On Angels, Agency, and Evolution

I have always found a common interpretation of the theory of evolution deeply unsatisfying. As a *description* of the process of speciation, the theory of evolution is a coherent theory that apparently fits the facts, and it is not my purpose to attack the science of evolution. As a deeper *explanation*, however, it is intellectually unsatisfying.

We human beings have a difficulty understanding randomness, and the whole theory of evolution is based on randomness. Random mutations occur and that drives speciation. But where do these random mutations come there, and how is the assumption of random mutation an explanation? I find two problems with the theory.

The first problem with randomness is really a question: where do these mutations come from? In economics, we often write stochastic models in which probabilistic shocks are drawn. To convey the message, we talk about "nature" drawing a realization from a probabilistic distribution because we need some sense of how this comes about, and our minds are apparently constructed to apprehend the concept of agency. That is, of actors making decisions and playing roles in the world.

The second problem is that stochastic processes seem to be a proliferation of causes. We are left with millions of different causes that arise into our world unpredictably with no apparent goal or purpose. The proliferation of unpredictable causes as an explanation of the world seems to be a step backward in explanation toward mythology, where things are ultimately causes by the whims of the gods. And yet it is an even further step backward because it lacks the idea of agency; the gods, however whimsical, might still be understood as having goals or purposes.

I think both of these problems need to really be considered together. The first problem is, after all, merely pointing out that it is impossible to apprehend or directly intuit the idea of randomness. This is not a problem in itself; it is true about many other scientific concepts as well. We have no direct intuition for Cartesian spaces in more than three (or perhaps four) dimensions, and yet physics has apparently found useful models of the world in which highly dimensional models yield predictions for aspects of the world, which we can directly intuit. Similarly, we have no direct intuition for imaginary numbers, and yet they are quite useful, even essential, for predicting harmonic and periodic patterns of things we can directly observe and apprehend, such as electromagnetic waves (or, more precisely, the lights or sounds which the waves influence). The name itself is poorly chosen, since we have no way of actually "imagining" these numbers, in the sense of assigning a mental image to them. But even negative numbers give us no mental image in the sense of quantity, although we can certainly intuit a negative number in the sense of a direction or vector.

The concepts of higher dimensions or imaginary numbers are akin to the concept of angels in many ways. First, they cannot be directly sensed or intuited, and it is not unreasonably to assume that there are aspects of reality that are beyond our ability to sense (or even apprehend, as I mention later). Second, they affect the world in ways that we can both sense and apprehend.

One key difference, of course – and this seems to me to be one of two essential key differences – is that mathematical concepts such as highly dimensional spaces and imaginary numbers affect our observable world according to predictable patterns. In the words of scientific methodology, they can constitute part

of a scientific theory because they give us "testable implications", against which we might evaluate the theory vis-a-vis the world we live in. Neither Greek gods nor angels have such testable implications, and so they cannot constitute an essential part of a scientific theory.

The concept of randomness appears to fall somewhere in the middle between imaginary numbers and angels along this dimension. Stochastic models (that is, models with random elements) do not give precise predictions for any particular situation. They instead give probabilistic predictions or tendencies. They only become precise and "testable" when applied to a large number of situations. Here the application of randomness to evolution appears at least partially problematic in that we do not have a large number of observations to evaluate any specific situation; instead, the theory of evolution gives us a data generating process for which we have a single, albeit long realization. In principle, it seems possible for this long realization to serve as a series of realizations of a single stable stochastic model. Nothing that I have ever read on evolution suggests that such a theory has yet been written, however.

The second key difference between the abstract mathematical concepts and angels is that while neither can be sensed, the latter can be apprehended. We human beings do understand the concept of agency, of beings who actively participate and affect the world with goal or purpose. We experience the world as agents, and we automatically understand ourselves and others in this way. Indeed, it is this understanding that allows me to say "we human beings" rather than simply "I". The idea of agency seems to be as innate as the idea of cause and effect or even basic logic. We might consider a formal world, a model or system, in which something could be both "true" and "not true" or for two plus two to equal both three and four, but it is not something we can really apprehend. Similarly, I might consider that I myself am an automaton, but again, it is not something I can really apprehend.

Not only can we apprehend the concept of agency, but it is an important aspect of our intellect and reason. That is, attributing agency to others is a way of putting structure on what we sense about the outside world. We attribute agency to some things (e.g., people, animals), and it helps us to understand their behavior. To other things (e.g., plants, rocks), we do not attribute agency, and when we talk about their "behavior", it is in a very different, passive sense. The idea of agency is even useful for prediction. For example, when I try to find my toddler in my house, I search for him in order of the places where he likes to go, his different play areas. Perhaps I could come about this rule with no behavioral model of agency or goal seeking, by simply a statistical analysis of where I generally find him. Such a model would be of no use, however, if I were visiting a friend's home for the first time and looking for my toddler after he'd wandered off there. I understand that my toddler thinks, and in some sense how my toddler thinks (what motivates him, for example), and this would guide my search in a relative's home. Our intellects have a natural way of perceiving intent and purpose in other agents, and this perception is generally though not always correct. Are minds are naturally attuned to agency. (In this sense, our minds find angels more intelligible and interesting than imaginary numbers, which is why we tell stories of angels but not imaginary numbers.)

Our minds seem to draw a connection between the idea of agency and that of randomness. Of course, one way of understanding randomness is as a useful abstraction that allows for less precision in a model – omitted aspects beyond our need or ability to model.[1] Our appealing to randomness in models may just

[1] For example, chaotic dynamic systems are examples where the processes are completely deterministic, but incomplete information forces us to take a probabilistic approach to prediction.

be a measure of our ignorance, or in social science models, a bow to the unpredictability of agency. Ignorance and agency sit well with our intellect, but not indeterminate randomness. We cannot always predict thunderstorms, not because they are truly random, but because we are ignorant of all the conditions and perhaps even mechanisms necessary to predict them. We cannot always predict baseball games, not because the mechanisms are truly random, and not only because we don't know all the necessary conditions but because human agents are involved making decisions.[2]

On some level, our minds tell us, that all unpredictability or perceived randomness requires agency because otherwise randomness is indeterminate. And so, economists talk about "nature" drawing a shock for their model; that is, we envision an agent drawing a number from a hat. Similarly, in reference to quantum physics, Einstein famous complaint was that "God doesn't play dice with the universe".

Herein lies the second reason that evolution is intellectually unsatisfying as an explanation. When considering a random process, our minds automatically ask, "What determines the actual realization of a random process? Why this realization and not that?" and, for each realization, the only answer can be: "It simply is." In this way, evolution, or any stochastic process, leaves us with many, actually an infinite continuum, of uncaused causes. This is inherently unsatisfying; we cannot help but wonder how this is even an explanation. Is the assumption that an infinity of causes "simply are" that much closer to an explanation than the assumption that the data themselves (the species, DNA structures, fossils, etc.) "simply are"? Again, it is not the science of evolution – evolution as a description of a process or even a surface explanation – that I question but evolution as a deep explanation.

Our minds impel us toward a deeper explanation. The process of moving from knowledge to understanding requires taking a myriad of observations and adding unifying intelligible structure to these observations. Along this dimension, evolution comes up short as a full explanation. Evolution is not meant to be a full explanation. It provides understanding of how, and even some understanding of why ("why did this species survive and not that?") but it leaves the deeper why questions unanswered ("why a mutation now but not then?", "why this mutation and not that mutation?")

In answering these questions, I find the idea of divine design far more compelling, and indeed far more interesting. First, it appeals to a simplification, a single uncaused causer. A single cause that exists by its nature (a necessary being) is more intelligible than infinite causes that by their very nature are contingent and need not exist. I would find an explanation in which each mutation were picked by an unnecessary angel from deck of cards which a first necessary mover had shuffled determinately far more compelling than indeterminate randomness.

Second, and perhaps more important, divine design replaces the unintelligible idea of randomness with the intelligible idea of agency, which seems to be at the heart of our experience. We understand agents as beings that set things in motion. A true explanation has to be true, but also an explanation, that is,

[2] We can, of course, make fairly precise predictions on large numbers of storms or even baseball games, which points out that neither ignorance nor agency are necessarily insurmountable for making prediction. That is, probabilistic models can be quite useful and even precise.

something that we are able to understand. Agency, even if indeterminate, is intelligible to us, while indeterminate randomness is not.

We do not experience life as a model, whether deterministic or random, but rather as a story in which we are actors and not automatons. We understand goals and purpose. We have a sense that we are not the only actors, nor even necessary actors. The truth of divine design may be debatable, but it at least appears to be an explanation.