

THE IMPACT OF DARWINIAN THEORY ON WESTERN THOUGHT

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The Darwinian theory of evolution is now widely received among the scientists. The details of the theory are still hotly debated but the theory itself has received an enormous explanatory power since the first time it was formulated a century and a half ago. The scientific debates occur henceforth inside the frame of Darwinism (at time called “neo-Darwinism”).

The most obvious result of the Darwinian enterprise is that we have entered a global evolutionary view of the world. It is not only the case in the living world. Even matter in the so-called “inert” sense of the word is seen to be in *process of becoming*. Evolutionary biology is akin to Big Bang cosmology. These two big theories of contemporary science are *more “historical” than “physical”*. At certain extent they escape the traditional criteria of scientific proceeding. They cannot be falsified by repeatable experiments for the simple reason that repetition does not occur in history. History is a process that brings something new in time. In this respect Darwinism has not only brought a new vision on the natural world, but also a new perspective on how science is practiced.

These elements explain why the Darwinian theory was so vividly discussed in the society at large at the time it was published. Even if it is now accepted among the scientists it remains a topic of contest in certain circles which do not easily accept this profound mutation “from certainty to uncertainty”¹.

This article will present four topics. First I will give a reminder of the main components of the Darwinian vision of the living world. The second topics will deal with the scientific reception of Darwinian theory, exhibiting some obstacles in the first period. These obstacles are linked with a certain vision of science as already noticed. The third point will concern religion. In the general public and the media the idea is widely spread that Darwinism has swept aside the claims of religion. The picture is more complex. It would be more right to speak of a mutation inside the religious vision of the world. The last topic will focus on the vision of humankind in relationship to the natural world. In sharp contrast with the traditional western anthropocentrism the Darwinian theory increases the inclusion of humanity within nature. This leads to a new vision of the human person.

Elements of the Darwinian vision of life

Charles Darwin was not the first naturalist to think that organic evolution might have occurred. Some of the component elements of his theory had been separately proposed long before the publication of *On the Origin of Species* in November 1859. One important step is the publication of Charles Lyell’s *Principles of Geology* (1830), which represents a “turning point in modern geology”². Lyell maintained the “uniformitarian” theory already proposed par James Hutton (1795) in opposition to the “catastrophist” theory held by the great French paleontologist Georges Cuvier. This so far prevailing theory postulated a series of “catastrophic” events leading to the extinction of species and creation of new ones. For

¹ Cf. F. David Peat, *From Certainty to Uncertainty. The Story of Science and Ideas in the Twentieth Century*, Washington, John Henry Press, 2002.

² Ian G. Barbour, *Religion and Science*, San Francisco, Harper and Collins, 1997, p. 50.

Lyell the mere operation of *natural causes* through *great spans of time* is responsible for the geological situation we can observe. We need no more “divine” (i.e. extra natural) interventions to explain away the natural phenomena. Long and slow working natural causes are enough.

If geology was firstly lead by “catastrophism”, botanic and zoology were under the sign of fixity. The great diversity of individual organisms could be reduced to a certain number of permanent “species”. In the middle of the eighteenth century the Swede Carl Linnaeus had worked out the first comprehensive system of classification still in use today. There are permanent distinctions among species. At least could one can accept individual variability (among the dogs one observes different races inside the one species) and extinctions from time to time. For Linnaeus and practically all the scientists of the time permanency is, as in the physical world, the condition of a “scientific” picture of reality.

This fixity of species was challenged by Jean Baptiste Lamarck. In his *Biological Philosophy* (1809) he proposed the idea of unlimited organic changes. An animal’s organ develops through habitual use and these acquired modifications are inherited and pass to the next generation. Lamarckian theory remained contested for some time. Indeed it failed to perceive the importance of extinction of species, whose evidences were more and more at hand. At the time the newly discovered fossils did not exhibit continuous variations but series that began and ended abruptly. Another difficulty was the acquisition of inheritable characteristics of individual organisms. Some of them cannot be acquired during its life.

The idea of *stability* of biological forms needs to be underlined. It long dominated Western thought. Two main sources can be proposed. One can think of a religious influence: each type of being was created by God in the beginning (or at least after every “catastrophe”). As far as it is created by God it should not change, except for individual variations that do not modify the “archetype”. Another cause, no less influent, is the traditional (i.e. Aristotelian as well as Platonic) conception of science: all individual beings are embodiments of eternal “essences”. This essence needs not to be fully realized in an individual organism. It constitutes the “ideal” type or the goal (final cause) this organism strives to get: “natural processes [are] incapable of any truly creative act”³.

The Darwinian *Origin of Species* presented a vast amount of evidences for evolution and it proposed a mechanism by which it could give rise to the vast variety of life-forms. In this respect it is not only a once again formulated “transformist” intuition. It brings out new material to support the hypothesis. “Darwin was a highly creative thinker who synthesized a number of key insights, some derived from his scientific work and others from currents circulating in his cultural environment.”⁴ The theory combines several ideas: (a) *Random variations*. That does not mean that these variations have no cause (we know more now thanks to genetics), but the causes of the variations do not play any role in the global evolutionary process: “variation was certainly caused by something (later identified as genetic mutations), but it was not aimed in any one direction.”⁵ (b) *The struggle for survival*. Some variations give a slight advantage in the competition for existence in a given environment. (c) *The survival of the fittest*. The individuals having such an advantage will live longer and have more descent than the other in that environment. Thus some variations are “selected” by the environment and after a long period of time give rise to new species.

³ Peter Bowler, *Monkey Trials and Gorilla Sermons*, Cambridge, Harvard University Press, 2007, p. 51.

⁴ Peter Bowler, “Darwin’s Originality”, *Science*, 323, 9 January 2009, p. 223.

⁵ Id., p. 224.

The result of the process is *unpredictable*. There is no more a series of isolated “special creations”, nor a “step-ladder” view of evolution, but the scheme of a “branching-tree”. In the Darwinian view, evolution is not to be conceived from the model of embryonic development as a predictable unfolding of possibilities. The variations occur in an undirected way before being selected by the environment. The very word of evolution is misleading, since it usually refers to the unfolding of an embryo in which the whole process and its goal are already predetermined. This is the reason why Darwin was first reluctant to use the word.

The Darwinian theory comes from an extensive study of nature, a study of artificial breeding techniques (selection of different attributes in pigeons, dogs and horses), a wide reading (for instance Lyell’s *Principles of Geology* with its insistence on processes of gradual change over very long periods of time and Malthus’ *Essay on the Principle of Population*, claiming that there is a struggle for resources), a wide correspondence with practically the whole scientific world of the time. Darwin’s work exhibits a *fruitful interplay of observation and theory*. It is not only a collection of data that can give birth to a new theory unless it is sustained by a *hypothesis* able to unify the data. On the contrary an idea, as original it be, is not enough to generate a fruitful theory. One needs both elements. The Darwinian theory is a good exemplification of the dialectic of the scientific process.

The Scientific Reception

At the time *The Origin of Species* was first published, evolutionary ideas were more popular within the lay public than within the scientific establishment. As we have just noticed, the idea of the constancy of species was strongly maintained among those who were best informed about biology. The variations among individual organisms were seen as only different implementations of a single divinely given archetype. A careful observation should be able to let perceive the original form.

The Darwinian theory of evolution had a great impact on the representation of nature. It was not the first suggestion that there exists some change in the natural world, but it took Darwin’s work to suggest that “all of nature is in a state of flux”⁶. The natural phenomena do not rest on a basis of permanent categories or immutable forms that science tries to “unveil”. On the contrary: as the American philosopher Alfred North Whitehead suggested, what seems to us as permanency is only a long time duration among an ocean of variations. Stability is an illusion produced by our limited time scale. The world is transformed from a fixed hierarchical “chain of being” into a dynamic “process”⁷.

This leads to emphasize the idea of *interaction*. One cannot think of entity without taking into account the set of relationships in which the entity is embedded. According to Whitehead’s “process philosophy”, an “actual entity” is constituted by the interplay of different kinds of relations. From this point of view, modern ecology appears to stand in Darwinian heritage. To be sure, the stress put originally on “struggle” or “competition” carries a peculiar accent that seems more “individualistic”. It could reflect the reigning social philosophy of competitive liberalism typical of the Victorian society. Recent studies give more attention to coordination and cooperation that play a no lesser role in the survival of groups. The stress is not so strictly put on individual organisms as to groups in relation to other groups.

⁶ I. Barbour, op. cit., p. 55.

⁷ Alfred North Whitehead, *Process and Reality*, New York, The Free Press, 1978.

The *historical dimension of nature* seems to be more fundamental than deterministic lawfulness that reigned in classical science since Galileo and Descartes. The debate about the role played by “chance” is still vivid among the biologists. It is unsatisfactory to pretend that chance rules the world. The natural process would be more precisely described as *dialectic of law and chance*. But the release from a strict determinism was seen and welcomed by philosophers such as Charles Sanders Peirce, William James and Henry Bergson as an indication of creativity in nature. History must be understood in its strong signification: it is constituted of events, genuinely new and unpredictable on the background of previous knowledge of the system.

I alluded to the Aristotelian root of western science and its insistence on permanency of being. It is not enough to explain away the origin of *modern* science as such since it is not the mere extension of the science of the Antiquity.⁸ In the middle ages the Christian doctrine of the creation of the world by an all-powerful God challenged the Aristotelian theory. That means at least two things: matter is not eternal since the world has a beginning; we have no direct access to the ultimate principles of being since they depend on an “independent” Creator. As such the cosmos is no more a “necessary” object but a “contingent” one. We could only have access to the components of being by *experiment*. Science is no more a mere rational enterprise but a mix of rationality and experimentation. The recognition of the fundamental contingency of the world paved the way to future recognition of its historical dimension.

The Reception of Darwinian Theory in Religious Circles

As we have just seen the religious factor played a significant role in the emergence of modern science. On the other hand it is well known that the Darwinian theory met a strong resistance in the religious circles. This paradox fades away when we realize that “religion” has a plurality of meanings. Indeed the reception of Darwinism among religious circles is much more multifaceted than usually thought. “Evolutionism is not necessarily atheistic, and creationism is not the only alternative open to the Christian.”⁹

If religion is seen as a synonym of a conservative way of thinking, there is no surprise that a theory insisting on the idea of change was so hardly received among religious people. In this respect three difficulties can be proposed.

In Darwin’s time the *argument for design* enjoyed great popularity despite the criticism by Hume and Kant. It gave the possibility to discover a “plan” within the biological order. The great variety of constantly changing phenomena can be “organized” to unveil a fundamental order of the universe. This has a religious value: this order is the result of the beneficent plan of God’s wisdom for the sake of humanity. All beings are “adapted” to their environment. These adaptations reveal the “workmanship” of a benevolent Creator who ordained a hierarchical “chain of being”, of which humankind was the highest step and final end.

Darwin’s scheme refuted the idea that creatures had been individually designed by God. The “design” of their structures is a “natural” phenomenon. There is no more need to appeal to an “extra-natural” instance to explain the “extraordinary” structures we observe in nature.

Another religious difficulty comes from the correct reading of the Holy Scripture. It is the proposal that the Earth is much older than it is suggested in the biblical chronology. According to the Bible the creation of the world happened about six thousand years ago, but

⁸ See: Jean Ladrière, *The challenge presented to cultures by science and technology*, Paris, Unesco, 1977.

⁹ P. Bawler, *Monkey Trials*, p. 4.

geology speaks of millions of years. That means that no literal reading of Holy Scripture is compatible with a scientific account of the world. Reading the Scripture needs an *interpretation* whose criteria are not only religious. The debate dealing with the biblical interpretation began long before Darwin wrote his book. Since the seventeenth century biblical literalism has been questioned. For example according to Galileo biblical references to the motion of the sun should be taken metaphorically and no more literally. The debate was not an easy one. To which extent the text can be read metaphorically? Who is able to interpret the Bible? According to what criteria? These questions remain valid today.

The third problem is linked with the origin of humankind. Apes and humans share a common ancestor. Humans do not arise by a distinct “act of divine creation”. They are no more “unique” in nature but “natural” organisms, sharing with the others both aesthetically appealing adaptations and cruelty, waste and ugliness we observe in natural life.

On the other hand progressive Christian thinkers warmly welcomed the new theory and immediately celebrated evolution. The famous novelist, at the same time a Christian socialist, Charles Kingsley was full of praise for *The Origin of Species*. He saw no contradiction with the Christian doctrine, writing that it was “just as noble a conception of Deity, to believe that He created primal forms capable of self development... as to believe that He required a fresh act of intervention to supply the lacunas which He Himself had made.”¹⁰ It should be noted that Darwin was enthusiastic of these lines.

This implies a new vision of the deity. Has God any role in the world? Traditional Christian theology insists on the transcendence of God over the world. God is seen as the “Lord” of the cosmos. Instead the new science invites to put another accent on the divine indwelling of creation. God is active inside the world. Pierre Teilhard de Chardin’s religious thought can be of great help in this respect. He tried to think anew the Christian vision of God, stressing the importance of the idea of divine “incarnation”, which means God’s participation in the world process. The God of Teilhard is a God who enters into the world to be one, to be incorporated, with it. “If the universe is rising progressively higher towards unity, it is therefore not only under the influence of some external force, but because in that unity the transcendent has made itself to some degree immanent.”¹¹ God comes to inhabit the world and to transform it from the inside. As Peter Bowler puts it: “It is a God who participates in the human drama and in the drama of creation.”¹²

This divine design expresses itself in the form of a universal communion. For Teilhard, every existent aspires to unity. The metaphysical scheme underlying his thought is of a “creative union”. In the beginning, there was multiplicity, but this multiplicity tends towards the one. This aspiration towards unity is at the same time an interior tendency to being and also an attraction towards an ultimate communion, the “Omega point”. His metaphysical scheme represents at the same time the necessary outcome of the development of being, which he calls natural, and also a force exterior to the world that operates despite the tendency to dispersion, opposing the tendency to unification. Without doubt, nothing guarantees in advance the victory of the forces of unification. Teilhard’s optimism is founded on his meditation on the victory of Christ over death. It is because, after everything has been said and done, life gets the better of death that it is *reasonable to hope* in the future

¹⁰ Quoted in Adrian Desmond and James Moore, *Darwin. The Life of a Tormented Evolutionist*, London, W. Norton, 1991, p. 477.

¹¹ Teilhard de Chardin, “Outline of a Dialectic of Spirit,” in *Activation of Energy*, tr. Rene Hague (San Diego, Harvest Book, 1978), p. 145.

¹² P. Bowler, *Monkey Trials*, p. 227.

salvation of humanity. So Teilhard does indeed take into account the existence of the forces of disintegration, but he believes that they will not have the last word.

Humanity and Nature

The Darwinian theory of evolution still raises a lot of questions. Some of them deal with strictly scientific issues. They are out the scope of this article. Others are more philosophical. We have already tackled some of them in previous paragraphs. It seems that a summary could be set up in the expression: “history of nature”¹³. Nature received a historical dimension. Previously history used to be a “privilege” of humankind, linked with the notion of “freedom”. The human person is free to build his own way. This freedom manifests itself in human action, his ability to transform his own environment. In this sense the Darwinian theory appears to have “humanized” the natural world.

But there is a reverse side. Human beings are no more a “special creation” distinct from the rest of the biological world. From now on humanity is a species of the same type as other animal species. Nature is understood to include humanity. There is no more “natural” division delineating humanity from the rest of the universe. This implies for instance that human culture could be analyzed in categories derived from biology. Freedom is no more a specificity of humanity: the so-called “free” acts can be reduced to a functioning of the organism (including the brain). All the aspects of human life, individual as well as social, come under the scope of one discipline, the evolutionary theory.

This is a great backlash on the anthropocentrism of the traditional western view. Man was seen as the “image” of a free Creator. The evolutionary description of human origins may be seen as a challenge to human dignity. This is not only a moral problem. The special status of humanity, placing it above the rest of the world, allowed the former to exert a certain power of transformation on the latter. This is one of the components of the “techno-scientific” revolution inaugurating the modern times. We know now that this capacity of transforming the natural world bore not only good fruits. The reflection on the history of modern “technoscience” encourages considering anew humankind and nature relationships.

If one maintains a “spiritual aspect” in human beings, this can be expanded towards the other natural entities. Teilhard de Chardin spoke of the “inside” of things, distinct from the “outside”. The latter is what can be objectively perceived. Everything can be an “object”, even the human person. The former cannot be directly perceived from the outside. It deals with the experience. It can be shared with each other. This is a way to stress the importance of *relationality*.

Darwin deliberately stressed the reductionist aspects of his theory in order to eliminate any hint of the involvement of a designer in his explanation of the development of living beings. As in a physical model these beings are only passive objects subjected to a “force” from outside. There is no consideration of relationships between objects. Like physical particles living organisms are isolated from each other (this model is accented in molecular biology).

Another view is proposed which criticizes the traditional reductionist view of modern physics.¹⁴ Its interest is directed to the process of emergence of greater complexity leading to living organisms “between crystal and smoke” (Henri Atlan). Selection still plays a great

¹³ See: Carl Friedrich von Weizsäcker, *The History of Nature*, London, Routledge and Kegan, 1951.

¹⁴ See Stuart Kauffman, *Reinventing the Sacred*, New York, Basic Books, 2008.

role but a more typical component is the capacity of organisms to try out new properties ("self-organization"). There is *creativity* even in the physical world, further than thought by the pioneers of mechanical physics.

The Darwinian theory gave opportunities to set up a new vision of nature, humanity and God. This vision is under the sign of history. As Teilhard wrote: "Nothing is comprehensible except through its history. 'Nature' is the equivalent of 'becoming' or self-creation: this is the view to which experience irresistibly leads us."¹⁵ We have not yet exhausted all the resources included in this theory. Indeed a scientific theory, as rich it be, cannot suffice to answer the more decisive questions we are confronted with. The various wisdoms of humanity possess inexhaustible treasures of reflection. A serious dialogue between them and the scientific vision of the world will be of great help to shed light on our common, unforeseeable, future.

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¹⁵ Teilhard de Chardin, "A Note on Progress", in *The Future of Man*, tr. Norman Denny (New York, Image Books Doubleday, 2004), p. 3.