



G.W.F. Hegel

Hegel's SCIENCE OF PHILOSOPHY Philosophy of Nature

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CONCERNING EVOLUTION

by Mike Marchetti

The Absolute Prius

The original intention of my first article was to direct attention to the philosophical aspects of the theory of evolution. I think this is the most significant contribution we can make to this subject. Robbert, in trying to validate the evolutionary concept in opposition to Hegel's stance on this matter, brought in aspects of the scientific evidence along with some thoughts on a possible philosophical justification. Because we are dealing with Hegel's **Philosophy of Nature** it may not be possible to deal with issues from a purely philosophical perspective since Nature necessarily implies that scientific evidences and arguments must be considered. Hegel's *philosophy* and the rational necessity in the development of the Concept guided him at every step in his interpretation of the broader stokes of Nature. The scientific evidences and *laws* established by scientists certainly help to formulate and serve to test such conceptual development. But ultimately it is in the Concept that completeness and consistency must be maintained. As Hegel recognizes, "the forms of nature cannot be brought into an absolute system..." (§ 370 add.)

The scientific aspect of the problem in itself will and should direct our philosophical thinking in the proper direction. We should be careful to note here that by the scientific aspect we mean the scientific *evidence* rather than the scientific theory. The latter should be guided by the Concept. As one trained in science, I have only studied evolution as a peripheral interest, much of the physical and chemical arguments upon which it is based are, however, familiar to me. I think we should understand from the start that there are many scientists, prominent and otherwise, who do not automatically presume the authenticity of either evolution or creationism. The essential point is that it is not necessary to accept the theory of evolution to maintain a scientific perspective, just as it is not necessary to reject the theory of evolution to maintain a religious one. In regard to the latter, that the current Pope Paul II, who is also known as the science pope, actively encourages a détente between Catholicism and science. The Catholics are of the opinion that the domain of science, which may describe the "how" of things, does not interfere with religion, which tends to area of the "why" of existence. I believe that philosophy has role to play in clearing up the issue of the domains of science and religion, as well as establishing its own place in man's culture. I made this point in my first article - it is significant enough to make again. Hegel has certainly given us some important insights into this subject and this will prove to be an essential component in understanding the

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validity of theories like evolution. In other words, if we can articulate the con-fusion or conflation of metaphysics and physics in such theories then we have demonstrated the role of a necessary element that must be considered in addition to the purely objective basis that such theories attempt to establish themselves.

Form and Matter

The fundamentalist creationists argue on the basis of the Bible that God formed a relatively recent earth and the variety of species in a one-time act of creation. The details are not given. We can say that this type of explanation places emphasis on formation or formal consideration without concern for details, content or matter. Science, however, is concerned with a rational explanation of the details of how creation occurs. This requires a clear understanding of what we mean by God, how this supposedly subjective being produces an objective world, as well as the details of what is that process of production of a content. All this must be rationally described in a systematic way, i.e. where each step of the development follows necessarily from the previous one. We can avoid starting with a first step that does not have a preceding one from which it necessarily follows by having it produced necessarily by the last one. In other words the system is a circle. Such as system was in fact developed by Hegel.

The evolutionists hold that (a) the universe and (b) various forms and species of life arise from a long series of consecutive events without any predefined connection and that Nature or matter is sufficient in itself to account for all that appears today as the world. There is no necessity for invoking God or subjectivity in order to explain what is purely an objective matter. Here we basically have an emphasis on matter or content without the inclusion of a formal or formative principle. Natural selection might be a candidate for this role, however it is not a well-defined concept and is not used at the level of cosmological development.

Both therefore seem one-sided in their approach. In the **Logic** § 128, Hegel explains that formless matter (which would be a necessary primitive stage for evolutionists) appears nowhere in existence. On the other hand a formative principle (such as God) would have nothing to mould if that were the case. If , however, we assume that God creates out of nothing then we are led to the conception that form and matter appear inseparably. This implies that form does not supervene upon an already existent matter but rather both are intrinsically integrated.

This is an essential principle for understanding Hegel's view regarding these theories. They are basic philosophical principles for anyone who takes a thinking approach to Reality. Can we test this principle of the inseparability of form and matter scientifically? Let's consider this observation from the French scientist George Cuvier, whom Robbert mentions in his article as having an influence on Hegel's thinking. In **Phil Nat** (§ 370 add.) Hegel quotes Cuvier, "Every organized being forms a whole, a unified and closed system, all the parts of which mutually correspond, and by means of reciprocal action, contribute to a common purposive activity. None of the parts can alter without the others altering also; as the result of this, each of them, taken separately, implies and yields all the others."

It seems that in his studies of fossil remains Cuvier was forced to

consider which animal particular bones were related to. This led him to the study of their formation and the purposive way in which they were related to each other. He further quotes Cuvier, "...with nothing but the well-preserved end of a bone, it is often possible to determine the whole of an animal by means of analogy and comparison, and with as much certainty as one would have if one were in possession of the animal itself. I tried this method out on parts of known animals on many occasions before I felt that I could use it with complete confidence in dealing with fossil bones; its success has always been so complete however, that I no longer entertain the slightest doubt as to the certainty of the results it has yielded."

The various parts of the animal, in other words, are intimately related to the whole. The whole as the form of the animal is connected to its content or parts. This verifies the inseparability of form and matter that we wanted to test.

Let us consider another example. Under what circumstances would the evolution of the eye occur? The eye is made up of many complicated connecting parts including cornea, iris, retina, optic nerve, muscles and veins. Here is what one prominent evolutionist said, "To suppose that the eye with all its inimitable contrivances for adjusting focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection, seems, I freely confess, absurd in the highest degree." His name was Charles Darwin. Although he did ultimately try to rationalize the gradual development of the eye in terms of evolution he nonetheless realized that he was stretching the point in order to save his theory, "...I have felt the difficulty far too keenly to be surprised at any degree of hesitation in extending the principle of natural selection to such startling lengths." One cannot honestly claim justification of a scientific theory on the basis that the missing links that would certify the theory are unfortunately extinct. The eye with all of its parts works only as a whole. None of the parts has the ability to see individually. Careful study of the integration of this organ with the body makes it seem as if the eye were formed only because there was an urge to see. The biomolecular theory of vision provides an even greater reason to question evolutionary schemes as Michael Behe shows in his book, "Darwin's Black Box." Thus this also confirms our principle.

At the most basic level of a primitive cell we find a very complex system at work. If we consider just three basic components of a cell, the cell wall, the cellular fluid and the proteinaceous components that make up the genes, DNA, etc. we find that none of these components could exist without the others. The proteins which form the cell wall and the fluid substrate, need the cell wall to protect them from being destroyed, and the fluid substrate to sustain their reactivity. The cell wall has no purpose without the inner proteins and fluid substrate, and so forth. Again we find an irreducible unity of whole and parts.

These examples would certainly rule out the sequential development of such structures from primitive elements. Even in embryonic development an ordering pattern governs the division of cells through their symmetry and differentiation.

Available Time

On paper, the theory of evolution can assume that whatever amount of time is needed to evolve existing lifeforms was

available. However, according to accepted massive geological evidence the environment of the Earth has been hospitable to the survival (not to mention the appearance) of life for roughly 4 billion years. That may sound like an eternity, until you start considering what has to have happened in that time. Human DNA alone (leaving aside the other complex structures of the cell) consists of about 3 billion nucleotides of genetic instruction. This means that according to evolution, they must have evolved at an average rate of about 0.75 nucleotides per year (not per generation). If the rate was not constant, then there must have periods when this rate was even faster.

Is it even remotely conceivable that the naturalistic process described above could support a rate like 0.75 nucleotides per year? No. Trillions or quadrillions of years might solve this anomaly, but those timespans utterly dwarf the actual time of 4-5 billion years. Evolution fails this empirical test.

The above calculations are rough but without considering the existence of a formative principle evolution is unable to present an empirical and mathematical demonstration that it could have occurred in the time available. The formative principle would have to be contained within the simple atomic and molecular components itself and the forces that combine them. There are four forces that operate in nature: gravity, electromagnetic, strong (short range nuclear) and weak (responsible for radioactive decay). In all of this we cannot find any principle of natural formation, which is what natural selection would be.

If there were a formative principle contained within all of this, we do not find complex inorganic structures such as cameras or computers naturally occurring in Nature, although on paper these should be much more likely to form than human DNA just because they have fewer parts. The reasoning is then given that only living systems possess the structures that allow forces of natural selection to operate. Therefore we do not find cosmogenesis explained in terms of natural selection. Only in living systems - at whatever time in evolution they became defined as such - a selective force spontaneously arose. They admit then that form becomes significant in living systems. This is exactly what the Concept implies - that form/matter are inseparable in living systems. If it fits this admission on the part of the scientists then why not accept the science of the Concept which Hegel provides in his **Philosophy of Nature**?

Natural Selection

The argument was given that Darwin's theory would present a special influence on Hegel's ideas in the case of evolution. If Hegel's objection to evolution is philosophically based upon the Concept, then any particular theory could not have influenced him even had Darwin lived during Hegel's time. Hegel does explicitly state that evolution of one species from another, which is basic to all objective evolutionary theories, is what he is rejecting. Darwin certainly holds this view thus I called it Darwinian-type evolution since he is the most famous representative of such theories. His unique contribution is the idea that "natural selection" ("survival of the fittest" was an expression that came from Wallace) plays a role in evolution. Darwin took the term natural selection from his knowledge of cattle breeding where artificial selection is used to promote specific characteristics in offspring.

Karl Popper pointed out the problem with a concept like "survival

of the fittest." It is a tautology and gives us no information or knowledge. If we go into the murky details of what fitness actually means, it rapidly veers away from the biological basis that it is meant to support. "Natural selection" is a term that is a bit more defensible. However, we should be acutely aware of the species-specific nature from which Darwin derived this term. In other words, natural selection describes a very commonplace phenomenon that is observed quite readily for any particular species. Encourage mating between cattle with large shanks and they will likely beget offspring with large shanks. In other words, external forces imposed upon an individual do affect that individual and the selection of which individual will thrive under such external circumstances. However, this is all about individuals or specific species. It really says nothing about evolution or changes from one species to another.

When the science of molecular biology was developed it was not species at the macroscopic level that evolved, it was random mutations at the microscopic molecular level that caused different species to arise one from another. After that came the genetic population theory and allele frequency modifications as the basis of evolution. Natural selection took a back seat to all of this. It cannot be formulated as a specific scientific law and really says nothing about how evolution occurs. The evolutionists readily admit this. Thus I don't think Hegel would have been very impressed by natural selection. Reason requires laws that summarize given evidence. Natural selection does not satisfy this criterion.

Irreversibility

Next we may consider the argument that irreversibility in nature provides a means for consequent development based on purely physical considerations. The Second Law of Thermodynamics concerning entropy provides an example of such irreversibility in nature. Let us analyze this piece of the argument first. The increase in entropy for a closed system would correspond to the spontaneous disordering of an originally ordered system. A given system always goes in one direction, toward a state of equilibrium or general homogeneity. Evolution may therefore be considered to be in direct opposition to the Second Law. So this is really not a good argument to use here.

One might instead refer to the spontaneous formation of crystals from a saturated solution. If we consider this in regard Prigogine's treatment of irreversible processes, we have a much more complex problem to deal with. However, what are often overlooked in the layman's perception of such descriptions, are the more abstract elements that are nonetheless essential to the whole argument being presented. Thus one may look at Prigogine's irreversible systems and think that spontaneous generation of order is indeed a fact, and it no doubt does occur in nature, but the explanation which the mathematics provides relies on what are called boundary conditions. One may become excited by seeing a spontaneous ordering of a system occur. Focusing on that, one will completely ignore the fact that the unseen boundary conditions for the system are the essential factor in determining the observable phenomenon. Modify the boundary conditions beyond a certain well-defined tolerance and irreversible activity disappears. The problem then becomes one of determining from what realm the boundary conditions are established for the irreversible process to occur. Philosophically, boundaries are both part of and not part of a closed system. What is therefore set up is an infinite regression of

determinations. This is therefore an unsatisfactory approach from a philosophical standpoint. Furthermore Prigogine is one of the prominent scientists in the world who does not accept the theory of evolution.

In 1977 Ilya Prigogine won the Nobel Prize in Chemistry for his work on dissipative structures - his term for localized entropic declination - in apparent violation of the second law of thermodynamics in which entropy increases. His views are grounded in the mathematical domain of theoretical physics and chemistry. There are many quotes we can take from him in regard to his dismissal of the simplistic theory of evolution. Prigogine (1972):

"The probability that at ordinary temperatures a macroscopic number of molecules is assembled to give rise to the highly ordered structures and to the coordinated functions characterizing living organisms is vanishingly small. The idea of spontaneous genesis of life in its present form is therefore highly improbable, even on the scale on billions of years during which prebiotic evolution occurred."

Or again (1972),

"... in a non-isolated system there exists a possibility for formation of ordered, low-entropy structures at sufficiently low temperatures. This ordering principle is responsible for the appearance of ordered structures such as crystals, as well as for the phenomena of phase transitions. Unfortunately this principle cannot explain the formation of biological structures. The probability that at ordinary temperatures a macroscopic number of molecules is assembled to give rise to the highly ordered structures and to the coordinated functions characterizing living organisms is vanishingly small."

Externality of Nature

We now consider the argument in reference to the spatiality of Hegel's concept of Nature as lacking in proper consideration of time that belonged more to Spirit and World history than nature. I do not think such a claim can be supported, and it was not demonstrated it in the argument given. For Hegel, Nature is characterized by externality. To say that Nature develops itself in space "beside each other" and not in the form of time "after each other" seems to neglect the fact that externality covers both phases of space and time. Therefore *Externality* and not space is the essential category of Hegel's concept of Nature. Hossele seems to be arguing from an existential platform so certainly we should expect to find a difference from conceptual reasoning. But that does not invalidate conceptual conclusions.

The Individual and the Concept

The next argument, I believe, involves some confusion over Hegel's statement as regards the "individual" and the connection of this statement in reference to the non-individual nature that evolution is concerned with. Hegel says,

"In Nature the Notion is however partly a mere inner principle, and partly and existence which is simply a living individuality; existent metamorphosis is therefore limited solely to this individuality."

It is clear to me that Hegel is saying here that certainly change or alteration occurs at an individual level in nature in the form of a living entity. We can easily observe life changing from gamete, to embryo, to fetus, to baby, to child, to youth, to adult, to old age, to death, and to dispersion. Enormous changes occur at the purely physical level. Hegel is not denying the obvious. But because this is a "living" entity there are two considerations that must be accounted for here – the physical existence and the inner subjectivity. Thus he says that the Concept is "partly" inner and "partly" existential. He limits this, however, to an individual only. To use individual embryological development in defense of evolution is wrong on the basis of the Concept being applicable at the individual level only. Evolution is a theory of non-individual or inter-individual or inter-species relationship, whereas the Concept is individually based. The autocatalytic reaction of proteins is quite within the Concept since within the individual gamete we find a whole world of micro molecular structures which in Hegel's argument undergo alterations which are again *partly* existential and partly inner. Protein autocatalysis will occur only within a certain well-defined environment. It cannot occur apart from that. The actual situation in a living environment is even more complex since replication only occurs for specific folding patterns of proteins, characteristic of tertiary molecules. Thus there is much more than simple self-development to consider here.

Irreducibility

It is interesting that the particulate conception of physics is gradually being converted into a more continuous picture of reality. Probabilistic treatments necessary for connecting macroscopic systems (such as ourselves) with microscopic phenomena (such as elementary particles) bring the participation of the observer into science. The whole basis of atomic theory has really been undermined. Hegel would welcome such developments and, one could argue, prefigured them.

Biology, which is a much younger field than physics, is still at the particulate phase of its development. One may wonder if a more field theoretic approach is in the future of biology. Eventually a more humanistic science may replace molecular biology just as we see happening in physics. Certainly biology should be more amenable to such considerations than physics, since reductionist theories do not work at all in biology. By taking a cell apart we kill the very living principle we wish to investigate. How can evolution ever expect to explain the formation of life in terms of a gradual construction from parts?

Are such future developments outside the realm of possibility? If the historical development of the idea follows the pattern of thesis, antithesis and then synthesis - atomic theory, field theory, and the synthesis of thought and being - we may find ourselves looking at a very new conception of biology in the not too distant future.

A Serious Problem

It is the need and the business of scientists to explain things. Given the world around us it is natural to ask how it all happened. If scientists are supposed to give the answer they need to say something. They can't say creation because of the reasons given above. Evolution sounds scientific though it really doesn't explain anything. I think this is why it is held onto so firmly. The real problem is that we don't have a serious

alternative. If Hegel has actually presented a rational way to understand Nature, I think we should test and develop that. I do not think his rejection of evolution invalidates his philosophy.

Darwin, himself, was extremely reluctant to publish his ideas because, as a good scientist, he knew they were not established on the basis of convincing scientific evidence. It was only after Wallace was going to print with his theories that Darwin reluctantly published his own. We should look at evolution with this fact in mind.

That the Idea in its immediacy should let itself go forth freely as Nature does not mean that we should allow Nature to fall from the embrace of Reason into the arms of understanding. The theory of evolution is the piecemeal work of analysis, understanding and imagination that is grounded more in imagination than hard empiric evidence. Reason becomes tired of all the possible combinations and permutations that it would have to have calculate to reproduce the evolution of life over billions and billions of years. Therefore it meekly surrenders itself to evolution rather than face such brain numbing tactics. This however, is not science or is certainly not the type of science upon which modern technology is built.

I have presented all these arguments because I would like to see Hegel's **Philosophy of Nature** given a chance. His opposition to evolution is not unfounded even though it may go against the majority view. In this endeavor to understand what he has presented we may find an alternative to the creationist and evolutionist arguments that will satisfy both.