (Downers Grove: IVP, 1994)
[118] David DeWolf, John West, Casey Luskin & Jonathan Witt, *Traipsing Into Evolution*: *Intelligent Design And The Kitzmiller vs. Dover Decision*, (Seattle: Discovery Institute, 2006), p. 35.
[119] Alexander, 'Designs on Science', p. 1.
[120] Alexander, 'Designs on Science', p. 4.
[121] Alexander, *Rebuilding the Matrix*, *op cit*, p. 233 & 235.
[122] cf. William A. Dembski, 'Is Intelligent Design Testable?' @ www.discovery.org/scripts/viewDB/index.php?command=view&id=584
[123] Alexander, 'Designs on Science', p. 3.
[124] *ibid*, p. 4.
[125] *ibid*, p. 2.
[126] *ibid*, p. 4.
[127] *ibid*.
[128] Darwinists have failed to provide evidence that the eye could be evolved *from scratch* though any series of sufficiently small mutations; let alone to provide evidence that any eye historically followed any such evolutionary pathway. Richard Dawkins argues that different forms of eye present in nature can be arranged into a sequence from less to more complex, and that this sequence shows the theoretical viability of a Darwinian explanation of the eye. However, not only is this sequence of eyes historically hypothetical (showing at best what could rather than what did happen), but its supposedly simple beginning assumes the existence of a cell sensitive to light (linked in the requisite way to an organism's behavioural output). That light sensitive cell, far from being a simple first step up Dawkins' 'Mount Improbable', appears to be an example of an 'irreducibly complex' system. Hence, while the eye is not irreducibly complex *as a whole*, it does appear to depend upon an irreducibly complex *core* system.
[129] Alexander, 'Designs on Science', p. 1.
[130] *ibid*, p. 2.
[131] *ibid*, p. 4.
[132] *ibid*, p. 3.
[133] Massimo Pigliucci, 'When Philosophy Matters', *Skeptical Inquirer*, Volume 30, No 4, July/August 2006, p. 19.
[134] William A. Dembski, *The Design Revolution*, (Downers Grove: IVP, 2004), p. 282.
[135] Bradley Monton, 'Is Intelligent Design Science? Dissecting the Dover Decision' @ http://philsci-archive.pitt.edu/archive/00002583/01/Methodological_Naturalism_2.pdf
[136] Alexander, 'Designs on Science', p 3.
[137] William Paley, *Natural Theology* @ www.hti.umich.edu/cgi/p/pd-modeng/pd-modeng-idx?type=HTML&rgn=DIV1&byte=53054870
[138] A.E. Taylor, *Does God Exist*?, (London: Collins/Fonatana Books, 1961), p. 118, my italics.
[139] *ibid*, p. 119, my italics.
[140] Charles Darwin, *Origin of Species*, (1872), 6th edition, (New York University Press, 1988), p. 154, my italics.

[141] Richard Dawkins, 'Universal Darwinism', in Hull and Ruse (ed.'s), *The Philosophy of Biology*, (Oxford University Press, 1998), p.29.
[142] Richard Dawkins, *The Blind Watchmaker*, (Penguin), p. 91, my italics.
[143] *ibid*.
[144] Massimo Piggliucci, 'Design Yes, Intelligent No', *Darwin, Design, And Public Education*, p. 467.
[145] Daniel C. Dennett, *Darwin's Dangerous Idea* (London: Penguin, 1995), p.318.
[146] *ibid*, p. 317, my italics.
[147] *ibid*, p. 471.
[148] *ibid*, p. 467.
[149] Behe, *Darwin's Black Box*, *op cit*, p. 39.
[150] For further tightening of the definition of irreducible complexity cf. William A. Dembski, *No Free Lunch: Why Specified Complexity Cannot be Purchased without Intelligence*, (Rowman & Littlefield, 2001)
[151] William A. Dembski, 'Reinstating Design Within Science', in Jay Wesley Richards (ed.), *Unapologetic Apologetics* (Downers Grove: IVP, 2001), p.253.
[152] Michael J. Behe, *Darwin's Black Box*, (Free Press, 2006), p.39.
[153] Behe, *ibid.*, p.72.
[154] Behe, *ibid*, p .
[155] Michael J. Behe, *Darwin's Black Box*, 10th anniversary edition, (Free Press, 2006), p.258.
[156] Behe, *Darwin's Black Box*, 10th anniversary edition, (Free Press, 2006), p. 258.
[157] Behe, *Darwin's Black Box*, 10th anniversary edition, (Free Press, 2006), p. 263-264.
[158] Michael J. Behe, 'Philosophical Objections to Intelligent Design: Response to Critics' @ www.arn.org/docs/behe/mb_philosophicalobjectionsresponse.htm
[159] William A. Dembski, *Intelligent Design* (Downers Grove: IVP, 1999), p.149.
[160] Michael J. Behe, 'The Pilgrim's Regress: A Review of *The Ancestor's Tale*' @ www.arn.org/docs/behe/mb_ancestorstalereview_0506.htm
[161] William A. Dembski, 'The Bacterial Flagellum: Still Spinning Just Fine' @ www.designinference.com/documents/2003.02.Miller_Response.htm
[162] Gene, Mike, 'Evolving the Bacterial Flagellum through Mutation and Co-option' @ www.idthink.net/biot/flag1/index.html cf. Minnich, Scott A. & Michael J. Behe, 'Genetic Analysis of Coordinate Flagellar and Type II Regulatory Circuits in Pathogenic Bacteria ' @ www.discovery.org/scripts/viewDB/filesDB-download.php?id=148
[163] Dembski, *op cit*, p. 3.
[164] Robert Macnab, 'How Bacteria Assemble Flagella', *Annual Review of Microbiology* (2003), 57:77-100.
[165] H. Allen Orr, *Boston Review*.
[166] Alexander, 'Designs on Science', p. 3.
[167] Scott Minnich, in the video *Unlocking the Mystery of Life*.
[168] Dembski, *op cit.*
[169] *ibid*.
[170] *ibid*.
[171] Minnich, *op cit.*
[172] cf. www.iscid.org/pcid.php
[173] J. R. Bracht, 'The Bacterial Flagellum: A Response to Ursula Goodenough' @ www.iscid.org/papers/Bracht_GoodenoughResponse_021203.pdf
[174] *ibid*.
[175] William A. Dembski, 'Gauging Intelligent Design's Success' @ www.designinference.com/documents/2003.11.Gauging_IDs_Success.pdf
[176] Dembski, 'The Bacterial Flagellum: Still Spinning Just Fine', *op. cit.*
[177] *ibid*.
[178] William A. Dembski, *The Intelligent Design Revolution*, (Downers Grove: IVP, 2004), p. 112-113.
[179] *ibid*, p. 113.
[180] *ibid*, p.112-113.
[181] Alexander, 'Designs on Science', p. 3.
[182] *ibid*.
[183] *ibid*, p. 2.
[184] William A. Dembski, *No Free Lunch*, (Oxford: Rowman & Littlefield, 2002), p. 248.
[185] Alexander, 'Designs on Science', p. 3.
[186] Michael J. Behe, *Darwin's Black Box*, 10th anniversary edition, (London: Free Press, 2006), p. 260.

[187] Alexander, 'Designs on Science', p. 3.
[188] *ibid*.
[189] *ibid*.
[190] As a general philosophical point, it isn't true that a term that applies to everything material is necessarily vacuous. For example, the description 'exists contingently' applies to everything material and is not vacuous.
[191] Alexander, 'Designs on Science', p. 2.
[192] *ibid*, p. 4.
[193] *ibid*.
[194] Daniel Dennett, *Darwin's Dangerous Idea*, p. 521.
[195] Judge John Jones, quoted by Massimo Pigliucci, 'When Philosophy Matters', *op cit*, p. 19.
[196] Alexander, 'Designs on Science', p. 4.
[197] Alexander, 'Designs on Science', p. 4.
[198] Dawkins, 'Darwin Triumphant', *A Devil's Chaplin*, p. 86.
[199] Dawkins, *Climbing Mount Improbable*, (Viking, 1996).
[200] Dawkins, *A Devil's Chaplain*, p. 211-212.
[201] *ibid*, p. 212.
[202] *ibid*.
[203] Brian Josephson, *The Independent*, (1997), quoted by Walter L. Bradley, 'Design or Designoid' in *Mere Creation*, p. 47-48.
[204] John Angus Campbell, 'Intelligent Design, Darwinism, and Public Education Philosophy' in John Angus Campbell & Stephen C. Meyer (ed.'s), *Darwinism, Design, And Public Education*, (Michigan University Press, 2003), p. 9-10.
[205] Neal Gillespie, *Charles Darwin and the problem of creation*, (University of Chicago Press, 1979), p. 147.
[206] Michael Ruse, speech given at the annual meeting of the American Association for the Advancement of Science, Boston, Mass., 1993.
[207] Alexander, 'Designs on Science', p. 5.
[208] Franklin Harold, *The Way of the Cell: Molecules, Organisms and the Order of Life*, (Oxford University Press, 2001), p. 205.
[209] Alexander, 'Designs on Science', p. 4.
[210] Simply in the course of researching this paper I have noticed that the term 'proof' used by both Richard Dawkins and Cornelius Hunter.
[211] www.thefreedictionary.com/mathematical+proof
[212] Stephen T. Davies, *God, Reason and Theistic Proofs*, (Edinburgh University Press, 1997), p. 4-5.
[213] Cornelius Hunter, *Darwin's Proof*: *The Triumph of Religion over Science*, (Grand Rapids: Brazos Press, 2003), p. 36.
[214] Stephen C. Meyer, 'The Cambrian Explosion: Biology's Big Bang', in John Angus Campbell & Stephen C. Meyer (ed.'s), *Darwinism, Design, And Public Education*, (Michigan State University Press, 2003), p. 323.
[215] Richard Norman, *On Humanism*, (London: Routledge, 2004), p.
[216] Richard Dawkins, *The Blind Watchmaker*, Preface, p. x.
[217] Scott O. Lilienfeld, 'Why Scientists Shouldn't Be Surprised by the Popularity of Intelligent Design', *Skeptical Inquirer*, Volume 30, Issue 3, p. 47-48. On the peacock's tail, cf. Stuart Burgess, *Hallmarks of Design*, chapter 5, 'Added beauty in the peacock's tail', (Day One Publications, 2002).
[218] Scott O. Lilienfeld, 'Why Scientists Shouldn't Be Surprised by the Popularity of Intelligent Design', *Skeptical Inquirer*, Volume 30, Issue 3, p. 48.
[219] C.D. Broad, 'Arguments for the Existence of God', *Journal of Theoretical Studies* 40 (1939).
[220] Richard Swinburne, 'Evidence for God' in Gilliam Ryeland (ed.), *Beyond Reasonable Doubt*, (The Canterbury Press Norwch, 1991).
[221] Alexander, *Rebuilding the Matrix*, *op cit*, p. 447.
[222] Koons, 'The Check Is in the Mail: Why Darwinism Fails to Inspire Confidence', William A. Dembski (ed.), *Uncommon Dissent*, p. 14 & 17.
[223] Koons, *op cit*, p. 7.
[224] Hunter, *Darwin's Proof*: *The Triumph of Religion over Science*, *op cit*, p. 34-35.
[225] Nigel Warburton, *Thinking*: *From A to Z*, (London: Routledge, 2000), p. 105.
[226] *ibid*.
[227] *ibid*, p. 106.

[228] Robert C. Koons, 'The Check is in the Mail', *Uncommon Dissent*: *Intellectuals Who Find Darwinism Unconvincing*, (Wilmington, Del: ISI Books, 2004) p. 8.
[229] *ibid*, p. 17.
[230] Warburton, *op cit*, p. 106.
[231] Robert C. Koons, 'Are Probabilities Indispensable to the Design Inference?' @ www.utexas.edu/cola/depts/philosophy/faculty/koons/ontocomplex.pdf
[232] Koons, *ibid*, p. 8 & 11.
[233] Richard Dawkins, quoted by Michael J. Behe, *Darwin's Black Box*, 10th anniversary edition, p. 264.
[234] Behe, *Darwin's Black Box*, 10th anniversary edition, p. 265-266.
[235] William A. Dembski, 'Denis Alexander on ID' @ www.uncommondescent.com/index.php/archives/84
[236] Dembski, *The Design Revolution*, (Downers Grove: IVP, 2004), p. 94.
[237] Michael J. Behe, 'Intelligent Design Theory as a Tool for Analyzing Biochemical Systems' in William A. Dembski (ed.), *Mere Creation*, (Downers Grove: IVP, 1998), p. 179.
[238] Dembski, *The Design Revolution*, (Downers Grove: IVP, 2004), p. 75.
[239] Dembski, *The Design Revolution*, (Downers Grove: IVP, 2004), p. 70.
[240] J.P. Moreland, 'Theistic Science & Methodological Naturalism' in J.P. Moreland (ed.), *The Creation Hypothesis*, (Downers Grove: IVP, 1994), p. 59.
[241] cf. *Message from the Designers* @ www.rael.org/rael_content/index.php; Peter S. Williams, 'Raelians Successfully Clone Naturalism' @ www.arn.org/docs/williams/pw_raeliansclonenaturalism.htm
[242] *Message from the Designers*, 'The Message' @ www.rael.org/rael_content/rael_summary.php
[243] Rael, *Intelligent Design*: *Message from the Designers*, Anthony Grey, Foreword, xx, @ www.rael.org/download.php?view.1
[244] *Message from the Designers*, faq @ www.rael.org/e107_plugins/faq/faq.php?cat.3.3
[245] cf. James A. Sadowsky, 'Can there be an endless regress of causes?'@ www.anthonyflood.com/sadowskyendlessregress.htm; Peter S. Williams, 'Who Made God?' @ www.uccf.org.uk/resources/apologetics.php?resourceID=131
[246] Alexander steers clear of affirming meticulous providence: 'does God's sustaining of the created order imply that he has a specific will for its every detail, or only a general will that defines its general properties? "Do you believe", wrote Darwin to the theist Asa Gray, "that when a swallow snaps up a gnat that God designed that that particular swallow should snap up that particular gnat at that particular instant?" The answer is surely "no"…' – *Rebuilding the Matrix*, *op cit*, p. 357.
[247] Winfried Corduan distinguishes between 'superseding or first-order miracles' as 'events in which the basic nature of reality has been defied' and 'configuration, contingency, constellation or second-order miracles' which 'do not appear to break any laws of nature per se, but they present us with a sequence of events that is so improbable as to be as astounding as an apparent violation of the laws of nature.' – 'Miracles', in *To Everyone and Answer*, *op cit*, p. 175. In these terms, God can bring about both types of miracle, but humans might be said to regularly accomplish second order 'miracles' (whenever they create specified complexity). ID does not entail belief in first order miracles; as Dembski writes: 'intelligent design does not require miracles or supernatural interventions in the classical sense of what I call "counterfactual substitution".' - 'Naturalism's Argument from Invincible Ignorance: A Response to Howard Van Till' @ http://acs.ucsd.edu/~idea/dembskivantill.htm
[248] Michael Poole, *Miracles*: *Science, The Bible & Experience*, (London: Scripture Union, 1992), p. 22.
[249] Geisler, *Christian Apologetics*, *op cit*, p. 280.
[250] Alexander, 'Designs on Science', p. 5.
[251] *ibid*.
[252] Phillip E. Johnson, in Phillip E. Johnson & D.O. Lamoureux (ed.'s), *Darwinism Defeated*? *The Johnson – Lamoureux Debate on Biological Origins*, (Regent College Publishing, 1999), p. 52.
[253] Alister McGrath, *Dawkins' God*, (Oxford: Blackwell Publishing, 2005), p. 55.
[254] McGrath, *Dawkins' God*, p. 59.
[255] McGrath, *Dawkins' God*, p. 59.
[256] Alexander, *Rebuilding the Matrix*, *op cit*, p. 446.
[257] C.S. Lewis, *Studies in Words*, second edition, (Cambridge University Press, 1967), p. 24.
[258] Lewis, *Studies in Words*, second edition, *op cit*, p. 25.
[259] *ibid*, p. 45.
[260] *ibid*, p. 35-38.
[261] *ibid*, p. 38.
[262] *ibid*, p. 39.

[263] Nancy R. Pearcey & Charles B. Thaxton, *The Soul Of Science*: *Christian Faith and Natural Philosophy*, (Wheaton, Illinois: Crossway Books, 1994), p. 80-81.
[264] Moreland, *Christianity and the Nature of Science*, *op cit*, p. 226.
[265] Alvin Plantinga, 'Evolution, Neutrality, and Antecedent Probability: a reply to Van Till and McMullen' @ www.asa3.org/ASA/dialogues/Faith-reason/CRS9-91Plantinga2.html
[266] cf. Stephen C. Meyer, 'DNA by Design: An Inference to the best Explanation for the Origin of Biological Information', *Rhetoric and Public Affairs*, 1, no. 4 (1999) @ www.discovery.org/scripts/viewDB/filesDB-download.php?id=100; Ø. A. Voie, 'Biological function and the genetic code are interdependent', *Chaos, Solutions and Fractals*, 2006, Vol 28(4), p. 1000-1004.
[267] Stephen C. Meyer, 'The Scientific Status of Intelligent Design', in Michael J. Behe, William A. Dembski & Stephen C. Meyer, *Science and Evidence for Design In The Universe*, (San Francisco: Ignatius, 1999), p. 189.
[268] Francis Collins, 'Faith and the Human Genome' @ www.asa3.org/ASA/PSCF/2003/PSCF9-03Collins.pdf
[269] cf. www.depts.ttu.edu/hhmi/viewEvents.php?id=3
[270] www.uncommondescent.com/index.php/archives/1253
[271] www.uncommondescent.com/index.php/archives/1253
[272] William A. Dembski @ www.uncommondescent.com/index.php/archives/84
[273] Nelson, 'Intelligent Design', *Nucleus* (January 2005) @ www.cmf.org.uk/printable/?context=article&id=1303
[274] *ibid*.
[275] *ibid*.
[276] *ibid*.
[277] *ibid*.
[278] *ibid*.
[279] *ibid*.
[280] *ibid*.
[281] Someone might ask why, if one can be an ID theorist whilst rejecting ID arguments from biology - and so accepting the theory of evolution - most ID theorists do in fact reject the grander explanatory claims of evolutionary theory. For one thing, ID theorists necessarily reject the rule of HMN, a rule which constrains those who accept it to accept the theory of evolution as the best available theory compatible with HMN. For another, ID theorists typically agree that the theory of evolution properly bears the burden of proof. This stance opens up the possibility that the theory has not met the proper burden of proof. Even young earth creationists accept that micro-evolution is a fact. What *is* open to doubt is whether the evidence for micro-evolution can be extrapolated into a sufficient, all-encompassing explanation of biological diversity. On the theoretical and evidentiary failings of macroevolution cf. 'The Scientific Controversy Over Whether Microevolution Can Account For Macroevolution' @ www.discovery.org/scripts/viewDB/filesDB-download.php?id=118; 'ARN Response to the PBS *Evolution* Project' @ www.arn.org/pbs_evolution0901.htm; Stephen C. Meyer, 'The Origin of Biological Information and the Higher Taxonomic Categories', *Proceedings of the Biological Society of Washington*, 117(2), 2004 @ www.discovery.org/scripts/viewDB/index.php?command=view&id=2177; Robert C. Newman *et al*, 'The Status of Evolution as a Scientific Theory' @ www.arn.org/docs/newman/rn_statusofevolution.htm; Jonathan Wells, 'Icons of Evolution' @ http://webcast.ucsd.edu:8080/ramgen/UCSD_TV/6466IcoEvoJonWel.rm; Jonathan Wells, 'Survival of the Fakest' @ www.discovery.org/articleFiles/PDFs/survivalOfTheFakest.pdf; Jonathan Wells & Paul Nelson, 'Homology: A Concept in Crisis' @ www.arn.org/docs/odesign/od182/hobi182.htm; Michael J. Behe, *Darwin's Black Box*, 10th anniversary edition, (Free Press, 2006); William A. Dembski, *No Free Lunch*: *Why Specified Complexity Cannot be Purchased without Intelligence*, (Rowman & Littlefield, 2001); William A. Dembski (ed.), *Uncommon Dissent*: *Intellectuals Who Find Darwinism Unconvincing*, (ISI Books, 2004); Michael Denton, *Evolution*: *A Theory in Crisis*, (Adler & Adler, 1986); Cornelius Hunter, *Darwin's Proof*: *The Triumph of Religion over Science*, (Brazos Press, 2003); Phillip E. Johnson, *Darwin on Trail*, (IVP, 1993); Antony Latham, *The Naked Emperor*: *Darwinism Exposed*, (Janus, 2005); Jonathan Wells, *Icons of Evolution*, (Regnery, 2002).
[282] Nelson, *op cit*.