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A Kind of Darwinism

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The topic of my three chapters centers on two aspects of the relation between science and religion. Specifically, I will discuss the relation between science and belief in God and the relation between science and Holy Scripture. More specifically still, I will discuss the relation between the Darwinian theory of evolution and belief in God. The topic of the present chapter is the Darwinian theory itself – for, if we are going to try to decide how a certain theory is related to another thing, *any* other thing, the first step must be to try to get clear on what that theory is. I will begin my discussion of the Darwinian theory of evolution with some remarks on the word *evolution* (in its biological sense), and will go on to recommend that the theory be replaced by a more modest theory I shall call "Weak Darwinism."

Introduction

The topic of my three chapters is two aspects of the relation between science and religion. Specifically, I will discuss the relation between science and belief in God and the relation between science and Holy Scripture. More specifically still, I will discuss the relation between (on the one hand) the Darwinian theory of evolution and belief in God and (on the other) the relation between the Darwinian theory of evolution and the doctrine of the inspiration of Holy Scripture. In chapter 55, I will discuss the relation between the Darwinian theory and belief in God, and in chapter 56 I will discuss the relation between the Darwinian theory and Scripture. The topic of this chapter is the Darwinian theory itself – for, if we are going to try to decide how a certain theory is related to another thing, *any* other thing, the first step must be to try to get clear on what that theory is. I will begin my discussion of the Darwinian theory of evolution with some remarks on the word *evolution* (in its biological sense).

1 The Word "Evolution" Is Ambiguous

In one of its senses, it purports to refer to a certain *phenomenon*, something that is "out there in the world" and was out there long before there were human beings – like life or gravity or

hydrogen fusion. (Whatever this phenomenon is, it is a purely biological phenomenon. I think it is necessary to say this, because I have heard it said that, or heard things said that seem to imply that, the Big Bang and the formation of galaxies and stars and planets were early, pre-biotic manifestations of the phenomenon called "evolution.")

In another of its senses, the word "evolution" refers to a certain *theory* – something that, like all theories, is a human creation – a theory that purports to explain certain things out there in the world, namely the Darwinian theory of evolution.

I think that this ambiguity can be a source of confusion. Accordingly, I will use the word only in one of these two senses, the second. In fact, I won't use the word "evolution" at all, not in isolation. I will use it only as a component of longer phrases like "the Darwinian theory of evolution" or the "theory of evolution" (for when I say "the theory of evolution" I shall mean the Darwinian theory). And when I use the word "Darwinism," as I occasionally shall, that will be just another way of referring to the Darwinian theory of evolution. "But isn't something called 'the theory of evolution' a theory about a phenomenon called 'evolution'?" The reader will see that when I give a statement of "the theory of evolution" – as I shall in a moment – the word "evolution" will not occur in this statement. As I represent this theory, it is not about a phenomenon called "evolution." At any rate, I don't want to describe it that way, if only because I am not sure what phenomenon "evolution" is supposed to be. The theory, as we shall see, explains (or purports to explain) lots of things, but which one of those things it explains, or which combination of them, is "evolution" is not a question I know how to answer. (That is why I have come down on the "theory" rather than on the "phenomenon" side of the ambiguity.) So, in my usage at least, the word "evolution" is not a serious part of the name "the theory of evolution." (I use that name simply because it's the traditional name for the theory I want to discuss.) But the word "theory" is a serious part of that name, and I want to say something about *that* word.

I hope all of us know that, although one perfectly good meaning of the word "theory" (both in science and in everyday life) is "unproved hypothesis," the word has (only in science) a second and equally good sense: an *explanation* (right or wrong) of something, and an explanation that has some real, usable internal structure. When, for example, we speak of the special and general theories of relativity, we do not mean to suggest that the things that those two formidable theoretical structures imply about items like distance and motion and acceleration and space and time and light and gravity are unproved hypotheses. Maybe those things have been proved and maybe they have not; our use of the phrase "the *theory* of relativity" is entirely neutral with respect to that question. (I have to say this because one continually hears people say things like "Evolution is only a theory.")

It is this second sense that the word "theory" has in the phrase "the theory of evolution." The theory of evolution is an explanation of something – in fact, of many things. (The word "explanation" has a stronger and a weaker sense. In the stronger sense something cannot be an explanation of some phenomenon unless is it right. In the weaker sense, something can be a *wrong* explanation of a phenomenon: its being wrong doesn't stop it from being an explanation. I use the word in the weaker sense: when the theory of evolution is an explanation of certain things, what I say is not meant to imply that it is the right explanation – or, of course, that it is not.) It is an explanation of things like the enormous complexity, the apparent exquisite design, and the vast taxonomic diversity that we find in terrestrial life. And it is not simply an explanation of such very general features of the biological world as those. It, or parts of it – some of that "real, usable internal structure" that I said a theory must have – can be used to explain a vast range of particular facts

about living things, like the fact that the males of various species of dabbling ducks have colorful plumage, strikingly different in the different species, or the fact that in most species that exhibit sexual dimorphism, the number of males and the number of females are about equal.

And what is this theory? In one respect, at least, it is almost unique among scientific theories in that it is very hard to find a statement of it. I will have to provide my own statement of the theory. If anyone wants to provide an alternative statement, I will be happy to consider it. I contend that the theory of evolution comprises the following five theses.

(1) There have been living things on the earth for a very long time – for about 600,000 times as long as a literal reading of the book of Genesis would suggest. The natural classes or taxa that these living things fall into, moreover, are, contrary to what Aristotle supposed, "mortal": most species are extinct; even some phyla are extinct. With the passage of time, new taxa come into existence even as others go out of existence. When a new species comes into existence, the members of that species are in every case descended from the members of other species.

(2) Any two living things, whatever taxa they may belong to, have common ancestors. You and a spider on that wall, for example. (In fact the two of you are rather closely related compared with a pair like you and one of the E. coli bacteria in your gut – which is, nevertheless, one of your relations.)

(3) Here are some data to be explained:

- For a very long time now, life on Earth has exhibited enormous taxonomic diversity.
- For a very long time now, the most complex organisms have been enormously more complex than the simplest ones.
- Even in the simplest organisms, there is a lot of apparent teleology or apparent design. If physiologists want to know what some mysterious organ or organelle or system in a living thing is "doing," it is almost always useful for them to ask what it is "for" – to ask something along the lines of: "If this organism had been designed by a team of biological engineers, why would they have included an item with these features in their design?"
- For a very long time now, the biosphere, the totality of living things, has embodied an enormously complex system of internal causal relations. (One might almost think of it – metaphorically, but the metaphor has a point – as itself an organism, one enormously more complex than the most complex non-metaphorical organism.)

These are data to be explained. *How* are they to be explained? The answer to this question is a simple one. The *only* explanation of all this diversity and complexity and apparent teleology is that provided by the operation of random mutation and natural selection. (Or at any rate, that's the only purely biological part of the explanation. Of course the explanation will have to involve the physical "boundary conditions" under which these biological mechanisms operate – such things as the chemical make-up and physical attributes of the Earth, the effects of phenomena like continental drift and out-gassing from volcanoes, the intensity of solar radiation at various times, and collisions of asteroids or comets with the Earth.) And the same is true, in miniature as it were, of even the minutest features of the biological world. In so far as *any* particular matter of biological fact has an interesting historical explanation (no doubt many biological facts are simply due to chance and there is no explanation of how they came to be that is more interesting than "That's just how things happened to turn out"), this explanation must be in terms of natural selection.

(4) Mutations are mainly due to copying errors that occur during reproduction. They have only biochemical causes. If the laws of chemistry will permit a certain mutation to occur when a certain cell divides – if that mutation is a chemical possibility – *whether* the mutation will occur and *how probable* its occurrence is have nothing to do with whether its occurrence would be a "good thing" for the descendants of that cell (or the descendants of the organism of which that cell is a part). Suppose, for example, that a certain species of toad faces extinction owing to climate change. Suppose that in the reproductive organs of a member of that species a new gamete is being produced, and (owing to ways in which genetic copying errors could occur in the species) three mutations, A, B, and C might, as a matter of biochemical possibility, occur in that gamete. A would be lethal to any toad that incorporated it; B, if it should, over the next 100 generations, spread widely among the toads of that species, would, to a high probability, enable the species to avoid extinction; C, if it became widespread, would almost certainly hasten extinction. The probability of each of these mutations occurring is a matter of biochemistry, of molecular mechanics, and has nothing whatever to do with the effects it would have if it occurred.

(5) All apparent design in nature, all complexity, all diversity, is produced by the gradual accumulation (directed by environmental pressure – that is by natural selection) of small hereditary differences, differences due to random mutations or to the random recombination of genetic material. (And this is no more than a gloss on something said above in (3): The *only* explanation of all this diversity and complexity is that provided by the operation of random mutation and natural selection.)

This must suffice for a statement of "the theory of evolution." There is a lot more to be said, of course. For one thing, and it is the most important thing, I have said nothing about what natural selection is, or, if you like, about what the words "natural selection" mean. (A better term – I have heard Alex Rosenberg use this phrase – might have been "environmental filtration.") That would be too large an undertaking. I will simply have to suppose that my audience has some familiarity with the concept of natural selection. And many will protest that I should have said something about "fitness" or about "adaptation" or about genes and gene-frequencies or about genetic drift or about reproductively isolated populations or about "the unit of selection" or about "spandrels" or about a dozen or so other matters. My only excuse for giving such a sketchy statement of the theory is that I have no space to say anything more.

2 Certain Aspects of the Theory of Evolution Are Problematic

I am somewhat skeptical about certain aspects of this theory – although by no means all of them. I will list some points on which the most committed Darwinian and I are in no disagreement. There are stylistic advantages in having a name for a convinced and orthodox Darwinian. I will call him "Alex" – in honor of my friend Alex Rosenberg,[1]

- Alex and I do not disagree about astronomy or geology or paleontology or, in general, the ages and histories of things. I have no stake in defending the literal truth of the chronology of creation in the book of Genesis.[2]

- We are not in any disagreement about the "common ancestry" thesis. Alex's picture of our family tree and mine are the same.
- We are not in disagreement about the importance of the concept of natural selection in biology or about the pervasiveness of the operation of natural selection in the biological world. Darwinians are fond of quoting Dobzhansky's famous dictum, "Nothing in biology makes sense except in the light of evolution" – or, as I would prefer to modify the dictum, given the scruples I expressed earlier about the ambiguity of the word "evolution," "Nothing in biology makes sense except in the light of Darwin's theory of evolution." I am willing to accept this dictum in a certain restricted sense – something like this, "We shall never understand anything about the biological world unless our biological theories give a central and essential role to natural selection. There are pervasive features of that world that would *make no sense* if natural selection had not played a central and essential role in its development."
- We are not in disagreement about the thesis that only natural causes have been at work in the history of life. It is not my purpose to put forward some sort of "intelligent design" thesis. I should say that, as a theist I do, of course, believe that the universe has a designer. But I do not think that the truth of this thesis can be inferred from an examination of the biological world. (And of course I do not think that it can be inferred from an examination of the biological world that the universe does *not* have a designer, a point to which I shall return.) I do not think that the science of biology needs to appeal to anything supernatural. On this point, I agree with Cardinal Newman: "I believe in design because I believe in God, not in a God because I see design."[3] (Note the indefinite article.) If I were going to look at the world and see design (independently of my theological convictions), it would be the laws of physics I would look at and not at the contingent biological structures to be found on the Earth. But I do not find even the arguments for design that appeal only to the laws of physics – so-called fine-tuning arguments – all that compelling. Suggestive, perhaps, but hardly compelling. In any case, fine-tuning is not my topic.

But then what *do* Alex and I disagree about? Essentially this proposition (I quote my own earlier statement of the theory):

The *only* explanation of all this diversity and complexity is that provided by the operation of random mutation and natural selection.

I do not mean to imply that I reject this thesis. I mean that I do not see any reason to accept it. Let's call it *Allism* – since it is essentially the thesis that natural selection does it all. I see no reason to be confident that natural selection has the prodigious power to organize nature, to produce biological complexity, to produce apparent design, that most biologists attribute to it. And I see no reason to be confident that natural selection *doesn't* have this power. I am just a sceptic about what natural selection can do at that grand level. Some scientists, who know far more about the issues involved than I, are more than skeptical about Allism. Here is a quotation from the English biologist Brian Goodwin:

> [D]espite the power of molecular genetics to reveal the hereditary essences of organisms, the large-scale aspects of evolution remain unexplained, including the origin of species. There is "no clear evidence ... for the gradual emergence of any evolutionary novelty," says Ernst Mayr,

> one of the most eminent of contemporary evolutionary biologists. New types of organisms simply appear on the evolutionary scene, persist for various periods of time, and then become extinct. So Darwin's assumption that the tree of life is a consequence of the gradual accumulation of small hereditary differences seems to be without significant support. Some other process is responsible for the emergent properties of life, those distinctive features that separate one group of organisms from another – f ishes and amphibians, worms and insects, horsetails and grasses. Clearly something is missing from biology. (Goodwin 2001, pp. xii–xiii)

I am not so sure as Goodwin is that "something is missing from biology." But I am also not convinced that *nothing* (or nothing that will not be supplied by future research carried out within the Darwinian paradigm) is missing from biology. I don't see why I should accept, rather than suspend judgment about, Allism. When I read books like the book by Goodwin from which this quotation was taken or Michael Denton's *Evolution: A Theory in Crisis* or Michael Behe's *Darwin's Black Box*, I find a great deal of what seems to me to be misplaced certainty that Allism is, and has been shown by their authors to be, false. But I also find a great many data that, it seems to me, represent the world as looking different from the way we would expect it to look if Allism were true. (Goodwin alludes to some of these data when he says, "New types of organisms simply appear on the evolutionary scene, persist for various periods of time, and then become extinct.") But it does not follow from this that Allism is in fact false – or even that its falsity is more probable than its truth. Let me tell you a cautionary tale from the history of science (the first of three cautionary tales I shall tell you).

Newton thought that the orbits of the planets must be unstable unless very precisely adjusted at the Creation (and perhaps periodically *re*-adjusted) by God. (This instability was supposed to be due to the perturbation of each planet's orbit by the gravitational influence of the others.) But in the late eighteenth century the great applied mathematician Laplace showed that nothing besides Newton's own laws – the laws of motion and the inverse-square law of gravitation – was needed to account for the observed stability of the planetary orbits. (Roughly: he showed that the orbital perturbations that worried Newton tend to "cancel each other out.") This was not something Newton missed because he was an idiot. It was not an *easy* thing to discover: Laplace had to invent a whole new branch of applied mathematics called perturbation theory to demonstrate it.

The lesson of this cautionary tale is: You cannot just look at a phenomenon and a theory and blithely say, that theory cannot account for that phenomenon. Not always – not in the case of every phenomenon that a theory provides no obvious account of. It is not always *evident* what a theory can account for: an account of a recalcitrant phenomenon may well be latent in a theory that suggests no obvious account of it.

And let us note that this cautionary tale would have the same point if Newton had postulated not a supernatural explanation of the stability of the planetary orbits but had rather proposed that some new physical principle, something besides his own laws of motion and law of universal gravitation, was needed to account for orbital stability. (Something of that sort did occur later in the history of astronomy: there *are* features of the planetary orbits that, it transpired, did require new physics for their explanation – but not the feature Newton was thinking of.) It is for this reason that the arguments of anti-Darwinians like Goodwin and Behe and Denton do not convince me that Allism is false: it may well be that nothing besides natural selection is needed to account for all those recalcitrant data that these and other writers appeal to in their attempts to refute Darwinism.

My position is that we do not know this to be true, however, and that at present we should neither accept nor reject Allism. We should be agnostics about the power of natural selection to explain all the complexity and diversity and apparent teleology that we observe in the biological world. Let me ask you something. Let me ask you to consider a theory I shall call *Weak Darwinism*. Weak Darwinism is simply Darwinism with Allism subtracted from it. To get a statement of Weak Darwinism, replace (in my five-part statement of the Darwinian theory above) this statement in part (3):

The *only* explanation of all this diversity and complexity and apparent teleology is that provided by the operation of random mutation and natural selection

with the statement

The operation of random mutation and natural selection is at least a very important part of the explanation of all this diversity and complexity and apparent teleology – perhaps it is the whole explanation and perhaps not.

And, of course, delete part (5) – or preface it with the words: "it may be that" or "for all anyone knows." Suppose all biologists were to accept only Weak Darwinism. Would the science of biology be adversely affected? I don't see how it would be. But I am neither a biologist nor a philosopher of biology, and I would like to hear how the specialists would answer this question. One thing is certain, however: it would not prevent biologists from explaining particular biological phenomena in terms of natural selection. Consider, for example, a fact I alluded to a moment ago, the fact that male dabbling ducks generally have showy plumage. Here is an explanation of this fact, an explanation in terms of natural selection:

Many regions of North America are inhabited by more than one species of dabbling duck. Hybridization sometimes takes place because the females, who are the mate-choosers, sometimes mistake males of another species for males of their own. The hybrid offspring are as a rule less viable than the intra-specific offspring and sometimes sterile, and this fact has led to selection pressure in favor of showy male plumage, distinct in each species, because such plumage enables females better to identify the males of their own species. Obviously, no such pressure operates on the females; in fact, the pressure is in the other direction, since a duck with showy plumage is more easily spotted by predators. Of course this second kind of pressure, this negative pressure, operates on the males too, but it is outweighed by the positive pressure that comes from its tendency to reduce mating errors. (Under most conditions, a male with showy plumage is more likely to be eaten before he reproduces; but, if he does reproduce, his offspring of both sexes will be less likely to be weak or sterile, and thus more likely themselves to reproduce. The latter effect predominates.) There are, however, certain isolated areas in which there is only one species of dabbling duck, and in those areas, of course, no mating errors can occur. There the negative or "camouflage" pressure works unopposed among the males as well as the females, and in consequence the males of several species in several such areas have lost their showy plumage.

I am not in a position to tell you that this explanation is right (biology is not my field, after all: I have more or less copied it from a biology textbook[4]), but it is certainly a good

explanation if it *is* right – just the sort of explanation we expect from science. My point is that explanations of this sort would be as available to biologists who accepted only Weak Darwinism as they are to biologists who accept Darwinism. It looks to me as if, in the present state of our knowledge, Weak Darwinism has all the same observable consequences as Darwinism, and it is of course a weaker theory: Darwinism entails Weak Darwinism, but not vice versa. I don't know what the best philosophers of science say about this today, but when I was in graduate school, they said that if two theories had all the same observable consequences and one was stronger than the other, you shouldn't adopt the stronger one. (Which is not to say that you should adopt the weaker one; that's as may be.)

Why, then, do most biologists adhere to Darwinism? In my view, there are two reasons. First, people like to think they understand things – and, of course, they *don't* like to think they *don't* understand things. Hear my second cautionary tale.

Lord Kelvin, the great nineteenth-century physicist (nineteenth-century to a first approximation; he died in 1907), he in whose honor the Kelvin temperature scale is named, thought that the output of radiant energy from the Sun must be due to the one mechanism he could identify as a possible source of such energy, gravitational compression. The Sun is a ball of gas. The mutual gravitation of the particles of matter of which it is composed will tend to cause those particles to form themselves into a smaller, denser ball. That is, particles of matter will tend to fall inward toward their center of mass. As a given particle falls, it loses potential energy and gains energy of motion or kinetic energy. Assuming that it hits other particles, this particle will probably strike off in other directions than downward: that is, the motion of the falling particles will be randomized and therefore express itself in the form we call heat. The gas that composes the Sun will therefore become hotter as it is compressed, and when things get hot enough they begin to radiate. The rate at which a hot body radiates away energy depends on its surface temperature and surface area. The surface area of the Sun is vast (about 6×10 exp18 square meters) and it is very hot (its surface temperature is about 6,000°K or C, or well over 10, 000°F). So the Sun puts out a lot of radiant energy per unit of time. How long could it keep doing that for at more or less its present rate? Lord Kelvin, being a physicist, was able to set up and solve differential equations, and he obtained what I'm told is the right answer, given his assumption about the source of the energy: For something between 20 and 40 million years. But that figure raised a problem. The paleontologists told him that there had been life on the Earth for at least 200 million years. (We know now that the right figure is almost twenty times that.) And obviously life requires sunshine. So, Kelvin said, the paleontologists had to be wrong. What he didn't know, however, was that, although the conversion of gravitational potential energy to radiant energy is indeed an important part of the story of where sunshine comes from, it's only one part of the story. There's another part, and it's considerably *more* important: most of the energy comes from the release of nuclear binding energy when atomic nuclei down in the Sun's core bump into each other and fuse. (More energy is needed to hold two or more nuclei together before they fuse than is needed to hold the one nucleus that is the product of the fusion together.) This source of energy is so potent that it easily permits the Sun to have been shining for as long as the paleontologists said it must have been shining for. And this additional mechanism was not only unknown to Kelvin when he made his calculation, it was one he *couldn't* have known about. Knowing about it had to wait for fundamental discoveries in physics that would come along in their own good time.

The lesson is: Don't always assume that the mechanisms you have identified and can describe and know are at work in the production of a certain phenomenon are *all* the mechanisms that are at work in the production of that phenomenon. And Lord Kelvin should not have made the assumption he did. The work of the paleontologists was good science. Lord Kelvin ought to have reasoned this way: "It seems that the Sun has been shining for a lot longer than I can account for, given the mechanisms for producing heat that I know about. So there must be at least one mechanism for producing heat that I *don't* know about." And this is exactly the sort of thing that people like Goodwin and Behe and Denton say about Darwin's theory in the light of the recalcitrant data with which they confront it. For my part, I have to say that I do not regard the cases as entirely parallel. Lord Kelvin's version of Allism (gravitational compression accounts for *all* the phenomena of solar radiation) was a quantitative theory, and it yielded precise numerical predictions – which, because they were precise, could be seen to be indisputably at variance with the fossil record. The Darwinian theory does not make precise predictions (not about such things as the generation of new taxa, at least) – it is none the worse for that, but the fact needs to recognized – and it is therefore much more difficult to say whether "natural selection does it all" is really at variance with a given set of data than it is to say whether "gravitational compression does it all" is really at variance with a given set of data. It is for precisely this reason that I am skeptical about Allism and not a denier of Allism.

I have just examined one reason I think a lot of people are Allists: the natural tendency to suppose that an understood and well-described mechanism that is clearly at work in the production of a phenomenon is the only mechanism at work in the production of that phenomenon. The second reason I promised you, I am afraid, has to do with religion, or more exactly, with anti-religion. A good many proponents of Darwinism think that Darwinism (if true) shows that there is no God, that Darwinism is inconsistent with theism. And this is a conclusion that many of them are very happy with. But if it is evident that Darwinism is inconsistent with theism (they suppose this to be evident), it is at least much less evident that Weak Darwinism is inconsistent with theism. (Who knows what the unknown mechanism or mechanisms at work in the development of life might be if there were such? To attribute apparent design in nature to a process of random mutation and the culling of populations by natural selection – a process that has operated over geologically vast stretches of time – seems to many to imply that there is no thought, no design behind nature. If there are evolutionary mechanisms other than natural selection, who can say what those mechanisms would seem to us to imply if we knew what they were? And, in any case, we *don't* know what they are, and an unknown can't seem to imply anything.)

And there is this sort of reasoning to be considered (I do not doubt it has been present in the mind of more than one biologist): "For whatever reason, we biologists have mostly embraced Allism. Allism is a part of Darwinism as it actually exists. Opposition to Darwinism has been mainly from religious quarters. If biology were to qualify the entrenched formulation of Darwinism in any way, that qualification would be perceived (certainly by religious people and perhaps by the general public) as a retreat by science and a victory for religion."

I won't say much more about this, but I will offer you a sociological speculation. Suppose that religious belief had more or less died out many years ago – as many high-minded and progressive people keep predicting it will any moment now. My speculation is this: Allism would have died out too; the working theory of evolution in biology would be something

like what I have called Weak Darwinism. There would be vigorous research programs in biology searching for evolutionary mechanisms that operate alongside and in interaction with natural selection. I don't claim to know that this is true, of course. No one could know anything like that. But I do find it an interesting speculation, and it's one that I occasionally entertain with a considerable degree of hospitality.

"But can you really take seriously the thesis that most biologists accept a false biological theory? And who are *you*, who are not only not a biologist but not a scientist of any sort, to defend such this thesis?" I certainly can accept – and do accept and am willing to defend – the thesis that most biologists accept a theory that *may* be false. I might remind my readers that there are biologists (Goodwin, for example) and scientists in closely allied fields[5] who think not only that Darwinism *may* be false but that it is false. But I will not explore the question, What should the lay person make of the fact that, although almost all biologists accept Darwinism, a few biologists (biochemists, geneticists, ...) reject that theory? I will instead tell a third cautionary tale, a tale that shows that allegiance to a false theory can be pervasive in a particular science (a theory against which there was evidence that should have rendered the theory at least doubtful).

Here is a quotation from what was once an important textbook:

> 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 ... 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 and Steam 1960, p. 43)

I want to emphasize that I am talking about the fairly recent past, and not about Lord Kelvin's day. If I had taken a course in geology when I was an undergraduate – which I did not – this book might well have been the text in that course. (It was published when I was a freshman.) The "geosynclinal theory" to which the text refers was an account of the origin of mountain ranges: huge troughs in the Earth's surface (geosynclines) gradually fill with sediment till their content begins to sink under its own weight; eventually it breaks through into magma, and the interior heat of the Earth pushes it back up and creates a mountain range. The forces that cause mountains to rise are thus essentially vertical. In the horizontal plane, the geosynclinal theory presents an essentially static model of the Earth's crust – in contrast to the theory of plate tectonics, which is now considered to be the correct theory of the origins of mountain ranges. The geosynclinal theory was confidently affirmed for many decades by geologists, despite well-known evidence that ought to have made them at least take very seriously the idea that the Earth's crust was (over geological time) very fluid in the horizontal plane. (The nice "jigsaw-puzzle fit" between the coastlines of South America and Africa was the most famous piece of evidence of this sort. But there was much, much more – including "matching" mineral deposits along those same coasts, and species that had a clear evolutionary relation on opposite sides of the divide.) This evidence was, however, ignored or ridiculed by most geologists. Many non-geologists, however, could see that there was something fishy about the geologists' professed certainty on this point. In fact, my fourth-grade teacher, Mrs Campbell, could – although she reluctantly said, after having displayed to us nine-year-olds with a paper cut-out how neatly the coastlines of South America and Africa fit together, "But the scientists tell us that it's just a coincidence, and we have to believe them."

Within ten years of the publication of *The Geological Evolution of North America*, the geosynclinal theory had vanished from geology almost as if it had never been.[6]

This third cautionary tale is not intended to imply that that Allism is in the same sort of state as the state that the geosynclinal theory was in 1960. The geosynclinal theory was just wrong, wrong all the way through. The process that it claimed led to the creation of mountain ranges was not even a part of the right story, and demonstrably so – whereas, as I have emphasized, natural selection is certainly at least a very important part of the story of how life on Earth got into its present form. And, as I have repeatedly said, I at least do not want to say that it is not the whole story (the whole story, that is, other than the parts of the story provided by physics and chance). The lesson of the third cautionary tale is simply this: it is possible for the consensus of opinion in a science to be wrong, and possible for outsiders to see that that consensus is wrong or that it shouldn't at any rate be treated as decisive.

But suppose the proponent of Allism were to say something to me along the following lines. "You have defended the thesis that we don't know Allism to be true. But you have conceded that you don't know it to be false. How then can you be a theist? Allism is inconsistent with theism, and, therefore, anyone who professes ignorance as to whether Allism is true should profess ignorance as to whether God exists. In short, if you do not claim to know that Allism is false, you should be an agnostic, not a theist." The central premiss of this argument is the proposition that Allism is inconsistent with theism. This proposition will be examined in the next chapter.

Notes

1 Alexander Rosenberg is the R. Taylor Cole professor of philosophy and co-director of the Center for Philosophy of Biology at Duke University. On March 22, 2007, the Life Sciences and Religion Community Forum of Central Virginia organized a debate between Professor Rosenberg and the author on the topic "God and Evolution" at Virginia Commonwealth University. This lecture is an adaptation of the author's opening statement in that debate. It will be published in a different form in Louis Caruana, SJ (ed.), *Darwin and Catholicism* (London and New York: T&T Clark International, 2009).

2 See van Inwagen (1995).

3 Dessain and Gornall (1973) p. 97.

4 Cf. Keeton (1969), p. 174.

5 Behe is a biochemist and Denton is a geneticist.

6 The great geologist Sir Harold Jeffreys continued to affirm the geosynclinal theory, and to insist that the evidence simply did not support the theory of plate tectonics, till his death in 1989.

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