An Introduction to Intelligent Design

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Contents

Introduction

> **"Any story sounds true until someone tells the other side and sets the record straight."** (Proverbs 18: 7, LB)

When interrogating the diverse positions on origins, it is essential that real cultural watersheds are recognised and real positions addressed, not imaginary ones that play little or no role in the thinking of the scholars in question. When a sophisticated, adult version of our favoured position is played off against 'Noddy' versions of other positions, the outcome is assured, but furthers neither the debate, nor the search for truth.

Intelligent Design (ID) is a case in point. It is so widely misrepresented and disparaged, that many know of it only through the lenses of its critics. It should hardly need saying that we can assess the truth of a position only by paying careful attention to its leading scholars, and then following the debate with its serious critics.

We must also remember that controlling worldviews may go unnoticed, not because they are *hidden*, but because they are *pervasive*.

Defining ID

ID is an increasingly influential movement. It is not a version of creationism, nor is it, in itself, an anti-evolutionary position (see Ross, 2005, Ross & Nelson, 2006, Nagel, 2008, 2012). ID is a minimalist, or non-creedal position that:

- *denies* that the universe, or living things, are solely the product of materialistic (unintelligent) processes
- *affirms* that design is real, both specifically, wherever design is scientifically detectable and researchable, and generally, in regard to the intelligibility and rationality of the universe and its 'anthropic' laws and systems.

ID explicitly excludes any position on scripture, on common descent, or on the age of the universe, Earth, or life. Thus IDers may also be creationists, theistic evolutionists, or even non-theists. Thus there are prominent secular agnostics and atheists, such as David Berlinski, Steve Fuller, Bradley Monton and the late Antony Flew who support ID, or, like atheist philosopher Thomas Nagel, defend its scientific status and merit (see Gidney, 2012; also see **Appendix A**)

Three Areas of Design

The science of ID is based on empirical observations. Several features of the universe and of living organisms show evidence of being deliberately designed. There are three main areas of ID science:

- design of the physical universe
- design of living organisms

- design for science and technology

NB: ID is about much more than evolution.

The Physical Universe: In physics and cosmology a picture has emerged of a universe whose fundamental constants and associated particles and forces are fine-tuned for Earth to sustain living organisms. Extremely small variations in these constants and forces would make life impossible (See, *e.g*., Ross 2001, Gonzalez & Richards, 2004). The laws of physics and chemistry, and the properties of the natural elements and compounds, appear remarkably designed for life in general and for intelligent life in particular. Naturalists commonly evade a design conclusion by postulating an infinite number of alternate universes (multiverse theory). Their argument is that if there are enough universes, chances are that one will be suitable for life, and that one is our universe. Apart from being highly speculative and without supporting evidence ('chance of the gaps') this actually doesn't solve the problem. Even given the fine-tuning of our universe, there is still no real evidence that naturalistic processes within our universe, *as it is*, could either cause living organisms to arise, or bring into being their amazing diversity of forms.

Living Organisms: Biological ID is an empirical approach that rejects the rationalism associated with the evolutionist tradition (*The Religious Root of Evolution*, page 6 below). Biological ID claims that certain patterns in the world of life bear the hallmarks of having been produced by an intelligent agent, rather than by unguided natural processes. The theory of ID maintains that there are two criteria, both of which must be met in order to justify a *scientific* inference to design. Failure to meet these criteria, does NOT mean the feature is not designed (it may or may not be the product of unguided natural processes); it simply means that we cannot at present provide *scientific* justification for an inference to design for this feature.

The two criteria are:

(1) Complexity.
(2) Specificity.

To satisfy the Complexity criterion, the feature under investigation must be highly improbable with respect to the available probabilistic resources, thereby rendering appeals to chance unreasonable. To satisfy the Specificity criterion the feature must conform to an independently given pattern. In Biology this usually means a functional specificity. We use this procedure all the time in everyday life and in the sciences it has application in forensics, SETI research and archaeology. For a short and lucid discussion, references and a relevant Biological example, see McLatchie, 2012.

The argument for biological ID as an empirical option is not the 'we do not know how it happened, therefore God did it' approach so disingenuously claimed by critics. Rather biological ID is based on three empirical facts:

(1) As even many atheists admit, numerous aspects of organic life look as if they are designed;
(2) no known naturalistic processes have been shown to be capable of producing the required quality or quantity of functional (specified) information;

(3) intelligent agents, such as humans, can produce millions of bits of functional information.

Science and Technology: It is not only that the universe appears designed for life, but that the Earth also appears designed for scientific discovery and technological development (Denton, 1998; Gonzalez & Richards, 2004). For example, the Earth is in one of those *very rare* locations where intelligent life can exist AND from where the universe can best be seen and investigated (Gonzalez & Richards, 2004).

Information

Information is irreducible to physics and chemistry – to matter and energy. Information is independent of the physical embodiment or *carrier*. The same information can be stored and accessed as writing on paper, as magnetic points on a computer's hard disc, as electric domains in a random-access memory, as bumps on a CD, as bases in DNA, or as thought in a human mind.

In living organisms the information is *coded* information. A materialist might claim that coded information is just a string of characters and that, by means of a random generator, any string of characters can be obtained by chance. But it is much more than a string of characters. In living organisms the coded information is always expressed through biological *machines*, where, thermodynamically speaking, biological machines are devices that capture random environmental energy thereby raising the local free energy so the machine can do useful work, *i.e*., perform a biological *function*. But these machines can perform their function only if they have the information to do so, either given to them directly as (coded) information and/or built into the design of the whole system – which design is, of course, the product of an earlier input of information (see Durston, 2008, Johnson, 2010, McIntosh, 2006, 2009). In the light of our present knowledge, it is right to conclude that no amount of random energy flow will produce either the machines or the information. We have no evidence whatsoever that naturalistic (mindless, unintelligent) processes can produce either living organisms, or new biological systems.

The irreducibility of information is one way of explaining why it is right to assume that biology cannot be reduced to, or explained by, physics and chemistry. We can also consider the machine-like nature of organisms. Machines do not break any physical laws, or contradict any physical processes, but they cannot be defined by, or reduced to those laws and processes. A machine 'harnesses' those laws and processes for the purposes specified by its (technological) design (see Polanyi, 1968). Similarly the biological functioning of living organisms depends on physical and chemical processes and does not contravene them in any way. But organisms are not physically defined and cannot be reduced to physical and chemical functioning. Organisms 'harness' the physical laws and processes for the purposes specified by their (biological) design. We may fairly assume that, whilst the further accumulation of chemical and physical knowledge will teach us much more about the functioning of organisms, it will not solve the mystery of the origin and nature of life, nor of the nature of intelligence.

Beyond the Reach of Chance

For a different illustration of the problem facing materialistic theories we can turn to the English language (see Denton 1985, ch 13, pages 308-325) There are many three letter English words. In fact, of all the possible three-letter combinations of the 26 English letters, about 1 in 30 are meaningful words in English. It is therefore relatively easy to construct a sequence of meaningful words (words with linguistic 'fitness') by changing one letter at each step (a linguistic 'gene mutation'). Furthermore we can construct several different routes between two words, or arrive at different end-points (*e.g*. can → cat → bat → bag or can → fan → fat → fen *etc*.).

If we then turn to seven-letter words, then a much smaller proportion of the possible seven-letter combinations are meaningful in English. Words like 'abandon', 'blister', 'yoghurt' and 'zoology'. In fact only about 1 in 100,000 are meaningful words. It is therefore very difficult, or even impossible, to 'evolve' from one word to another by changing one letter at a time. Finally if we turn to twelve-letter words – such as 'abbreviation', 'behaviourism', 'youthfulness' and 'zygapophysis' - we find that only about I in a 100 trillion (10^{14}) of the possible twelve-letter combinations are meaningful. It is effectively impossible to 'evolve' from one word to a different one by one letter changes, or even, in most cases, by two or three letter changes.

In contrast to this simple illustration of linguistic function, the protein molecules of life contain hundreds or thousands of amino acid 'letters'. Unlike with letters and words, the protein functions are not arbitrary. With proteins, researchers have shown that there are only very tiny islands of functional protein in unimaginably vast oceans of non-function (Meyer, 2009, chapter 9, pages 194-214). This non-function is not simply no specific function, but that these proteins cannot fold into stable forms – a physical pre-requisite for *any* biological function). Many of these islands are separated by thousands or even millions of bits or information. No known unguided (mindless) natural processes have been shown to be able to cross even a 50 bit information gap – not even in the most favourable computer simulations (Durston, 2008). On the other hand, we do know one thing which can cross huge information gaps: we know that intelligent agents can produce unlimited quantities of new functional information.

That last point is crucial. This ID argument is not an argument from incredulity, or a 'god-of-the-gaps' argument. It is an argument from *evidence*: the negative evidence of the inability of unguided natural forces to produce even relatively small gains in functional information, and the positive evidence that intelligent agents can produce unlimited quantities of new functional information.

On the endlessly repeated charge of 'God of the gaps' against ID see the papers by Larmer (2002), Larson (2009) and Snoke (2001).

Of course, materialists might respond that we cannot prove that no materialistic process exists that could cross these information gaps. Fair enough. But materialists are claiming that a scientific theory of materialistic evolution (*i.e*. Darwinism) *actually exists now*. Are they prepared to be honest and admit that at present this claim is false – that no such theory currently exists? And – as in forensic investigations – to admit that there comes a point at which it is no longer reasonable

to deny that an event (say, origin of living organisms, origin of new body plans) was intended (a 'murder')? It is utterly unreasonable to continue to insist – against the steadily mounting evidence – that we are dealing with an extremely rare and unlikely 'accident', or with unknown lawful processes that allow increase in functional complexity against entropy and without any input of relevant information. After all, countless thousands of committed Darwinists have already laboured without success for generations. 'Darwin of the Gaps' ought to be as unacceptable as 'God of the Gaps'.

Evolution and Materialism

The word 'evolution' is commonly used with four different meanings:

evolution^{1} = change over time (variation)
evolution^{2} = natural selection
evolution^{3} = universal common descent
evolution^{4} = materialism

In other words, 'evolution' can be defined in fundamentally different ways and at several different levels (see also Meyer & Keas, 2001; Thomson, 1982). People may use the term to mean two different things even in the same sentence. When the different definitions are not understood or acknowledged, the result is confusion. A further result of confused definitions can be the portrayal of creationists and IDers as ignorant and stupid. This tactic may be the easiest way to discredit opponents in debate, but its use is unconscionable.

Creationists and IDers accept evolution^{1} and evolution^{2}. For example, given the Biblical record (*e.g*. all humans descended from Adam via the offspring of Noah, and all land animals filtered through the bottleneck of Noah's Ark) variation is a fundamental part of the belief of Christian creationists. The theory of natural selection was actually first put forward by creationists in the 19th century (as just an *ecological* theory) and only later taken over by evolutionists and promoted as also an *evolutionary* theory. Furthermore, many proponents of ID would accept evolution^{3} = universal common descent. ID, remember, is not, in itself, an anti-evolutionary position. Only evolution^{4} – materialism – is rejected by all creationists and IDers. So depending on the definition in question, a creationist or IDer could affirm that they believe in evolution!

Carelessness over definitions renders most media polls on origins very difficult, or impossible to interpret (see Baker, 2010).

Evolution^{3} – universal common descent - is probably the normal everyday understanding of 'evolution'. When most people think of evolution they think of the iconic evolutionary tree and the big story of descent – Amoeba to Man, hydrogen to humans, dust to stars, particles to people, goo to you via the zoo …

However it is the evolution^{4} – materialism – that is crucial in the real debate. Actually no definition of 'evolution' or 'creation' is worldview neutral – every definition is located in some worldview context. The dominant context today is materialism. For many in the secular scientific community, evolution = fully materialistic evolution.

Materialism is the belief that material (or physical) nature is all there is, and that there is no immaterial realm beyond physical detection (no spirit, soul, angels, God). There is no independent existence of mind. There is no 'intelligence', 'design', 'plan' or 'purpose' behind or at work in the universe. There is no moral order in the universe. The materialist worldview story is that nothing spontaneously generated matter and energy, that matter and energy gave rise to life, and then to intelligent life.

> [Some physicists, especially those who believe in a multiverse, consider the universe to be eternal and apply the materialist worldview story to our present phase of – in their view – local cosmic history.]

This is the cultural significance of Darwinism. For both its original author, Charles Darwin, and its leading modern proponents, Darwinism is *the* materialistic theory of biological origins. The primary cultural role of Darwinism is as a key part of the *materialistic origins myth of secularism* (see Flannery, 2008; Hunter, 2007 and Wiker, 2009). In other words, if atheistic materialism is true, then something like Darwinian evolution must follow. This is why many argue that Darwinism *must* be true:

> "We take the side of science *in spite* of the patent absurdity of some of its constructs, *in spite* of its failure to fulfil many of its extravagant promises of health and life, *in spite* of the tolerance of the scientific community for unsubstantiated just-so stories, because we have a prior commitment, a commitment to materialism. It is not that the methods and institutions of science somehow compel us to accept a material explanation for the phenomenal world, but, on the contrary, that we are forced by our a priori adherence to material causes to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counterintuitive, no matter how mystifying to the uninitiated. Moreover, that materialism is absolute, for we cannot allow a divine foot in the door ... To appeal to an omnipotent deity is to allow that at any moment the regularities of nature may be ruptured, that miracles may happen ..." (Richard Lewontin, Professor of Zoology, Harvard University, 1997, p 31)

The crucial point here is that if one does not assume that materialism is true, then the evidence for Darwinism, and even for universal common descent itself (evolution[3]) is very small indeed.

The Religious Root of Evolution

We live in a *uni*verse. It has an intelligible unity and order that our minds can grasp. Without that unity and order there could be neither philosophy nor science. For secularists the pressing question is then: How do we account for this unity and order if there is no Creator outside the world system and therefore the unity and order have to be grounded within the universe itself? The historical answer has been the philosophy we now know as *evolutionism*. Evolutionism asserts that everything that has ever existed is part of a great continuity in space and time. The claim is that it is this continuity that accounts for the rational unity and order that the universe displays. (For the history see Lovejoy, 1936; see also Lewis, 1964; Hunter, 2007)

The claim is, of course, nonsense, and we will address that on page 9 below.

This *principle of continuity* is seen as the only possible naturalistic basis for reason and science:

> "I cannot avoid believing the possibility of this [inorganic origin of life] will be proved some day in accordance with the law of continuity."
> (Charles Darwin**,** Letter to D. Mackintosh, 1882, in Francis Darwin (ed), 1903, p 171.)

> "Our faith in the idea of evolution depends on our reluctance to accept the antagonistic doctrine of special creation, because this view is foreign to our belief in the continuity of law and order." (Louis More, American physicist, 1925, p 304.)

> In any endeavour to trace the evolution of a highly specialised organ, a difficulty often arises in the application of what may be called the principle of continuity. It is repugnant to reason to suppose that eye or ear appeared suddenly in evolutionary history. Their evolution *must* have been a continuous process...
> (Richard Pumphrey, Professor of Zoology, University of Liverpool, 1950, pp 5-6.)

> Francis Crick, British biophysicist and Nobel Prize winner, rejected a theory of the origin of the genetic code because, 'it violates the principle of continuity'.
> (Francis Crick, 1968, p 372.)

There is, of course, no such law or principle in science. Such continuity is not an empirical (or inductive) finding of scientific investigation; nor is it a theoretical principle of proven fruitfulness: it is purely and simply a dogma of the evolutionist faith.

The principle of continuity is then seen as the only possible basis for reason and science, a claim that is endlessly and fervently repeated:

> "Evolution theories have been accepted not because observers have witnessed evolution, but because countless facts of biology make sense on the assumption that evolution has happened and is happening, and these facts make no sense otherwise." (Edmund Sinnott, Leslie Clarence Dunn & Theodosius Dobzhansky, American geneticists, 1958, p 276)

> "It is no longer possible to give a complete or even a coherent account of living things without the story of evolution." (Evelyn Klinckmann, American biologist, 1970, p 14.)

> "Without that idea [evolution] one is left in chaos: there is no scientific meaning to the facts." (Elizabeth Perrott *et al*., biologists, 1974, p 51.)

> "With modifications to include new findings, they [hypotheses about the evolution of the universe, earth and life] have become the central organising theories that make the universe as a whole intelligible, lend coherence to all of science, and provide fruitful direction to modern research." (National Academy of Sciences, 1984, p 7)

Clearly these are not statements of empirical science, but expressions of a religious faith.

Listen to Law professor Phillip Johnson recounting his experience:

> "When a few years ago I began pressing in university circles the question whether evolutionary naturalism is true, I was met mainly with blank incomprehension. Ask a group of intellectuals whether neo-Darwinism is really true, I learned, and you can hear minds snapping shut all around the room.
>
> When I did get a reply, it usually was that "evolution" is the best naturalistic theory and that naturalism is the philosophical basis of science and thus equivalent to rationality. Hence naturalism is "the way we think today." To ask modernists whether science is true is like asking them whether rationality is rational or truth is truthful. Science is, by modernist definition, our only truly objective way of knowing anything." (Phillip Johnson, 1995, page 195)

Evolution as Religion

Little wonder that scientific debates over evolution often sound like political or religious debates and that philosophers identify a *religion of science* in it all.

> "When I was a boy I believed that 'Darwin discovered evolution' and that the far more general, radical, and even cosmic developmentalism which till lately dominated all popular thought was a superstructure raised on the biological theorem. This view has been sufficiently disproved. … The demand for a developing world – a demand obviously in harmony with the revolutionary and the romantic temper – grows up first; when it is full grown the scientists go to work and discover the evidence on which our belief in that sort of universe would now be held to rest."
> (C.S. Lewis, 1898-1963, Professor of Medieval and Renaissance Literature, Cambridge University, 1964, pages 220-221)
>
> "It is as a *religion of science* that Darwinism chiefly held, and holds, men's minds ... neo-Darwinism is not only a scientific theory, and a comprehensive, seemingly self-confirming theory, but a theory deeply embedded in a metaphysical faith: in the faith that science can and must explain all the phenomena of nature in terms of one hypothesis, and that an hypothesis of maximum simplicity, of maximum impersonality and objectivity ... man seems at home in a simply rational world." (Marjorie Grene, 1910-2009, American philosopher of science, 1966, page 187 & 199-200)
>
> "Marxism and evolutionism, the two great secular faiths of our day ... They are, not accidentally, but by their very nature, dominant creeds, explicit faiths by which people live and to which they try to convert others. They tend to alter the world."
> "Evolution … is the creation myth of our age. By telling us our origins it shapes our views of what we are. It influences not just our thought, but our feelings and actions too, in a way which goes far beyond its official function as a biological theory ... today, a surprising number of the elements which used to belong to

traditional religion have regrouped themselves under the heading of science, mainly around the concept of evolution."
(Mary Midgley, b 1919, formerly senior lecturer in the Philosophy Department at the University of Newcastle upon Tyne, 1985, pages 15-16, 30-31)

"Ultimately the Darwinian theory of evolution is no more nor less than the great cosmogenic myth of the twentieth century." (Michael Denton, b 1943, molecular biologist, 1985, page 358)

"[History will ultimately judge neo-Darwinism as] a minor twentieth-century religious sect within the sprawling religious persuasion of Anglo-Saxon biology." (Lynn Margulis, b 1938, professor of biology at the University of Massachusetts, quoted by Mann, 1991 from a 1990 article by Margulis)

"The idea is that life arose and evolved to its present form solely because of the laws of chemistry, and ultimately of particle physics. In the prevailing naturalistic worldview, evolutionary theory plays the crucial role in showing how physics can be the theory of everything."
(Thomas Nagel, b 1937, American atheist, professor of philosophy at New York University, 2008, page 202; see also Nagel 2012)

Naturalism and Evolution as a Defeater for Science and Reason

The claim that physical continuity in time and space is a necessary and sufficient ground for rationality, is, to put it mildly, baseless:

"Long before I believed Theology to be true I had already decided that the popular scientific picture at any rate was false. One absolutely central inconsistency ruins it; … The whole picture professes to depend on inferences from observed facts. Unless inference is valid, the whole picture disappears. Unless we can be sure that reality in the remotest nebula or the remotest part obeys the thought-laws of the human scientist here and now in his laboratory – in other words, unless Reason is an absolute – all is in ruins. Yet those who ask me to believe this world picture also ask me to believe that Reason is simply the unforeseen and unintended by-product of mindless matter at one stage of its endless and aimless becoming. Here is flat contradiction. They ask me at the same moment to accept a conclusion and to discredit the only testimony on which that conclusion can be based. The difficulty is to me a fatal one; and the fact that when you put it to many scientists, far from having an answer, they seem not even to understand what the difficulty is, assures me that I have not found a mare's nest but detected a radical disease in their whole mode of thought from the very beginning. The man who has once understood the situation is compelled henceforth to regard the scientific cosmology as being, in principle, a myth; though no doubt a great many true particulars have been worked into it." (C.S. Lewis, 1944, reprinted 1962 (see page 162), 1965 (1977 reprint pages 54-55) and revised and extended as "The Funeral of a Great Myth", in Lewis 1967 (1981 reprint pages 117-118)

"I argued that the conjunction of naturalism with the belief that human beings have evolved in conformity with current evolutionary doctrine … furnishes one

> who accepts it with a *defeater* for the belief that our cognitive faculties are reliable -- a defeater that can't be defeated. But then this conjunction also furnishes a defeater for any belief produced by our cognitive faculties, including, … [naturalism & evolution] itself: hence its self-defeating character." (Alvin Plantinga, Professor of Philosophy, University of Notre Dame, 1994; extended in Plantinga, 2011)

> "If we think we believe something because it is true, for a Darwinian this must be a piece of self-deceit, concealing the plain fact that we believe it because the idea has eliminated competing ideas from our minds, and is simply more successful in evolutionary terms." (Keith Ward, Professor of Divinity, University of Oxford, 1996, pages 167-8)

> "Sophisticated members of the contemporary culture have been so thoroughly indoctrinated that they easily lose sight of the fact that evolutionary reductionism defies common sense. A theory that defies common sense can be true, but doubts about its truth should be suppressed only in the face of exceptionally strong evidence." (Thomas Nagel, 2008, page 202; cf 2012: page 5)

Finally we must mention two topics, which are not relevant to the evaluation of ID itself, but to the evaluation of all modern theories of origins. These two topics are absolutely crucial to the debates, yet are often ignored or seemingly unknown, even to professional biologists.

The Two Foundational Laws of Biology

The Law of Biogenesis

> *Living things arise only from other living things.*

Billions of direct observations over all of recorded history have confirmed the law with no known exceptions. You just don't get any higher confidence in science than that.

Origin of Life (OOL) studies have taught us a lot, but as regards OOL they have bequeathed us abysmal results and seemingly insurmountable problems. What nature and OOL experiments overwhelmingly give us are *geopolymers* – complex red oils and complex black tars – not the unadulterated molecules of life.

The Law of Heredity

This law is very closely related to the first:

> *Living things arise only from other living things* of the same kind.

After the Law of Biogenesis this is the next most rigorously tested law of biology. All the evidence shows that variation is limited.

Remember that, as contrasted with creationism, evolution is *not* the theory that organisms show variation – that has always been accepted by all sides – but the theory that there are *no limits to that variation*. The Law of Heredity contradicts that

claim. All living organisms (and all fossil remains) belong to distinct natural kinds. Variation and hybridization occur only within these kinds. In every single breeding experiment to date, where we try to push the limits to see how far we can go, we always hit a limit beyond which further change is lethal, or not possible. There are no exceptions:

> "To clarify, individual experiments involving a particular trait may encounter a dead end, but given the millions of different organisms on the planet, evolutionary pathways to a novel genus, order, or phylum should be relatively easy to find with some experimentation if Darwinian evolution is possible. We should not expect to encounter dead ends for 100% of our experiments." (Durston 2008, page 4)

The problem isn't that we haven't tried for long enough; the problem is that we hit the biological boundaries so soon. Nor is there any evidence that time is a relevant factor. With bacteria, for example, we have been pursuing the experiments for thousands of generations: "Throughout 150 years of the science of bacteriology, there is no evidence that one species of bacteria has changed into another" (Professor Alan Linton, bacteriologist, Bristol University, 2001, page 29. See also Behe, 2007)

There is Much More to Heredity than DNA

Modern Darwinian biology is characterised by the view that every feature of organisms and the whole of development is determined by the genes. In other words, all biological heredity is grounded in a chemical called DNA, such that a given DNA molecular composition is the necessary and sufficient condition for a particular species. "DNA is god and RNA is her prophet". If this view is true then gene mutation and selection can be promoted to explain the continuity of evolution. Not surprisingly the commitment has prevailed throughout the modern era. The trouble is that it has long been known to be untrue.

In building a house, we need materials, assembly instructions, and a blueprint. The same building materials can be used to build many different structures; if they are assembled in the wrong place or time the result can be a mess. In an embryo, DNA is analogous to a list of building materials; it also contains some rudimentary assembly instructions. But abundant evidence shows that the blueprint is not in the DNA, and biologists not under the spell of neo-Darwinism (according to which DNA mutations are the ultimate raw material for evolution) have known this for decades.

Homeotic genes get a lot of press because mutations in them are so dramatic (*e.g.*, legs instead of antennae sprouting from a fruit fly's head, or a second pair of normal-looking wings). But homeotic genes act long after the body plan is well established. They are also remarkably non-specific: A normal mouse *Pax-6* gene can replace a mutated *Pax-6* gene in a fruit fly, which will then develop normal eyes; but the eyes are fruit fly eyes, not mouse eyes. Homeotic genes are somewhat analogous to switches in a railway goods yard: They can send goods wagons down the right or wrong track, but they tell us nothing about what they are carrying, and they do not determine the layout of the goods yard.

To put it another way, to argue that DNA determines everything is like claiming that a computer disc can not only copy itself, but can also create the whole computer/monitor/modem/printer *etc*. system that runs the programmes it encodes. Neither discs nor DNA can do any such thing.

Biologists have mutated every possible developmental gene in the fruit fly *Drosophila melanogaster* and the zebrafish *Danio rerio,* but the organisms remain *Drosophila melanogaster* and *Danio rerio.* They don't even change into similar-looking species of fruit flies or minnow-like fish (Cyprinidae). There is no empirical evidence to justify the claim that genetic changes alone could produce the differences between [say] chimps and humans. Judging from the evidence we actually have, we could change the genome of a chimp embryo all we want and there would be only three possible outcomes: a normal chimp, a defective chimp, or a dead chimp.

Let me be clear. The argument is NOT that there is no scientific theory of development that we can discover and understand, but that Darwinian materialistic reductionism is a major hindrance to that process of discovery. My expectation is that when a credible theory is finally articulated not only will it indicate that Darwinism is false, but also that universal common descent is biologically impossible. But the point for the present is simply that without a scientific theory of (embryological) development, there cannot be a scientific theory of evolution. Yet again (see pages 3-4 above) we must conclude that no such theory yet exists.

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Appendices: Other Relevant Matters

Here are gathered a number of matters that would have interrupted the main flow of this exposition of ID. However they are relevant to a fuller understanding of the modern ID movement, so are included here.

Appendix A: Extrinsic & Intrinsic ID

Intelligent design may be *extrinsic*, *i.e*, agent-determined, derived from an intelligent Designer [who may be 'supernatural'], or *intrinsic* [wholly 'natural'].

Computer experts, for example, are not supernatural, but no-one would therefore conclude that computer hardware and software are not intelligently designed. For many scholars, past and present, nature had an intrinsic, or inbuilt teleology that derived from immanent principles, *i.e*. principles of design that were part of nature and not due to a supernatural being. This was true of the ancient philosophers Socrates, Plato and Aristotle and of many others to this day. Thus there are those (*e.g*. Thomas Nagel) who are naturalists, without being materialists.

Even those who believe in an extrinsic Intelligent Designer will recognise design vehicles, or proximal causes, that belong within nature and are open to scientific investigation. Extrinsic ID is not a 'Science Stopper' nor a 'God of the Gaps':

> "the idea that someone who admits the possibility of design as an explanation will have no reason to look for explanations in terms of natural law is completely unsupported, either epistemologically or historically. From Newton on down, scientists who believe in God have always been as intent as anyone else to discover universal natural laws that can be empirically confirmed."
> (Thomas Nagel (b 1937), professor of philosophy, New York University, 2008:196fn7)

> "Even if God or some other transcendent power or principle were ultimately responsible for a phenomenon, the proximal cause actually inferred, a design vehicle, might be a natural entity. … How this design vehicle itself works is then a tractable question, which may in turn lead to the question of whether the program itself was designed, and if so, by what means. … Normally … design encourages further investigation into exactly how a designing system works."
> (Angus Menuge (b 1964), professor of philosophy, Concordia University personal communication, 2009 – see Menuge, 2009)

Appendix B: Core and Peripheral Beliefs

The philosopher of science Imre Lakatos introduced a very useful distinction (Lakatos, 1978). Scientists work within what Lakatos called 'research programmes' (*c.f.* Thomas Kuhn's 'paradigms'). The distinction was between the *core* beliefs of those programmes and the surrounding layers of more *peripheral* beliefs. During the life of a programme, scientists are willing to change less important beliefs, so long as the core beliefs can be sustained. In ID the two statements on page one are the core of the ID programme (and central to Phillip Johnson's original insight – see Johnson, 1991). Within the movement scholars have developed various more specific

arguments, such as Michael Behe's *Irreducible Complexity* (IC, Behe, 1996) and William Dembski's *Complex Specified Information* (CSI, Dembski, 1998, 2002). These have stood up well against ferocious attack, but are not core arguments and could be modified or replaced without undermining the viability of ID as a whole.

Appendix C: Naturalism and Materialism

Naturalism claims that 'nature is all there is' and that therefore scientific explanations may appeal only to strictly natural processes and events. The latter is called 'Methodological Naturalism' (MN). It is held that MN is essential to the scientific enterprise, but involves no position regarding the existence of God. Science is simply unable to make that judgment. Although MN is a widely held approach, it is very problematic. There are two main problems in relation to science:

The first problem is that the key term, 'nature', is undefined. Today the discussion is framed by an implicit contrast between 'natural' and 'supernatural' modes of explanation, whereas the contrast should really be between unintelligent (mindless) and intelligent causes (see discussion of ID above).

The real question is: does our understanding of 'nature' admit the possibility of inbuilt teleology, and of design vehicles. Or is it really Materialism – the claim that the only causes at work in the universe are those of undirected chance (random events) and necessity (law-governed events)? Are we advocating MN, or is it really MM (Methodological Materialism)?

Appendix D: Method, Realism and Completeness

Another problem with naturalism follows from the way in which scientific explanations always involve a three-way tug of war between method, realism and completeness:

Method – do we allow all possible methodologies, or mandate some restriction, *e.g*. that only materialistic explanations (explanations appealing only to strictly material processes and events) are allowed? With few exceptions, this is the consensus position of evolutionists.

Realism – is science a search for truth, *i.e*. will we accept only those explanations that we believe to be true? Or (non-realism) will we accept explanations that work, even though we think they may be false?

Completeness – is science able to explain all aspects of the phenomenon under investigation? Or is it limited to particular aspects and so may not be able to give a full, or complete explanation?

The problem for scientific explanations is that our knowledge is extremely limited in both space and time and at the outset of any scientific investigation we do not know the truth. Therefore we can mandate any two of these, but not all three. Let's consider the three options:

We may mandate method and completeness, but sacrifice realism. Historically this was Descartes' position, but it is a minority position in modern science.

We may mandate realism and completeness, but sacrifice restrictions on method. Historically this was the dominant empiricist position and is essentially that of ID proponents today.

Finally we may mandate method and realism, but sacrifice completeness. Historically this was Bacon's position and is the favoured position of evolutionists (including TEs) today. However they are loath to admit that they then cannot claim completeness, *i.e*., that their MN cannot exclude non-materialistic explanations. Of course if they do still claim completeness, then they are revealing that their materialism is more than just a method (MN or MM) and is actually materialism pure and simple (philosophical or ontological materialism). In any event, the crucial question that MN and MM evolutionists have to answer is: How – by what criteria – do they distinguish between materialistic and non-materialistic phenomena? If they say that intelligence was not involved in the origin and diversification of life then where is their method, their criteria, for detecting intelligence? If they have no method or criteria, then how do they conclude that intelligent agency has not been involved?

Appendix E: Paradigm Shifts

Is the situation in biology today similar to that in geology in the 1960s? At the beginning of that decade *Geosynclinal Theory* reigned supreme as the explanatory framework (paradigm) for understanding the origin of mountains and their great thicknesses of sedimentary layers:

> "The geosynclinal theory is one of the great unifying principles in geology. In many ways its role in geology is similar to that of the theory of evolution which serves to integrate the many branches of the biological sciences. The geosynclinal theory is of fundamental importance to sedimentation, petrology, geomorphology, ore deposits, structural geology, geophysics, and in fact all branches of geological science. It is a generalization concerning the genetic relationship between the trough like basinal areas of the earth's crust which accumulate great thicknesses of sediment and are called geosynclines, and major mountain ranges. Just as the doctrine of evolution is universally accepted among biologists, so also the geosynclinal origin of the major mountain systems is an established principle in geology." (Clark & Stearn, 1960, page 43)

By the end of the decade geosynclinal theory was dead, replaced by plate tectonics.

At present Darwinists are not about to allow ID to even be considered. Their scorn and ridicule is very reminiscent of that poured upon proponents of continental drift. Lines of evidence that may cast doubt on Darwinism and favour ID or other approaches are not considered. Biologists should learn the humbling lesson from geology and consider the possibility that old theories, especially those that protect the philosophy of naturalism, may be hindering the search for truth (Wiester, 1997)

Appendix F: The Bush of Knowledge

It is not true, either in fact, or in principle, that the scientific disciplines are autonomous (independent, neutral) with respect to each other, to philosophy, or to religion (faith commitments). In every area of scientific study, the data ('facts') are understood in the terms of a theory, against the frame of reference of a paradigm (conceptual framework, research programme), within a philosophical view of reality, and from a religious stance. Thus there may be no simple relationship between religion (faith) and a specific scientific discipline or theory. The influence will be both real and significant, but operate through a hierarchy of commitments, which we must 'dig out' before we can examine them critically. It is often necessary to trace presuppositions back through several layers before the controlling perspective becomes clear. Incidentally this is why the development of self-critical Christian philosophy and its articulation into every discipline is so important (see the literature cited in the *Worldviews* section of the *Bibliography*). Otherwise secular commitments will continue to reign at all levels.

In the Western world today, the biological sciences are dominated, at the philosophical level by a reductionistic evolutionary naturalism. As noted above (*The Religious Root of Evolution*) evolutionism is a form of pagan rationalism. At the discipline level modern biology is dominated by the philosophies of *mechanism* (all events are explained by preceding events which are their causes) and of *atomism* (all wholes are explained by analysis into their parts, *e.g*. organisms into their genes).

Paradigms provide the key scientific concepts and show how these concepts interrelate to create a framework for research. Examples of paradigms in the biological sciences are: cell theory, competitive exclusion principle (in ecology), gene theory, the principle of homeostasis (in physiology), sociobiology, selfish gene theory, law of biogenesis, Darwinism, structuralism (in developmental biology), principle of homology (in morphology).

Darwinism, for example, provides a framework for origins research utilizing key concepts such as '(random) variation', 'heredity', 'adaptation', 'fitness', 'environment' and 'natural selection', and shows how these concepts interrelate to explain the evolution of organisms. Paradigms cannot be directly refuted by facts, but by more effective/fruitful theories articulated within a competing paradigm (*cf*. Darwinism and ID)

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