

What happened to the term: *evolution*?

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Introductory remark

This is the first of a number of brief articles reflecting on some of the complexities involved in scientific attempts to understand and explain living entities, their genesis and how they are related. The first one will ask what happened to the meaning of the term *evolution* within (neo-)Darwinism. It will argue that *evolution* in the *biotic* sense of *development* has been reduced to *physical change*, to the idea of *continuous flux (gradualism)* – and that this view even overrules Darwin's idea of *natural selection*. In order to show that the problems involved are super-imposed by a preconceived conception of *continuous change*, a number of key quotations will be extracted from the works of acknowledged biologists.

Physical change versus biotic development

As *physical* entities atoms, molecules and macromolecules are not *alive*. Only plants, animals and humans actively function within the *biotic aspect* of reality. When this distinction between the physical and biotic aspects of reality is accepted, it entails that the term *evolution* is normally used to designate biotic growth (development).

Yet, when Darwin published his famous work on the *Origin of Species* in 1859, the term *evolution* instantly lost its unique *biotic* sense. It was no longer employed merely to designate progressive *organic development*. Darwin in fact proceeds from a radical *physicalist* (materialist) starting-point which fully emasculates the term “evolution.” This is not realized by most supporters of (neo-)Darwinism. Of course it is also not understood by the general public who continues to think that the (Darwinian) theory employs the term *evolution* in the sense of *progressive biotic development*. But they are not aware of the fact that the authentic meaning attached to the term *evolution* within (neo-)Darwinian circles, is given by equating it with *physical change*.

The ambiguity of evolution within neo-Darwinism

Although the biotic meaning of *evolution* surfaces as soon as evolution is discussed, it is implicitly pushed towards the background when the presumed development from the first cell to humans is explained. The term “evolution” then once again assumes the (non-physical) meaning-nuance of “progressive (biotic) development.” But even when this (inconsistent) leap is made back to *biotic evolution*, the meaning of the latter is speculatively extended beyond all boundaries. Just consider the following statement of T.H. Huxley at the occasion of commemorating the appearance of Darwin's *Origin* in 1959: “This is one of the first public occasions on which it has been frankly faced that all aspects of reality are subject to evolution, from atoms and stars to fish and flowers, from fish and flowers to human societies and values – indeed, that all reality is a single process of evolution” (Quote from

his lecture “The Evolutionary Vision” presented at the *Convocation Ceremony* that took place on Thanksgiving Day (1959). He also said that religion is an “organ of evolving man” which is no longer needed. But note the discrepancy between the claim that “all aspects of reality are subject to evolution” and the statement that “all reality is a single process of evolution”: the first one elevates “evolution” to an all-encompassing law to which all aspects of reality are subjected and the second one reduces all laws to what “all reality is”, namely “a single process of evolution”! What is contradicting the latter statement is the *constancy* in which the “law” of the combined effect of random mutation and natural selection is supposed to operate. It is only on the basis of this element of constancy that evolutionary change could be accounted for.

Strictly speaking Darwin’s theory does not allow for progress

The biologist who clearly realized that Darwin's position in 1859 does not allow for *progress* (biotic development across all boundaries), is no one other than Stephen Gould. In a 1996 work on the grandeur of life he relates this to the fossil record:

I believe that the most knowledgeable students of life's history have always sensed the failure of the fossil record to supply the most desired ingredient of Western comfort: a clear signal of progress measured as some form of steadily increasing complexity for life as a whole through time. The basic evidence cannot support such a view, for simple forms still predominate in most environments, as they always have. Faced with this undeniable fact, supporters of progress (that is, nearly all of us throughout the history of evolutionary thought) have shifted criteria and ended up grasping at straws.

In a different context he explains this as a *paradox*:

The problem that spawns this confusion within the Darwinian tradition may be simply stated as a paradox. The basic theory of natural selection offers no statement about general progress, and supplies no mechanism whereby overall advance might be expected. Yet both Western culture and the undeniable facts of a fossil record that started with bacteria alone, and has now exalted us, cry out in unison for a rationale that will place progress into the center of evolutionary theory.

Keep in mind how Gould explains natural selection in 1996. “natural selection—a mechanism that yields only local adaptation to changing environments, not general progress.”

Gradualism: the continuity postulate of modern philosophy

This situation is further complicated because Darwinism and neo-Darwinism not only reduced the biotic meaning of *evolution* to physical change, but also assumed that this physical change is *continuous*. This conviction that *evolution* means *continuous change (flux)* is also known as *gradualism*. According to Stephen Gould the embarrassment caused by the idea of progress is actually an outcome of Darwin’s prior (*a priori*) commitment to the *continuity postulate* of modern philosophy. This postulate entails that human thought can bridge all boundaries (discontinuities) encountered within reality. It is generally known in the form of the slogan: *nature does not make jumps (natura non facit saltus)*, which goes

back to the so-called *lex continui* of Leibniz (in the 17th century).

Geology does not reveal the expected finely-graduated organic chain

The belief that nature does not make jumps underlies Darwin's view that geology must reveal a finely-graduated organic chain – and if it does not, the only explanation would be that the fossil record is “imperfect.” Although this conviction appears to be nothing but a “neutral statement of fact,” the use of the word “imperfection” in the subsequent “explanation” demonstrates the hidden assumption of *gradualism* (the just-mentioned *continuity postulate*) expressed in it. Yet Darwin was honest enough to concede:

Geology assuredly does not reveal any such finely-graduated organic chain; and this, perhaps, is the most obvious and serious objection which can be urged against the theory. The explanation lies, as I believe, in the extreme imperfection of the geological record.

Darwin believes in the “imperfection” of the fossil record

When Darwin says that he *believes* in the “extreme imperfection of the geological record” it means that he believes that there has been a *perfectly continuous development* but that this *perfect continuity* is simply not displayed in the fossil record. Therefore he maintained the hope that these intermediate (or transitional) forms will still be found:

But we continually overrate the perfection of the geological record, and falsely infer, because certain genera or families have not been found beneath a certain stage, that they did not exist before that stage.

He phrases this gradualistic continuity postulate also in the following terms: “Natural selection acts only by the preservation and accumulation of [infinitesimally – new insertion, Darwin, 1859:142] small inherited modifications” (Darwin, 1859a:56).

Clearly, Darwin's belief embodied the hope that fossils of the continuously changing transitional forms will be found through continued paleontological research and the discovery of new fossils. This raises the question:

What happened to this expectation during the subsequent more than 150 years?

In 1999 Jones reiterates the problem as follows:

The fossil record – in defiance of Darwin's whole idea of gradual change – often makes great leaps from one form to the next. Far from the display of intermediates to be expected from slow advance through natural selection, many species appear without warning, persist in fixed form and disappear, leaving no descendants. Geology assuredly does not reveal any finely graduated organic chain, and this is the most obvious and gravest objection which can be urged against the theory of evolution.

Let us see what Ernst Mayr, one of the key figures in the “New Synthesis” of Darwinism (that gave rise to the label neo-Darwinism) had to say in 1991:

Paleontologists had long been aware of a seeming contradiction between Darwin's postulate of gradualism ... and the actual findings of paleontology. Following phyletic lines through time seemed to reveal only minimal gradual changes but no clear evidence for any change of a species into a different genus or for the gradual origin of an evolutionary novelty. Anything truly novel always seemed to appear quite abruptly in the fossil record.

The dominance of a philosophical presupposition in neo-Darwinism

The fact that the continuity postulate (gradualism) occupies *the* central position in Darwin's thought shows that an *a priori* speculative philosophical view overrules the available data. This is confirmed by Gould:

- (i) “Gradualism may represent the most central conviction residing both within and behind all Darwin's thought”;

and:

- (ii) “I believe, therefore, that Darwin's strong, even pugnacious, defense of strict gradualism reflects a much more pervasive commitment, extending far beyond the simple recognition of a logical entailment implied by natural selection – and that this stronger conviction must record such general influences as Darwin's attraction to Lyell's conflation of gradualism with rationality itself, and the cultural appeal of gradualism during Britain's greatest age of industrial expansion and imperial conquest”.

According to Gould the continuity postulate represents the core conviction of Darwin

From the foregoing the astonishing position is clear: for Darwin natural selection does not represent his core conviction – this position is occupied by the *continuity postulate*.

Moreover, it is important for those interested in intellectual history (“the history of ideas”) to realize that the primacy given in Darwin's thought to the continuity postulate (nature does not make jumps), evinces the rootedness of his thought in the modern humanistic science ideal which surfaced during and after the Renaissance.

Evolution as continuous flux questioned

In his large work on the structure of evolutionary theory Gould (2002) connects this *a priori* postulate regarding incremental continuous change to the widespread and generally defended neo-Darwinian basic definition of evolution as *continuous flux*.

The stories begin from the same foundational fallacy and then proceed in an identical erroneous way. They start with the most dangerous of mental traps: a hidden assumption, depicted as self-evident, if recognized at all – namely, a basic definition of evolution as continuous flux.

Gould understood Darwin's commitment to the boundary-leveling modern humanistic science-ideal. In 2002 he writes: “We often fail to recognize how much of the Origin presents an exposition of gradualism, rather than a defense of natural selection.” And:

“In fact, I would advance the even stronger claim that the theory of natural selection is, in essence, Adam Smith’s economics transferred to nature”. To this we may add what Marx wrote to Engels in a famous letter of 1862:

It is remarkable how Darwin recognizes among beasts and plants his English society with its division of labor, competition, opening up of new markets, ‘invention,’ and the Malthusian ‘struggle for existence.’ It is Hobbes's ‘bellum omnium omnes’ [war of all against all] and one is reminded of Hegels Phenomenology, where civil society is described as a ‘spiritual kingdom,’ while in Darwin the animal kingdom figures as civil society.

An increasing challenge to the idea of continuous transition

The last fifty to sixty years witnessed an increasing challenge to the classical Darwinian conception of a gradually and continuous transition through numberless incrementally small changes over millions of years. This challenge flows from what Gould and Eldredge (already in 1972) characterized as the dominant theme of the fossil record, namely *stasis* (constancy or fixity). Two years later the paleontologist Kitts categorically in the neo-Darwinist Journal *Evolution* states: “Evolution requires intermediate forms between species and paleontology does not provide them.”

Stasis is data

One may capture the core of this issue by employing the opposition of continuity versus discontinuity, as it is explained by McGar in a work on Gould (2006):

The clear predominance of an empirical pattern of stasis and abrupt geological appearance as the history of most fossil species has always been acknowledged by paleontologists, and remains the standard testimony... of the best specialists in nearly every taxonomic group. In Darwinian traditions, this pattern has been attributed to imperfections of the geological record that impose this false signal upon the norm of a truly gradualistic history. Darwin’s argument may work in principle for punctuational origin, but stasis is data and cannot be so encompassed.

Gould is therefore justified in asking (in 2002): “So if stasis could not be explained away as missing information, how could gradualism face this most prominent signal from the fossil record?”

In 2006 Van den Beukel mentioned that Gould and Eldredge claimed that stasis (= immutability, stand-still), and not change, is the dominant theme of the fossil record. He adds a remark from Eldredge, namely that this destroys the backbone of the most important argument of the modern theory of evolution. Berlinski also affirms that most species “enter the evolutionary order fully formed and then depart unchanged.”

Conclusion

In its original biotic sense the term *evolution* (biotic development) merely designated the growth (development) of a living entity from birth to maturity. Within (neo-)Darwinism two important things happened to the term *evolution*.

- (i) It was first of all reduced to physical change in order to avoid the idea of progressive development.
- (ii) Secondly, neo-Darwinists (inconsistently) continued to switch to a biotic perspective in order to express their belief (faith) in the speculatively assumed continuous evolutionary process of infinitesimal, incremental change – a process in which new and “higher” forms allegedly “evolved” while bridging the gap between the level of bacteria and that of humans. In terms of the overextended use of the term “evolution” all aspects of reality are not only subject to evolution since all reality *is* a process of evolution.

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Some related problems will be discussed in a few brief follow-up articles.

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A recent neo-Darwinian hoax

In respect of Dinosaurs with feathers there appeared an article in the *National Geographic* of November 1999 asking the question: A flying Dinosaur? (Vol. 196, No.5 November 1999, pages 100 ff.). It was proudly announced as “a missing link” between “terrestrial dinosaurs and birds that actually fly” – written by Stephen Czerkas. The opening words of this article claims: “With arms of a primitive bird and the tail of a dinosaur, this creature found in Liaoning Province, China, is a true missing link in the complex chain that connects dinosaurs to birds. Scientists funded by National Geographic studied the animal, named *Archaeoraptor liaoningensis*, under ultraviolet light [with a picture of it] used CT scans to view parts of the animal obscured by rock” (page 100). The author points out that *Archaeoraptor liaoningensis* was a “better flyer” than “*Archaeopteryx*, the earliest known bird.” Its tail is said to be “strikingly similar to the stiff tails of a family of predatory dinosaurs called dromaeosaurs. Moreover, this “mix of advanced and primitive features is exactly what scientists would expect to find in dinosaurs experimenting with flight” (page 101).

However, less than a year later, in the *National Geographic* of October 2000 (Volume 198, No. 4, pp.128-132), an extensive article appeared – *Archaeoraptor Fossil Trail*; announced a “Report to Members” – in which it was categorically conceded that the entire story was a hoax – in the words of Xu: “I am 100% sure we have to admit that *Archaeoraptor* is a faked specimen” (page 132). In this article we read: “Two months later, when it turned out that the fossil had been artfully assembled from parts of unrelated creatures,” that is to say, that it was a fraud, “Allen was in quick succession shocked, humiliated, and furious” (page 128).

Czerkas, S. 1999. “It's a Missing Link”, in: *National Geographic*, November 1999, Vol. 196, No.5 November 1999, pages 100-107.

Report to Members (explaining that the “dinosaur-birds” story of 1999 was a fraud). 2000, published in the *National Geographic* of October 2000 (Volume 198, No. 4, pp.128-132).

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