# Darwin's Theory of Evolution
# Part III: Consequences for Philosophy

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WE ARE NOW at the last stage of our survey of Darwin's theory of evolution. We have presented the study of his theory and its application, and followed its subsequent development in several directions. Now is the time to study the importance of his theory for philosophy and sociology. For While in the field of philosophy the import of his theory has remained far from properly understood, in the field of sociology it has been subject to the widest possible types of misapprehension, misinterpretation and misapplication.

Let us see how.

One by one.

A large number of scholars have thoroughly studied Darwin's Notebooks written on the morrow of his return from the Beagle journey in order to follow the course of his intellectual development.[1] It is more or less universally acknowledged that during that period he gradually discarded his long-held beliefs in Christianity and turned towards an atheistic viewpoint (although he preferred to use the polite term 'agnostic' to the aggressive term 'atheist'). The chapter on religion in his autobiography also testifies to that thesis.[2]

**Materialism**

For several reasons, personal as well as social, Darwin seemed to have adopted a neutral attitude to the question of religion in public. In his *The Origin of Species* there are a few references to a so-called Creator.[3] But all these mentions seem to be quite perfunctory and nothing serious. The personal reason stemmed from the fact that his wife was a devoted believer. As a perfect gentleman of the time and land he was very careful to least injure her feelings. He knew the more he proceeded with the theory of random variation and natural selection, the more would he undermine the Biblical explanation of creation and diversity of the biosphere including the design argument. In spite of finishing writing his autobiography in 1878-79, he did not send the manuscript to any publisher. For the public, he was averse to any cheap stunt or publicity that usually emanates from the circulation of a new and unorthodox idea, whatever its scientific import. He therefore aimed at a gradual transformation of hearts. It must be stated in all fairness that he was successful in this strategy. Even some of the people believing in the essential canons of Christianity found his points unassailable and sided with the theory of evolution. *The Origin of Species* is, truly, in his own words, a "long argument" against the long prevailing idealist and theological orthodoxy.

The fact remains that his is a theory which is materialist through and through. It banishes any supernatural agent from playing any role in the creation, maintenance and change of the living species of plants and animals; or, in the least, it ren-

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ders such an agent a poor performer, if at all. There are scores of letters to his friends and mentors like Asa Gray[4] and Charles Lyell[5], where he privately expressed his well- considered opinion against the theory of intelligent design. The arguments he put forward to them are still relevant and irrefutable. Among all people, the Christian fundamentalists have understood this very well, especially in the USA, where a whole machinery has been active in fighting Darwinism in the name of a so-called creation science in the schools and other public forums.

This point assumes special importance in view of the following fact. Alfred Russell Wallace, who had also independently arrived at the same conclusion as Darwin on natural selection, and who held radical views in many aspects of life and society, remained a life-long believer in the Christian canons. In the later part of his life he had joined the spiritualist societies of England which tried to invoke the spirits of the departed celebrities and embroiled himself into some notorious scandals. Darwin scrupulously stayed away from any of this kind of intellectual aberrations. If we remember that he lost two of his children while writing *The Origin* and continued to suffer from a permanently ailing health, this steadfastness in the rationality becomes all the more meaningful for the posterity. From the Age of Reason he had passionately sharpened the edge of reason in his thinking.

**End of metaphysical rigidity**

Darwin's theory has much broader an implication for philosophy. It is no wonder that Karl Marx was the first to note the tremendous importance of a general truth revealed by this theory of evolution. Sometime after the publication of *The Origin* he wrote to Engels in a letter on 19 December 1860: "Darwin's book on Natural Selection ··· is the book which contains the basis in natural history for our view."[6] In another letter written to Lassalle on 16 January 1861 he remarked: "Darwin's book is very important and serves me as a basis in natural science for the class struggle in history."[7] What were the elements in that book that made Marx so euphoric about Darwin?

To have a grasp of those elements we have to go back to the problem of outlook we already referred to in the first part of this essay.[8] We noted there that the pre-Darwin intellectual mindset in Europe was dominated by the metaphysical outlook cloaked under the two-millennia old burden of Aristotelian principles of formal logic. Let us make a detailed detour here. The three basic laws of thought enunciated by Aristotle in his formal logic were:

(a) Law of Identity – A is A (identification of a thing or a proposition thereof);

(b) Law of Negation – A is not not-A (differentiation of a thing or a proposition thereof without involving contradiction);

(c ) Law of Excluded Middle – A thing is either A or not-A; nothing can be both A and not-A at the same time.[9]

As long as the sciences were at the stage of study and classification of separate things and phenomena (which they continued to be till the end of the eighteenth century), they were somehow amenable to this formal structure of thinking. As Maurice Cornforth observed: "Aristotle's logic was primarily a logic of classification. This limitation corresponded, indeed, to the level of development of the science of his time, which still moved to a great extent within the stage of classification. ··· The chief fault of Aristotle's logic was that it tended to impose a metaphysical rigidity into the

Georg Wilhelm Friedrich Hegel (1770-1831)

process of thought – and this tendency was carried further by his successors, the Scholastics of the middle ages."[10] But already, as Engels later pointed out, the volume of information collected by the different branches of science demanded systematic collation and integration, which required the scientists to look into the processes of change and development of the phenomena. And it was a task beyond the purview of the formal logic of Aristotle.

## Qualitative Change

Man sets only those problems before him which he is in a position to solve, said Marx.[11] Towards the close of the eighteenth century came Hegel who developed a new logical framework as an answer to this problem. Cornforth pointed out that for long the progress of knowledge required "the narrow, metaphysical approach of the traditional logic" to "be superseded by a new, dialectical approach in logic"; and "the basis for the necessary advance in the science of logic was laid by Hegel,"[12] The three basic principles of dialectical logic that he counterpoised against the above laws, run as follows:

(a) Identity of Opposites – In a developmental process, a thing or phenomenon is always subject to the interplay of opposite forces within it, which while remaining in a state of conflict present a united whole;

(b) Quantitative Change to Qualitative Change – This interplay and conflict continue to produce small quantitative changes in the thing or phenomenon which in its turn at a definite stage undergoes a qualitative change to give birth to a new thing or phenomenon;

(c ) Negation of Negation – Development is an uninterrupted process of progressive replacement of one thing or phenomenon by another.

These three principles are far from arbitrary and also not mere replacements of the Aristotelian laws. Each of them has a specific epistemological function in organizing thought. The first principle states the efficient *cause* of change and development of material objects and events; the second delineates the *course* of change and development and describes how a new quality is born of the old qualities; and the third defines the general *direction* as well as outcome of change.

Hegel in his *The Science of Logic* and *The Encyclopaedia* lucidly explained these things with some illustrative examples: Mechanics deals with motion of bodies. All right! Suppose an arrow is moving past a post. Let us ask: Is the arrow at the post or not? You cannot give your answer in simple terms of 'yes' or 'no'. For the arrow is both near the post while passing by it and is going away from it. You have to say both 'yes' and 'no'. It is moving because of the conflict between its inertia inhering in it and motion imparted to it. Its moving away from the post is at first quantitatively increasing and

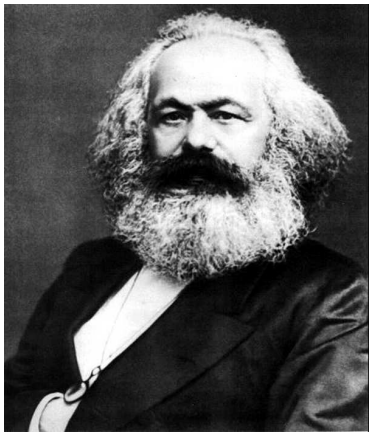
finally it is qualitatively departing from the post. Its approach to the post is negated by its departure from the post. The same argument he raised in connection with understanding the rotational movement of the planets. This kind of simple cases elicits the necessity of dialectical logic for the understanding of dynamic processes quite well.

Suppose, further, a seed is germinating. Suppose it will germinate into the sapling on the ninth day. On each day the seed is moving towards germination, but the change is only quantitative, may be even imperceptible. If any body asks, whether it is a seed or a sapling now, it is not possible to answer by 'yes' or 'no', because it is neither solely a seed nor yet the sapling, but a unity of the two. On the ninth day there takes place a qualitative change of the seed into the sapling. The seed is negated by the sapling. Here also formal logic fails to answer the question like what it is called when it is going to germinate but has not yet done so.

Cornforth rightly remarked that "Hegel's basic innovation in logic was the idea that logical theory must be worked out in correspondence with the stages of development of thought as it approaches an ever more comprehensive knowledge of reality." And in formulating the principles of dialectics he "broke completely with metaphysical approach of the traditional logic".[13]

**Dialectics in Nature**

But Hegel had two limitations. First, he was an idealist in philosophy; secondly, he did not have the necessary scientific data to establish dialectics as the essential grammar of science. So, even after coming very close to it, he could not take the decisive step to rescue materialism from the metaphysical labyrinth on the basis of dialectics. Instead, extracting dialectics from matter, he brandished it *against* materialism. The responsibility to absorb and fuse the two great heritages in philosophy, namely materialism on the one hand and dialectics on the other, was taken over by Marx and Engels. In opposition to Hegel who viewed dialectics merely as a logical method of thinking, they argued that dialectics could be the true method of thinking *if and only if* thinking corresponded with the real dialectical processes of nature and society, that is, the real material world and life. It is in this task that they found in Darwin's theory of organic evolution a very suitable illustration.



Karl Heinrich Marx (1818-1883)

Engels pointed out that the English and French materialists of the two previous centuries, in spite of putting up a brave front against the old feudal and religious ideologies, suffered from three serious weaknesses: They analyzed nature and society in terms of metaphysical rigidity; they could neither explain developmental processes nor qualitative change. They explained history in terms of individual heroes and their heroic feats. For social change they stressed the change of hearts of the people through education and other cultural means. On the other hand, explaining every thing in terms of mechanics and mechanism they denied any qualitative change

in nature. They either claimed that every change was one of degree, more or less, or that whatever appeared as new was in some or other form implicit in the old. As a result, whatever different qualities were found in nature were created independently of one another, either simultaneously or separately. Moreover, they failed to study things and phenomena in their interconnections.

Contrary to this position, Engels showed that developmental process in general and human history in particular, represented a series of cases where quantitative changes led to qualitative changes, in the wake of which fundamentally new qualities emerged from the old. The dialectics of quantitative changes leading to qualitative changes follows from as well as leads to dynamic interconnections of things and phenomena – both of which require the most rigorous and elaborate study of natural phenomena. He specified three discoveries of science of his time which he thought established the laws of dialectics in nature on a firmer foundation: namely, (i) transformation of different forms of energy into one another; (ii) cell as the structural and functional unit of life; and (iii) theory of organic evolution.[1] Transformation of energies showed that certain changes in the quantitative relations beyond specific limits led to a change in the form of energy (like heat changing into light, mechanical vibrations within certain limits appearing as sound, etc.). The development of the adult being from a single zygotic cell, the embryo, furnishes another example (actually trillions of examples) of quantitative changes leading to qualitative changes.

Next came the case of organic evolution. Although Lamarck's theory of evolution was already available, neither Hegel nor Engels found anything in it substantial for dialectics. The gradualist picture of progression Lamarck had produced with the knowledge he had before him, could explain modification of organs but not the emergence of new organs or disappearance of some existing forms among the plants and animals with complete satisfaction. However, Engels was aware of the fact that "in Lamarck's time science was as yet far from being in possession of sufficient material to have enabled it to have answered the question of the *origin of species* except in an anticipatory way, prophetically, as it were."[14]

It is in this regard that Marx and Engels saw the great significance of Darwin's work. Already, just one year before the publication of *The Origin* (just two weeks *after* Darwin's and Wallace's papers on evolution were jointly read at the Linnaean Society of London) Engels had written to Marx in a letter on 14 July 1858 about the emerging lessons of evolutionary theory and mentioned in particular: "At every step one bumps up against the most complete uniformity of structure [of man] with the rest of the mammals, and in its main features this uniformity extends to all vertebrates and even – less clearly – to insects, crustaceans, earthworms, etc. *The Hegelian business of the qualitative leap in the quantitative series is also very fine here.*"[15]

This is the letter where Engels had for the first time referred to the three abovementioned discoveries, which had brought the dialectical picture of nature with a better clarity to them. Darwin's theory came

[1] Dialectical principles are universally valid in all scientific theories; it is obviously possible to obtain them in or derive them from all scientific relations, laws and principles. Engels mentioned these three discoveries as ones which helped them at the time to clarify the things in the simplest and most obvious way. For these were then almost exhaustive of the physical and biological phenomena. Today we may cite many other instances which are glaringly cogent to the point, for example, theory of relativity, quantum mechanics, genetics, development of the computers, growth of global warming, generation of antibiotics, and so forth.

to them as the right thing at the right moment. Later Engels clarified their position in a greater detail: "If all multi-cellular organisms—both plants and animals, including man—in each case grew out of a single cell according to the law of cell division, what then is the source of the infinite diversity of these organisms? This question was answered by the third great discovery, the theory of evolution, which for the first time was comprehensively worked out and substantiated by Darwin. However many transformations this theory will still undergo as regards details, in the main *it has already solved the problem in more than an adequate manner.* The evolutionary series of organisms from a few simple forms to increasingly multifarious and complicated ones, as it confronts us today, and extending right up to man, has been established as far as its main features are concerned."[16]

Friedrich Engels (1820-1895)

However, before concluding from Engels, let us see how Darwin himself approached the matter. We must remember that Darwin, as it seems, was not much concerned at that time with the philosophical import of his theory. This is one of the reasons that his *The Origin* appeared to Marx to be hued with an empirical style. Even then here and there appear some comments which to a scrupulous observer cannot but strike as having somewhat deeper and more generalized significance.

For example, when he addressed the problem of gradual modification and transmutation of species, his main task was to show the emergence of the new from the old. The separateness and discontinuities between species are known to all; but that is not the whole picture. Within the visible discontinuities there are long sequences of continuous processes, involving small changes, quantitative changes, which finally produce the end result, as we see them. In his own words: "[T]he chief cause of our unwillingness to admit that one species has given birth to other and distinct species is that we are always slow in admitting any *great change* of which we do not see the *intermediate steps.* ··· The mind cannot possibly grasp the full meaning of the term of a hundred million years; it cannot add up and perceive the full effects of many slight variations, accumulated during an almost infinite number of generations."[17]

It is with this point circulating in his mind that he focussed on how the small, gradual changes accumulated over a long period finally led to the emergence of a new species: "I look at varieties which are in any degree more distinct and permanent, as steps leading to more strongly marked and more permanent varieties; and at these latter, as leading to sub-species, and to species. ··· Hence I believe a well-marked variety may be called an incipient species; ···"[18] That is why he demarcated species from varieties in an interesting way, in terms of this two-stage development: "··· the only distinction between species and well- marked varieties is that the latter *are* known, or are believed, to be connected by intermediate gradations, whereas species *were* formerly thus connected."[19] If you note the change in

the tense of the verb 'be' in the two places, you will be able to see the breach in the continuity.

And Engels could hardly fail to note this "Hegelian business" in the theory: "Darwin in his epoch-making work, set out from the widest existing basis of chance. Precisely the infinite, accidental differences between individuals within a single species, differences which became *accentuated* until they *break through* the character of the species, and whose immediate causes even can be demonstrated only in extremely few cases, compelled him to question the previous basis of all regularity in biology, viz., the concept of species in its previous metaphysical rigidity and unchangeability."[20]

Actually, the Darwinian "tree of life" conception of evolution is fundamentally different from the "ladder of life" perspective *par se* Lamarck in several important aspects. Lamarckian theory in fact could not properly demarcate species from varieties. Emphasizing environment as the cause and adaptation as the principal motive force behind transmutation of species, it effectively assumed all sorts of variations possible and real. The resulting gradualist, continuous and quantitative picture that emerged made the concept of species a rather unstable and fuzzy one. It was not possible for him to view the co-emergence of mammals and birds from the reptiles in more or less the same geological period.

For Darwin, variation is a natural and random event for every species, and the starting point of evolution. But this randomness does not imply any and every kind of variation. He was always aware that "nature is prodigal in variety, though niggard in innovation."[21] Darwin did not know the reason behind this finiteness of innovation; but we know today that the genetic compositions of species pose some limits on the range of not only allelic variations but also mutations. Thus he rendered species stable as well as mutable; changing quantitatively in varieties and then qualitatively to new species. Jackson highlighted this aspect quite candidly: "Darwin proved that the mutability of the variety was not at all the indefinite, haphazard thing the older science had supposed, that there was a *method in its madness*, and that ··· it was *variation in a regular way which produced the species*, and not variation in an irregular way which produced the variety."[22]

Now we can easily understand why Marx and Engels paid so much attention to Darwin's theory of organic evolution. The failure to understand the dialectics of quantity and quality led the celebrated palaeontologist and a Marxist, Stephen J. Gould, a staunch opponent of biological determinism concerning man's social life[23], to argue that man's biological akinness to chimpanzee is a matter of a quantitative rather than qualitative difference. This, he held, is true in terms of both language acquisition and intelligence.[24] This kind of simplification often has the counterproductive impact on Gould and other likeminded scientists who want to highlight the reductionist approach in the attempts to apply genetic determinism on problems of human sociality (as we shall see below).

The further development of evolutionary biology through its merger with genetics has much more enriched the study of dialectics. The quantitative changes behind the qualitative changes are nowadays really studied, measured and analyzed in the laboratory in quite sophisticated manners. Development of molecular biology, biotechnology, genetic engineering, and so on, has turned the quantitative and qualitative questions into some real issues. Application of statistical method, population approach, randomness, probability theory, etc. at various micro and macro levels has

rendered it possible to visualize the matrix of quantitative and qualitative changes in action. The genetically modified life forms produced in the laboratory and then circulated in the agro-market all over the globe – for both good and bad results – are evidence of application of this positive knowledge. □

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