

Aristotle and the Eternal Caterpillar

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Design arguments are arguments from apparent purposiveness to the conclusion that there is an intelligent deliberating being who planned the order in the world. Socrates and Plato put such arguments. Empedocles, Democritus and Epicurus argue that all such purposiveness, except for the action of intelligent beings like humans or gods, is only apparent. We point out that both camps share the common assumption that all cases of working for the sake of something involve intelligent deliberation. Using Aristotle, we argue that this assumption is false. Unintelligent creatures can act for the sake of something. We use this argument and Aristotle's further remarks to also argue that this shows that if there were a designer of the universe which acted for the sake of producing living things, it might well be an unintelligent designer, like an eternal caterpillar.

Introduction

Design arguments are ancient. They are arguments from apparent purposiveness in the biological and non-biological world to the conclusion that there is an intelligent deliberating being who planned the order in the world. Xenophon puts a design argument into the mouth of Socrates (*Memorabilia* I, iv, 1–10).¹ Plato hints at a design argument in the *Timaeus*. He explains the cosmic order through the imitation of an eternal model. By following the eternal model, a divine being he calls the *dimiourgos* (maker) has created order in the world out of an originally chaotic material. On Plato's account, the *dimiourgos* created functionally organised creatures whose organs are finely structured to work together so as to help them survive, via a world *psyche* (soul) and *daimones* (lesser divinities). Plato sometimes presents his ideas about the *dimiourgos* as a *mythos* (story). The *mythos* may not be intended to be precisely true. Nevertheless, it seems that he thinks the only plausible explanation for the ubiquity of *kosmos* (order) in the world, including apparent biological purposiveness, is that something like the *dimiourgos* exists.

¹ We have followed the normal convention of referring to passages in Xenophon, which is to refer to sections of the edition of the complete works of Xenophon compiled by Sauppe.

An assumption behind such accounts is that deliberation, planning and skilful activity is very different from the instinctual activities of humble living things such as spiders or vegetables. The instinctual activities of vegetables and spiders are not a form of properly intelligent behaviour. So, if there is a *dimiourgos*, it is not like them. This assumption is intuitively plausible though it is not beyond challenge. We will accept it for the purposes of this paper.

We should note here that Socrates and Plato are not thinking of the origin of the universe here. Greek thinkers of this time typically take it for granted that the universe has always existed. They are interested in the origins of order.

Aristotle (384–322 BC).

Attempts to explain apparent purposiveness without invoking a designer are also

ancient. Empedocles attempted to explain it in the plant and animal world via three factors: the random production of whole body parts by the earth, an attractive force that brought those parts together, and natural selection, which quickly winnowed out creatures that were not well adapted to their environment. (The idea that evolution might play a part does not seem to have occurred to Empedocles.) Democritus attempted to explain all kinds of apparent order by invoking the random movement of atoms. After Aristotle, Epicurus and Lucretius seems to have tried to marry Democritus and Empedocles and add a small amount of evolution within species (Campbell, 2004:145–180). On the account of all of these thinkers, what was thought to be purposiveness in the biological world is only apparent purposiveness. The human body is not really a system that has been produced by a designer. Further, the human body is not a system working for the sake of an end. It only appears to be such a system.

The Crucial Assumptions

It is important to spell out some assumptions that underlie the debate between the line of argument of Socrates and Plato and the line of argument of Empedocles, Democritus and Epicurus. Assumption A is: *There are only two plausible possibilities. The two possibilities are: P1) all apparent purposiveness in the world is the result of conscious deliberation; and P2) apart from what is produced by conscious deliberation in higher animals, the apparent purposiveness in the world is to be explained solely by factors which do not work for the sake of (or towards) ends. (By factors which do not work for the sake of [or towards] ends, we mean factors like the forces which move*

atoms or those which are involved in natural selection.) Some argue that P1 is more plausible and some that P2 is more plausible. Nevertheless, both sides assume that these are the only possibilities worth debating. We will see that Aristotle showed that A is mistaken.

Underlying A is a further assumption B, which is that *if X happens for the sake of Y, some intelligent deliberating thing is (or must be) bringing about X for the sake of Y*. Note that B is not an assumption about the meaning of words. It is not being said that that we typically use “for the sake of” in a way which implies intelligence and deliberation. If that were what was being said, B would be trivial. But it is not trivial. It is a substantive thesis about the nature of what Aristotle calls “*to hou eneka*” (“the for the sake of”). Those who adhere to assumption B in the debates we are discussing are providing part of a real and not merely nominal account of what is involved in instances of “the for the sake of”. That is, they are making claims about what is involved universally in something being for the sake of something else. (Aristotle would also say that they are making claims about what is involved as a matter of natural necessity.) For an analogous case, consider someone in a scientific context saying that if X is a metal it is (or must be) a solid at room temperature. She is not talking about the use of the word “metal”. She is talking about the properties of all metals. In fact her claim is false as some metals are not solids at room temperature, even if stereotypic metals are. We will also challenge assumption B as an account of reality by relying on Aristotle, though we will not be entering into a discussion of his much debated account of natural necessity here.²

Aristotle’s System of the World

Before we start our discussion of some key arguments in Aristotle, let us clear up some possible misconceptions. What we have said about Aristotle may seem strange to those who know that Aristotle believes there are gods. So let us turn to explaining some parts of Aristotle’s system. Aristotle conceives of things reproducing of their kind eternally. There is no need for a *dimiouros* in his system of the world in part because he thinks that the world is infinite in time and the same species have existed eternally, each thing giving rise to descendants of its kind in a regular way. The natural tendencies of all things have always been there. His very neat dissolution of the problem of the origins of all kinds of order is not to invoke a mysterious *dimiouros*. It is to extrapolate backwards in time from what we observe everyday. However, there are gods in his system. He thinks that observations shows that they need to be there to keep motions going in the sublunary realm in which motions come to end when a motive force ceases. The gods are part of a natural order that has always existed. Aristotle uses a natural teleology to

² Contrary to an earlier tradition, we interpret Aristotle as being interested in the nature of the world and not in the uses of words. For an interpretation of *Metaphysics* of this kind, see Politis, 2004.

explain much that Plato's unnatural teleology explains by postulating unnecessary unobservables such as the *dimiourgos* (Johansen, 2004:69–79).

Since Newton, we have known that we do not need to invoke a heavenly realm with its own laws to keep motion going in the sublunary realm. (Newton's First Law tells us that, contrary to Aristotle, a moving object not acted upon by a force will continue in straight line motion for ever.) We also know that the heavens are like the earth. So we now know that there is no need for Aristotle's gods to explain motion in the sublunary sphere. Nevertheless, we know from the fossil record that currently existing living things have not reproduced of their kind eternally. On the contrary, they came into existence from much simpler living things. Probably the earliest living things came from non-living things. Further, as far as we can tell, the universe itself came into existence an immensely long time ago in the big bang. Does this mean that something like Plato's *dimiourgos* can sneak back into the picture as the creator of the universe? Some thinkers have argued for theism by claiming that the initial conditions, materials and laws at the time of the big bang were precisely calibrated in order to produce life. This claim is widely rejected, but let us suppose it is true. Does it imply that the universe had an intelligent designer? By adapting Aristotle, we will see that it does not.

Aristotle's Criticisms of Assumptions A and B

Aristotle's criticisms of A and B are buried in a section of *Physics* in which his primary target is Empedocles. Against Empedocles, Aristotle's central argument is that apparent purposiveness is ubiquitous in the biological world, and we cannot explain why it is present always or usually without assuming that the parts of a process or the parts of a body really are present for the sake of an end (*telos*). For instance, the fact that in all normal human beings and in many other kinds of animals the back teeth come up in manner suitable for grinding and the front teeth come up in a manner suitable for breaking up food is to be explained by the ends of survival and reproduction (198b:23–199a:5).³ Speaking of the development of organisms, Aristotle declares that where there is an end in view, the earlier and successive parts of processes of development work for the sake of (*eneka prattetai*) the end (199a:8). Such arguments were adequately rebutted by Darwinists. We do not need to pursue the details here.

The target of much of Aristotle's subsequent discussion is unclear. However, some of his arguments are directed at those who hold assumption B. These arguments would not only serve as a good critique of Empedocles, but also of Socrates and Plato.

³ We have followed the normal convention of referring to passages in Aristotle, which is refer to line numbers in the standard edition of the works of Aristotle, edited by Bekker.

Aristotle's First Argument

The first argument uses observations of the animal and plant world to make a crucial point about “the for the sake of”. The highly organised structure and behaviour of simple animals and plants can only be properly explained by assuming that, due to their intrinsic nature, they work for the sake of something (survival and reproduction). Yet it is wrong to assume that they have skill (*techne*), inquire (*zitisanta*), or deliberate (*vouleusamena*), for they pretty clearly do not. Someone who thinks they do is faced with the absurd assumption that plants are intelligent deliberators, for it is clear they too work for the sake of an end (199a:21–30).

Remember here that Aristotle assumes that he has ruled out a random process and natural selection in his arguments against Empedocles. He thinks he has shown that *hou eneka* cannot be explained as merely apparent. Talking in his way, he thinks he has already shown that the relation X is for the sake of Y is a genuine and ubiquitous feature of the biological world. Here he is arguing that while “the for the sake of” is genuine, it does not necessarily involve intelligent deliberation. This is illustrated by the fact that observation shows no sign of intelligent deliberation is involved in many instances. In our terms, assumption B is false.

Apply the point in the previous two paragraphs to arguments for a designer to see how someone influenced by Aristotle could criticize them. Suppose we think that there is evidence that the big bang was produced by something working towards an end. Suppose we also think that this thing existed before the universe existed and is eternal — it did not come into existence through a process involving random mutation and natural selection. There is no more need to attribute skill, inquiry or deliberation to it than there is to attribute it to a plant. To attribute these things to it, we would need evidence that it does more than carry out a complex and structured routine directed to building a universe for the sake of producing living things. We now know that plants have intrinsic in them only an apparent “for the sake of” which has arisen through evolution by natural selection. However, they might have had in them a true tendency to work “for the sake of” transmitted through previous generations eternally. If they had this tendency, intelligent deliberation would not be a necessary part of it. We see that we have no reason to think that intelligent deliberation is a necessary part of “the for the sake of”.

We should not be misled in our inquiries into nature by the fact that we often use the words “for the sake of” in contexts which involve intention any more than we should be misled by the fact that stereotypical metals are solids at room temperature into thinking that Mercury is not a metal. Assumption A is also false.

Aristotle's Second Argument

In a second argument, Aristotle seems to be criticizing those who deny that there *can be* something working for the sake of something when they do not see that

thing deliberating (*vouleusamenon*). He says that skill (*techne*) does not deliberate. (Presumably he is also assuming that no one would deny that skills in use are typically being directed towards some end.) He draws an analogy between the skill involved in ship building and what happens in nature. He also says that if ship building were intrinsic to wood, wood would naturally produce the same results that ship building does (199b:26–30). Some have found these remarks puzzling, but we do not. It is a very common for people who have acquired a skill not to think about what they are doing when they apply it. In ordinary talk we are struck by how “natural” their activity seems to be. The skill has become second nature to them so that it has become an almost automatic routine. A skilled driver who has driven a particular route many times does not think: “now I will turn the steering wheel to here and put my foot on the brake”. She may not even be aware of doing these things. They just happen spontaneously. Further, a skilled driver may suddenly find herself driving towards a place where she works even though it’s a holiday because she has done it so many times. Not only do the individual movements necessary to drive the car occur without deliberation which directs them to that end; she also has, without deliberation, worked for the sake of going to the place where she works. Aristotle is arguing that observation shows that nature is like the skilled driver we have described. The difference is presumably that some intelligent deliberation was involved when the skilled driver first laid down these procedures and laid them down for the sake of an end.

It is possible that Aristotle is partly criticizing Plato in putting the argument described in the last paragraph. A *dimiourgos* is literally a craftsman, someone who has a great deal of *techne*. A craftsman who is, as it were, born highly skilled for ordering the world in the manner Plato assumes would not be a deliberating inquiring being. He would be like a vegetable or a spider.

Plants and animals are structured by their natures which are passed on from their ancestors, to facilitate achieving an end. The process of development of animals, from egg like things to creatures with organs disposed in just the right way, and in just the right places, to facilitate survival, is not done through deliberation. The behaviour of simple animals and the doings of plants is for the sake of survival even though they do not deliberate. Applying this to arguments for a designer, if there were a designer, it might well be just doing what is natural in an instinctive way without deliberation or inquiry. Assumption A is false.

Aristotle’s Third Argument

In an earlier passage, Aristotle also says that creatures like humans which act skillfully, use skill (*techne*) in a way which mimics what nature does without them. This remark occurs in a passage in which he compares how living things work by skill or naturally. He says that if there were a naturally occurring house, it would happen in the same order as a house made by skill. Conversely skill either completes

what nature cannot complete or imitates nature (199a:15–17). We take it that part of what he means by this that a being acting skillfully must, at least largely, follow a pre-existing order of nature to be able to act at all.

Whatever we think of Aristotle's claim that if there were a naturally occurring house, its production would follow the order in which it would be produced by skill, the converse point is very plausible. Armed with this point, we might say that if there were no order of nature before the *dimiourgos* got to work, he would be unable to do anything. To spell out why, consider how we deliberating creatures actually do things. We rely on our knowledge of how the world works to use our bodily organs or tools to manipulate the world to fit our plans. Plans cannot do anything of their own accord and neither can planners. Aristotle is not here merely making a point which merely relies on experience. It is a point which seems true a priori. It is hard to see how an intelligent deliberating mind would be able to act on anything in a world in which there is no fundamental order. Its acts might well in one place produce one result and in another a completely different result. The results produced could not, even in principle, be predicted. They would also not be stable over time. If a pure mind tried to produce a clock, in a disordered world it might well end up producing a fish. The fish might well then turn into a house. It follows from his account that there cannot be a god who created the fundamental order in the world because a being can only act if there already is a fundamental order in the world.

Of course, Aristotle does not think of the world as being covered by scientific laws in a modern sense. For him, the order of the world is the fact that things come in stable kinds which have an inherent tendency to do certain kinds of things or to become certain kinds of things. (Things have an inherent dynamis — power or potentiality.) Just as even a good scribe can fail to write properly sometimes, the tendencies in things are sometimes not actualized (199a:33). The tendencies in things are only actualised for the most part. However, to modernise his point we only have to think of the order of the world as consisting of things which falling under scientific laws. There are many modern accounts of the nature of scientific laws in the philosophical literature. The reader can choose whichever account she prefers.

The third argument does not rule out a *dimiourgos* bringing order to the world. It rules out a *dimiourgos* bringing fundamental order to the world. Something which brings about some order on the basis of a pre-existing order does not need to be an intelligent deliberator.

The Caterpillar at the Beginning of the Universe

Consider caterpillars: they apparently make a very complicated hammock with the production consisting of many stages. Pierre Huber found that if you collected a caterpillar that had completed its hammock up until the sixth stage and put it into a hammock only completed to the third stage it would simply reperform the 4th,

5th and 6th stages, but if you did the reverse and collected a caterpillar from a 3rd stage hammock and introduced into a 6th stage hammock it started where it left off at the 3rd stage. The apparent purposive behaviour does not appear to display intelligent deliberation (Darwin, 2003:225–6).

Suppose we think there must be or is very likely to be an eternal designer. All we know about it is that it engages in universe building activities from pre-existing materials according to pre-existing laws and carries out these tasks in fine grained way. (Argument 3 has shown us that this is best it could do.) We are not in a position to interrupt its routine at any point to see whether it is an intelligent deliberator. Going on the evidence we have, we should attribute only what is necessary to carry out its complex task. What is necessary is that it lay down a bunch of initial condition and law building routines using more fundamental laws and initial conditions. The simplest hypothesis consistent with the evidence is that it is like a caterpillar. To defend another hypothesis, we would need evidence of intelligence and deliberation. No such evidence has been provided to us and it is not clear how it could be. We can't interrupt its routine to see what happens.

Using Aristotle, we can conclude that arguments for an intelligent deliberating designer on the basis of the data available to us will always be inconclusive.

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