

New Evolutionary Theory: The End of Ideology

During the first half of the 20th century Charles Darwin's theory of evolution became firmly established as scientific orthodoxy, and Darwin became hailed (and is hailed to this day) as the greatest biologist in the history of science. The 19th century foundations of Darwin's theory seemed impressive and unassailable:

First, there was the great scientific tradition stemming from Sir Isaac Newton's theories of physics. By utilizing only *linear* differential equations and by assuming that the parts of the particular physical system being studied always interacted either weakly or transiently (or both), Newton was able to discover scientific laws that could predict the future or retrodict the past with amazing accuracy. Throughout the 19th century Newton's methods were successfully extended to ever-greater numbers and types of physical systems. Where particular physical systems could not be successfully explained in fully Newtonian *deterministic* terms, the methods of statistical mechanics arose to save the day by allowing the incorporation of *chance* within a strictly linear mathematical and scientific framework. No wonder it was the firm faith of most 19th century scientists that all of natural science, including especially biology, would soon be "reduced" to classical physics. As Albert Einstein wrote in his "Autobiographical Notes":

What made the greatest impression upon the student, however, was less the technical construction of mechanics or the solution of complicated problems than the achievements of mechanics in areas which apparently had nothing to do with mechanics: the mechanical theory of light, ... and above all the kinetic theory of gases ...

We must not be surprised, therefore, that, so to speak, all physicists of the [19th] century saw in classical mechanics a firm and final foundation for all physics, yes, indeed, for all natural science.

The second foundation for Darwin's theory of evolution was Charles Lyell's principle of *uniformitarianism* in geology, according to which all *important* changes in the long history of the earth were the result of physical processes that were *slow*, *minute*, and *gradual* (at least, on a geological timescale). Furthermore, uniformitarianism claimed that these physical processes would have to be the very same processes that are observable today. Of course, Lyell had to acknowledge that some catastrophic geological events, such as earthquakes and volcanic eruptions, do in fact occur, but he claimed that all such catastrophic events are and were of only local, temporary significance.

It is often forgotten how radical Lyell's version of uniformitarianism really was: Lyell sought to make geology as consistent as possible with Newtonian determinism (according to which, ideally, nothing unexpected or unique should ever really irreversibly happen), by asserting that *apparently* irreversible, unique events in the so-called "history" of the earth were really just, in effect, experimental errors around a deterministic mean. For this reason, he actually expected the periodic return of long-extinct species and genera, as he wrote in the following passage:

Then might those genera of animals return, of which the memorials are preserved in the ancient rocks of our continents. The huge iguanodon might reappear in the

woods, and the ichthyosaur in the sea, while the pterodactyl might flit again through the umbrageous groves of tree ferns.

Darwin did not go so far as Charles Lyell in this respect, but as he studied Lyell's *Principles of Geology* during his long voyage around the world on the *H.M.S. Beagle* between 1831 to 1836, he became convinced that all of the significant changes in the biosphere over the long history of the earth *must* have been the result of processes that were slow, minute, and gradual on a geological timescale, and that furthermore these processes must be the very same processes that can be seen working today.

In 1859 Charles Darwin stunned the scientific world with his publication of *The Origin of the Species*. The essence of Darwin's theory of evolution can be stated very simply: The evolution of biological genera, families, species, and so on throughout the millions of years of the history of the earth occurred via exactly the same linear, statistical processes that today can be seen to produce and sustain *varieties within* individual species. Darwin saw the varieties which human breeders could create within a given population of a species via methods of *artificial selection*, and reasoned that nature, having millions of years to work, could easily produce all of its immense taxonomic variety via an analogous gradual, statistical, linear process of *natural selection*.

There is of course a great deal more that could be said (and has been said) about both Darwin's theory of evolution and the subsequent history of Darwinism, including its merger with population genetics to form *neo-Darwinism* and subsequent nuances, such as the *punctuated equilibrium* theory of Stephen Jay Gould and Niles Eldredge. But the essence of Darwinism remains to this day as stated in the previous paragraph.

As we enter upon the 21st century, a remarkable situation can be seen in the science of evolutionary biology: Darwinism (more-precisely, neo-Darwinism) remains a firmly enforced scientific orthodoxy. Yet the foundations upon which that orthodoxy is based (the presumed all-sufficiency of linear and statistical science, together with Lyell's principle of uniformitarianism) have crumbled and collapsed, leaving Darwinism suspended in mid-air, held up only by the firm *ideological* predispositions of its proponents!

As Einstein pointed out in his "Autobiographical Notes", the collapse of linear mechanics as a supposedly all-sufficient scientific paradigm began with the success of *field theories* in physics, ultimately resulting in Einstein's own highly successful and *nonlinear* General Theory of Relativity. But the ubiquity of *nonlinear* physical systems did not become apparent to many scientists until after 1950, when the increasing availability of mini-computers and personal computers allowed many more scientists to explore and apply nonlinear mathematics to physical systems, especially to far-from-equilibrium thermodynamic systems.

It turned out that there are, in fact, far more nonlinear physical systems in nature than linear physical systems, for the simple reason that the parts of the vast number of physical systems interact *both strongly and persistently*, which immediately requires that they be explained in nonlinear, rather than linear, terms. Nonlinear physical systems have remarkable properties that make them significantly different from linear physical systems. For example, often a nonlinear physical system will continue on a smooth,

predictable trajectory for a time, but then will suddenly and holistically reorganize itself into an entirely different structure!

Today most scientists (or, at least, most physicists, if not most biologists) agree that nearly all biological entities are *nonlinear* systems, since obviously the parts of nearly all biological entities interact *both* strongly *and* persistently. A particularly compelling example of this can be seen in the development of the biological embryo, which consists of a series of smooth periods of growth, punctuated by sudden, holistic re-organizations that result in the increasing specialization of groups of cells.

But it is not only the linear scientific paradigm which has crumbled and collapsed: The geological doctrine of uniformitarianism has collapsed as well. By the 1960s it had become clear that the so-called “scablands” around Spokane Washington had been carved out by an immense catastrophic flood, resulting from the sudden breaking of an ice dam that had been holding back the glacial Lake Missoula. The 1960s also saw the increasing acceptance of Walter Alvarez’s theory that the extinction of the dinosaurs at the end of the Cretaceous period was caused by the world-wide effects of a catastrophic asteroid impact. While not every geologist agrees with Alvarez’s theory, most geologists now concede that the doctrine of uniformitarianism in the form proposed by Charles Lyell is untenable. Instead, the geological doctrine of uniformitarianism has been revised to mean simply that the scientific laws applicable to the past are the same scientific laws that are applicable to the present, a statement with which even the most ardent catastrophist could agree.

The collapse of these two foundations of Darwinism (the linear scientific paradigm and uniformitarianism) has exposed the extreme fragility of Darwin’s essential claim that the process by which biological genera, families, and species arose and were sustained over millions of years is exactly the same as the process by which varieties *within* species arise and are sustained today. Shockingly, it has suddenly become evident that there never was a scintilla of credible evidence for Darwin’s essential claim, and that (on the contrary) there always has been much evidence against it, in spite of Darwinism’s continued status as an absolute litmus test of scientific orthodoxy!

To take just one example (cited in more detail by John A. Davison in his *Evolutionary Manifesto*), the great horticulturalist Luther Burbank pointed out as far back as 1939 that there are significant limits to the varieties within a species that can be produced by artificial selection, from which he concludes that “there is undoubtedly a pull toward the mean which keeps all living things within some more or less fixed limitations”. These limitations are *not* due to “lack of time” as Darwin claimed, but rather are due to *inherent limitations* in the range of biological changes that can be produced by selectionist methods. (This, at any rate, is the universal testimony of those who actually *practice* artificial selection.) This fact *by itself* constitutes a sufficient refutation of Darwinism.

To avoid the devastating implications of this fact, the Darwinists have resorted to an ingenious stratagem:

1. Re-define the word “species” in such a way that biological differences which were formerly regarded to be differences between intra-species *varieties* are now regarded to be differences between *species*. This much-broader definition of “species” separation requires only a general reproductive isolation (which can be

merely a geographical isolation), rather than a true physiological incapability of interbreeding.

2. Show that Darwinian selectionist processes *do* apply to the many “species” that result from this re-definition.
3. Declare the evidence for Darwinism to therefore be “overwhelming”.
4. Mock or marginalize anyone who dares to point out the Darwinism does *not* explain the emergence of species as they have *traditionally* been defined.

Darwinism would long ago have gone the way of other 19th century scientific relics, such as uniformitarianism in geology and the steady-state theory in astronomy, if it weren't for its status as a central battleground in the “culture war” between those who believe that our “ultimate concern” should be a transcendent God and those who believe that our “ultimate concern” should instead be our own putatively radically autonomous human selves. The former usually derive their positions from the Protestant Reformation, while the latter derive their positions from Enlightenment thinkers.

Because of this “culture war” the only *culturally significant* critics of Darwinism have been either creationists or (more recently) devotees of the ID (“intelligent-design”) movement. Unfortunately the anti-Darwinian critiques of *both* of these groups have been insufficiently radical. While they have succeeded in poking many holes in Darwinian theory (it's easy to do), at bottom the creationists and the ID people both agree with the Darwinists that *physically* the biosphere and its components are “nothing but” linear, near-equilibrium “machines”, albeit highly complex machines that have significant elements of probability and chance thrown into the mix. (See, for example, Michael Behe's influential ID book *Darwin's Black Box*.)

As a result, their only *essential* disagreement with Darwinism lies in their treatment of the evident teleological elements (i.e., purposefulness) in these “machines”. For a machine in our ordinary experience (such as an automobile) is evidently organized in accordance with a *purpose* in mind, but this purpose is *imposed externally* from outside the machine by the designers of the machine and does not arise *immanently* from within the machine itself. Consequently, the creationists and ID people propose that the concept of a transcendent God or Intelligent-Designer must be allowed *within science itself* as an explanation of the evident purposefulness of biological entities.

Darwinists indignantly (and correctly) reject this position, pointing out that the “bracketing out” of subjective agents as purported scientific explanations is essential to the methodology of “hard” science. But the Darwinists also go on to claim that the *apparent* teleological aspect of biological entities is (anyway) only an *illusion* that has been successfully “explained away” by linear science (either by Darwinian theory or by cybernetics).

More precisely, the Darwinists usually claim that the science of cybernetics has successfully accomplished this “explaining away”, while the cyberneticists usually claim that it is the Darwinists who have accomplished this feat! James Barham has exposed this “shell game” in his brilliant article “Theses on Darwin” (*Rivist di Biologia / Biology Forum* 95, 2002), which also correctly points out that the only way to *scientifically*

explain the evident *immanent* teleology of biological entities is via nonlinear, far-from-equilibrium science. (Barham is, by the way, an atheist.)

Historically, this deep underlying unity between creationists, ID people, and Darwinists can ultimately be traced to the common rejection of the Medieval synthesis by both the Reformation and the Enlightenment: Most creationists and ID people are conservative Protestant Christians of a Calvinist bent (like the original Reformers), and Calvinism utterly rejects all *immanent* teleology. (Calvinists regard even *human* free-will to be nothing but an illusion: For them only the transcendent God's will is free.) For completely different reasons that ultimately stem from the Enlightenment, Darwinists *also* completely reject immanent teleology, as well as rejecting in addition *transcendent* teleology. (The only exception to their blanket rejection of all forms of teleology is the human individual, who for some reason is regarded as being radically autonomous and free.)

The exclusive "ultimate concern" of creationists and ID people for the transcendent God on the one hand, and the exclusive "ultimate concern" of the Darwinists for the putatively radically autonomous human individual on the other, leaves no room in their respective worldviews for general Medieval *immanent* teleologies, such as group persons, group subjects, and human-society-as-part-of-an-organic-immanently-purposeful-biosphere. For similar reasons, their respective worldviews also blind them to the evidently nonlinear, far-from-equilibrium nature of most biological entities, which (in turn) precludes them from ever seriously considering any theories of evolution other than Darwinism.

In other words, for their own separate ideological reasons, both sides have sought to inseparably wed the *theory* of Darwinism to the *fact* of evolution: Creationists and ID people do so in order that the considerable evidence against the *theory* of Darwinism will tell against the *fact* of evolution as well, while Darwinists do so in order to claim that Darwinism is a *fact*, not a *theory*, and thus to immunize it from all criticism. The nearly-complete refusal of both sides to pry the *theory* of Darwinism away from the *fact* of evolution and consider the possibility that *some other theory* of evolution (such as Robert F. DeHaan's theory of *macrodevelopment* or John A. Davison's theory of *semi-meiosis*) might better explain the *fact* of evolution ensures that their fatal and fruitless ideological embrace will continue for the foreseeable future. Indeed, the attitude of both sides with respect to *any* alternative theory of evolution seems to be, "Even if it were true I wouldn't believe it!"

Fortunately there have been a small number of scientists throughout the history of this controversy (of varying religious persuasions, or none) who have diligently sought to discover a correct theory of biological evolution based on considerations of *science*, not *ideology*. Included among these are the six great scientists whom John A. Davison mentions in his *Evolutionary Manifesto*: William Bateson, Leo S. Berg, Robert Broom, Richard B. Goldschmidt, Pierre Grassé, and Otto Schindewolf.

To these names I would personally like to add the name of Robert F. DeHaan. DeHaan is the creator of the theory of *macrodevelopment*, which proposes that over millions of years the biosphere has nonlinearly unfolded taxa from generic forms to specific forms, in a manner analogous to the way in which a biological embryo develops in the womb. *Macrodevelopment* will, I think, eventually be proved to be the best *overall* framework

for a correct theory of biological evolution. (See the second half of my book *Far From Equilibrium* for further details.)

Also important is John A. Davison's own theory of *semi-meiosis*, as expressed in his *Evolutionary Manifesto*. In essence, Davison's theory of *semi-meiosis* is one of the very few efforts to seriously consider the problem of evolution in detail from a genetic, yet non-Darwinian, point of view. Indeed, one needs to go back over fifty years to the work of the great geneticist Richard B. Goldschmidt in such publications as *The Material Basis of Evolution* (1940) in order to find a comparable depth of original treatment of genetics and evolution. (And, of course, Goldschmidt was severely hampered by his lack of access to the vastly expanded experimental knowledge of genetics and DNA that has been discovered since his time.)

But, like Goldschmidt, Davison puts the evolutionary focus where it belongs: on nonlinear, sudden, holistic *chromosomal rearrangements*, rather than on the gradual, linear accumulation of individual *point mutations of genes* exclusively favored by the Darwinists. Such holistic chromosomal rearrangements *cannot* be produced by ordinary sexual reproduction, which merely re-sorts and exposes traits within a limited range. The revolutionary contribution of John A. Davison is to propose instead a holistic *semi-meiotic* mode of genetic reproduction to explain the sudden, nonlinear chromosomal rearrangements required by the scientific facts of evolution.

Hopefully the recent advent of Robert F. DeHaan's new evolutionary theory of *macrodevelopment*, together with the emergence of John A. Davison's theory of *semi-meiosis*, will herald a new era of evolutionary science, replacing the old era of evolutionary *ideology* which has dominated and retarded our minds for over a hundred years.

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