

THE HARMONIZER

Science, Philosophy, Religion, and Art

All Branches of the Same Tree of Knowledge

February 2013

Editorial Board

Editor-in-Chief:

Sripad Bhakti Madhava Puri, Ph.D.

Editors:

Bhakti Niskama Shanta, Ph.D.

Bhakti Vijnana Muni, Ph.D.

Syamasundar Das, BA (Hons) Arch.

Jadu Krishna Das, BS Chem. Engr.

Layout / Design:

Jayadeva Das, BA Art Ed.

Links:

[Previous Issues](#)

[Skype Conferences](#)

[Subscribe to mailing list](#)

[Darwin Under Siege](#)

[Sadhu Sanga Blog](#)

Submit comments, questions, and articles via email to [Editors](#)

Donations for Bhakti Vedanta Institute accepted in the [USA](#) and [India](#).

Embryology, Developmental Biology, Evo-Devo

Bhakti Madhava Puri, Ph.D.

Does The Evidence Support Evolution?

The study of organisms within the range of their existence from fertilization to birth is referred to as **embryology**. The process of progressive change during that period is called development. That development does not stop at birth but continues on throughout the entire life-span of the organism as the process of growth and decay — catabolism, anabolism, and metabolism. The study of this entire range of life has recently become known as **developmental biology**. The belief that the development from an initial stage of a fertilized egg or zygote to a fully formed adult represents, in compressed time, the whole process of evolution that occurred over millions of years, has recently been named **evo-devo**, or evolutionary development.

It is interesting to note that with the advancement of biology, it also seems to be going backwards. While Louis Pasteur (1822—1895) had put to rest the concept of abiogenesis (the origination of life from non-living material) through his conclusive experiments, modern research into the origin of life (OOL) from chemicals continues to this day based on the principles discovered by modern biology concerning the fundamental chemistry of DNA and RNA that seem to be universally present in all life forms.

On the other hand, Ernst Haeckel (1834—1919) developed his controversial recapitulation theory to foster the idea of evolution, that ontogeny (embryological development) recapitulated phylogeny (a

term coined by Haeckel to represent the assumed historical evolution of a phylum/species). Scientists rejected that theory as being quite contrary to known facts of embryological development. There were both unreconcilable differences in embryonic structures of different species as well as temporal or sequential differences in their developmental stages. While such recapitulation was refuted at that time, today the field of evo-devo attempts to once again revive that old conception.



Louis Pasteur

Johannes Muller

Johannes Muller (1801—1858) had summarized what came to be known as the laws Karl von Baer (1792—1876) formulated for embryology. Charles Darwin (1809—1892) upon reading his summary, interpreted embryological similarities of different species to be convincing evidence that would support his theory of evolution. Of course, Muller was a vitalist who believed that the indivisible wholeness of the organism was due to a soul, for which purely physical laws could never account. In Darwin's eyes "community of embryonic structure reveals community of descent," as he would write in his *Origin of Species* in 1859. But such arguments at that time proved to be based on a very limited

knowledge of the details in the biology and morphology of organisms. With advancement of modern knowledge in biology, such vaguely based generalizations could not be maintained. [1]

Two early forms of embryology were embraced before 1830, namely, preformationism and epigenesis, both of which seem false by today's knowledge. Charles Bonnet formulated preformationism in 1745 arguing that adult forms reside in gametes and eventually unfolds or manifest as the organism develops. This type of unfolding was actually the original meaning of the term evolution. This led to the idea that a *homunculus* or miniature man resided inside the sperm and developed in the presence of the right environmental conditions. Epigenesis implies the exact opposite of preformationism, or stimulated development that is caused from the surroundings outside (epi-) the generation (genesis) of the organism.



Gregor Mendel



Francis Bacon

When Gregor Mendel (1822—1884) developed his idea of heredity, the internal concept of the preformationists was replaced by genetic factors. The external forces of epigenesis were transformed into the natural selection pressures postulated by Darwin. But embryology itself could not be explained by either of these two principles until recently with the discovery of DNA, where genetic and epigenetic processes have been described within the single cell of an organism.

Hans Driesch (1867—1941) was a committed mechanist but was forced to give up his strict allegiance to physics due to his studies in embryological development. In fact, he became an advocate of an entelechial force, or an internal teleological principle as the chief characteristic of living systems. [2] Physical modification, surgical deformation, and even genetic manipulation seem to be insufficient to create any radically new organisms when these procedures are performed at the embryological stage of their development. Although the crucial homeotic genes (homeobox genes) that determine the appendages and their location of appearance in an organism are damaged or replaced, there is morphological change but no change of species. The experiments on fruit flies, for example, over many generations have certainly produced modified insects with different numbers of legs at different

locations in the body but they are nonetheless still fruit flies. [3]

Hybrids or chimeras can be formed by combining genes from different species, but left in the wild these strains will revert to their original forms, become infertile or die. This cannot provide a vital method for explaining evolution. In general, until the supramaterial nature of life can be ascertained and the sentient principle acknowledged there will not be much progress made in establishing a science of the living organism.

The more science advances, the more it studies Nature in its intimate details, the more it comes to realize the existence of a pervasive reason, an inherent natural intelligence that is working in even the most insignificant portions of the universe. Francis Bacon (1561–1626) said, “A little philosophy (science) inclineth man's mind to atheism, but depth in philosophy (science) bringeth men's minds about to religion.” This point is especially true today. It is not from ignorance that men come to have faith in God, but from a maturity of reason and experience.

Vedanta philosophy teaches that there is a conscious intelligence that underlies all experienced existence. Being self-evident, this should hardly have to be argued. Yet modern science has failed to integrate this truth into its materialist/naturalistic paradigm. Correcting this deficiency will be the challenge of 21st century science, and the highest reward for humanity.

References

1. Richardson, M. K., Hanken, J., Gooneratne, M.L., Pieau, C., Raynaud, A., Selwood, L. & Wright, G.M. (1997). There is no highly conserved embryonic stage in the vertebrates: implications for current theories of evolution and development. *Anatomy and Embryology*, 196, 91-106.
2. Bhakti Vijnana Muni, Ontological Wholism and Soul is the Concept of Developmental Biology, *The Harmonizer*, February 2013 (this issue).
3. “In the best known organisms, like *Drosophila*, innumerable mutants are known. If we were able to combine a thousand or more of such mutants in a single individual, this still would have no resemblance whatsoever to any type known as a [new] species in nature.” Richard B. Goldschmidt, “Evolution, As Viewed by One Geneticist,” *American Scientist*, January 1952, p. 94.

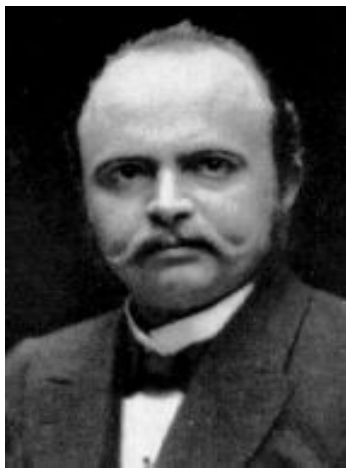


Ontological Wholism and Soul is the Concept of Developmental Biology

A review of the experiments and scientific conclusions of Hans Adolf Eduard Driesch
Bhakti Vijnana Muni, Ph.D.

Life of H. A. E. Driesch

Hans Adolf Eduard Driesch was a leading experimental biologist and philosopher during the early 20th century. He found concepts like soul and entelechy meaningful. He established the concept of pluri-potency in embryology and explained that organism can't be explained without the concept of soul. Life force is to be considered mind-like, non-spatial, intensive and qualitative.



Hans Adolf Eduard Driesch

Crisis in Embryology and Evolution Theory

Evolutionary biologists claim evolution is compatible with development. Eugenie Scott, Executive Director of the NCSE, USA claims, "When explaining biological questions, such as the evolution of the eye, there is no need to say that God had nothing to do with it. It's an irrelevant comment. [1]" In the guise of methodological naturalism life's deeper questions are thereby neglected. Evolution being considered as merely a contingent phenomenon, cannot explain purpose in sentient organisms.

Haeckel's ideas and his embryological drawings have been proved to be fakery designed to dogmatically support Darwinian evolution. Blechschmidt, wrote, "The so-called basic law of biogenetics is wrong. No buts or ifs can mitigate this fact. It is not even a tiny bit correct or correct in a different form. It is totally wrong." [2] Kalinka remarks, "Despite its intuitive appeal, the principle of early embryonic conservation has not been supported by morphological studies. Counter to the expectations of early embryonic conservation, many studies have shown that there is often remarkable divergence between related species both early and late in development, often with little apparent influence on adult morphology." [3] Even in the popular pharyngula stage biologists have found considerable variability at the purported phylotypic stage. It is reported in *Nature*, "However, both the model and the concept of the phylotypic period remain controversial subjects in the

literature, with some studies of heterochrony in vertebrates indicating that divergence peaks at the phylotypic period or that there is no temporal pattern of phenotypic conservation." [3]

Driesch proved three major points, (1) the equivalence of the blastomere nuclei, (2) the regulative capacity of the egg and, (3) an interaction between two blastomeres in normal development. It indicated that every cell of an organism has the same genome and hence the differentiation should proceed due to the cytoplasmic differentials. Harrison remarked, "the prestige of success enjoyed by the gene theory might easily become a hindrance to the understanding of development by directing our attention solely to the genome, whereas cell movements, differential, and in fact all developmental processes are actually effected by the cytoplasm."

Weismann and Roux: Non-epigenetic assumption in development

For Weismann, epigenesis can never form the foundation of a real morphogenetic theory. Weismann's theory corresponded to two parts. He assumed that a very complicated structure below visibility limits located in the nucleus of the germ cells is the foundation of all morphogenetic processes. A part of this structure was the basis of heredity. Another part directed development and disintegrated during nuclear division. Thereby the germplasm successively reduced in genetic information during somatic cell division. At the end of organogenesis this structure is assumed to have been localized in the cells and broken up into its elements. Roux's *Entwicklungsmechanik* or developmental mechanics is similar. Roux experimented on eggs of frogs where he took two and four cell frog embryos (blastomere stage) and killed half of the cells of each embryo with a hot needle. Embryo was seen to emerge from the remaining blastomeres and at a certain stage was as if half cut of a fully formed embryo. Then he proposed his "mosaic theory of epigenesis" that after a few cell divisions the embryo would be like a mosaic, each cell playing its own unique part in the entire design.

Driesch disproves Mosaic theory of Epigenesis

Driesch repeated the experiments of Roux on Sea Urchin. He shook its germs during their two-cell stage. He succeeded in

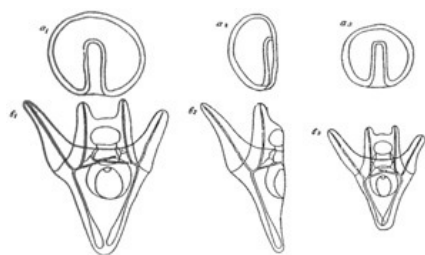


Fig. 1: Sea Urchin whole embryo

stages were just half of the normal ones. The stage corresponding to the normal 16 cell stage was built up of 8 elements only in his subject. It showed two micromeres, two macromeres, and four cells of medium size. This was exactly as if the normal 16-cell stage had been cut in two. Even the form of the whole was that of a hemisphere. But soon Driesch found a small but whole gastrula was formed followed by a whole and typical small pluteus larva (Fig. 1). This was completely opposite to Roux's observations. He repeated the results for several cases like separating one of the first four or three of the first four blastomeres and they also developed into whole organisms. The implications were immediate. It became impossible to allow that nuclear division had separated any sort of germplasm into two different halves. Not even the protoplasm of the egg could be said to have been divided in the first cleavage furrow into unequal parts. This experimental observation alone was sufficient to overthrow the *Mosaic theorie*.

He also did experiments by raising the temperature of the medium, by diluting them by sea water or by applying pressure. As neighboring sequences during the developmental stage did not affect the final form of the organism, it implied that there cannot be any close relation between single nuclear division and organogenesis in the sense implied by Roux. Instead of a morphogenetic chaos there was normal organogenesis. He confirmed these with experiments on the eggs of frog, annelids and ciona. Driesch surmised that in the protoplasm there must be some sort of intimate structure which includes polarity and bilaterality as its chief features of its similarity. This must belong to even the smallest element of the egg. He did experiments with Morgan on the eggs of ctenophore. By cutting some mass of protoplasm just before the beginning of cleavage, it resulted in a larvae that had exactly the same type of defects as present in the larvae developed from one of the first two blastomeres alone. This proved that a defect in one side of the protoplasm resulted in a corresponding defect in the adult organism as was the result in Roux experiments. After killing one of the first two blastomeres, as was done in the experiment of Roux, Morgan was able to bring the surviving one as to a half or a whole development depending upon whether it was undisturbed or turned. Thus whole or partial development may be dependent on the power of regulation contained in the *intimate polar-bilateral structure* of the protoplasm. There was a good deal of epigenesis in ontogeny.

Distribution of prospective value and prospective potency

The real fate of each embryonic part in its line of morphogenesis is its *prospective value*. *Prospective potency* signified the

killing one of the blastomeres and sometimes two blastomeres separated from each other. The isolated cell went through cleavage just as it would have done in contact with its sister cells. The cleavage

prospective fate of those elements. *Prospective potency* of single cells of blastula of sea urchin is the same for all of them, at least around its axis. But the *prospective value* of any blastula cell is a function of its position in the whole. As in the blastula, endoderm as well as ectoderm, *prospective potencies* are the same for each element. At the moment where the future intestine is marked in the blastoderm, but which has not yet differentiated into a tube, if the upper half of the larvae is separated from the lower half by an equatorial section, it results in a complete larva from the section which contains the anlage of the endoderm. The other half will proceed well into morphogenesis but will form only the ectodermal organs. Similarly if endoderm is separated, it is able to form only those organs as are normally derived from it. Though the ectoderm and endoderm have potencies equally distributed amongst their respective cells, they possess different potencies compared with each other. They are *equipotential* in themselves but that varies from one another. There are potential embryonic restrictions at later stages. Important differences exist between germs of different animals with regard to the degree of specialization of their cleavage cells. Some eggs would be typically more specialized at the beginning of morphogenesis than others. Maturation thus becomes a part of ontogenesis. In every sort of egg there occurs an earliest stage, in which all parts of its protoplasm are equal as to their prospectivity and there is no potential diversity or restriction of any kind.

Driesch calls elementary functions of the organism as internal means of morphogenesis. Secretion, migration, cell division, aggregate state of organism, osmotic pressure and surface tension are examples. Process of growth and capillary effects are results of specialized metabolism at the surfaces. It is the form of the organism as a whole and not merely the individual cell that is subject to regulation processes. Is there a mathematical equation that is discoverable about any phenomena of constantly connected organisms? Thermodynamics applies the term in a linear sense and restricts any deeper and particular study of nature. Cause of morphogenetic change is that typical change, quality, or property on which certain character depends. For example, that which at one time becomes intestine, at another time manifests as lens of the eye. Driesch claimed that *prospective potency* applied to that elementary organ from which the new process takes its origin. Each elementary process not only has its specification in the development process but also has its typical place in the whole – its locality.

Light and gravity are external formative causes. Galls of plants are examples of such organogenetic effects of such stimuli. The potencies of the plant and external stimuli equally contribute to their specification. Indeed every embryonic part may in some respect be the cause of morphogenetic events that are to occur in every other part and roots of epigenesis are to be found here. Heliotropism and geotropism are the two well known physiological functions in plants. Herbst argued that such directive stimuli are also at work among the growing or wandering parts of the embryo. Transplantation

experiments have proved that innervation may occur in very abnormal ways. Lens of the eye of certain amphibia is formed of their skin in response to a formative stimulus proceeding from the primary optical vesicle. If this vesicle fails to touch the skin, no lens appears. The lens may appear in quite abnormal parts of the skin if they come into contact with the optic vesicle after transplantation. After the eyes have been cut off in a crayfish, they are regenerated in the proper way if the optic ganglion was present. But an antenna will arise if the optic ganglion was also removed.



Hans Spemann, Nobel Laureate Spemann coined terms like *homogenous induction* if an implanted part makes another cell equal to itself and *heterogeneous induction* for action of formative stimuli proper. Spemann calls the ultimate source of all these formative influences as organizer. The original organizer may influence the secondary ones, etc. The Spemann school has shown the triton embryo to be *equipotential* to an unexpected degree. *Equipotentialities* refer to the primary potencies. Spemann was awarded the Nobel Prize in 1935 for the discovery of the organizer center. Spemann showed that different parts of the organization centre produce different parts of the embryo. Spemann thus laid the foundation of *experimental morphogenesis*.

Embryological processes occupy particular and specific temporal positions within a precise and well-ordered sequence of events. For some reason if it does not take place when due it never takes place. Herbst suppressed growth of intestine in gastrula of echinoderms by removing potassium from sea water. *Synchronic metamorphosis* is the result when we implant embryonic eyes or gills of a salamander upon a host of greater age, which becomes its temporal rule. Fundamental and important aspects of organogenesis occur in quite separate lines. The processes may begin from a common root but become absolutely independent of one another in their manner of differentiation. Its sense is always relative and negative, yet the result is holistic. Echinoderm acquires a mouth even in cases where there is no intestine present. Yet ectoderm and endoderm are both formatively dependent on the intimate organization of the blastoderm. In the sense of receiving stimuli properly there is causal harmony. Functional harmony is the descriptive unity of the organic functions. A threefold harmony among parts is evident in individual morphogenesis.

Problem of Morphogenetic Localization

At that time the analytical problem of morphogenesis was centered on three elementary concepts: *prospective potency*, *means* and *formative stimuli*. Is it possible to reduce the organism to a machine by such elemental analysis? Driesch calls the blastoderm of the echinoderms as well as the germ layers of

these animals as *equipotential systems*. In higher plants there is a system which is called the organ proper of restitutions (regeneration). Potencies are of complex types. They consist of producing the faculty of wholeness of a complicated organization, such as a branch or root. Driesch called his *equipotential systems* with single potency as *singular equipotential systems*. Potency of any element consists in the possibility of many single acts. The reaction of one and the same cell varies according to the nature of stimulus. There exists a sort of inner harmony in every case among the real products of the morphogenetic systems. These products are due to the inner forces of the systems exclusively, and hence, they are *harmonious-equipotential systems*. The critics point out, that the germ, e.g. in the shape of sixteen cells, might be regarded as a typically ordered physico-chemical system. But Driesch draws our attention here to the experimental results. If we take away one of the first four cleavage cells, the result is the normal one. If in 16-cell stage, we take away two micromeres, one macromere, and three mesomeres—and thus allow development to start from very “unharmoniously composed” conditions, the results are still normal. In the face of such experimental results, physico-chemical explanations break down completely.

The chemical theory cannot account for the fact that a differentiated organism is unique each time in locality, quantity, and form. Morphogenesis consists of a certain rather limited number of truly different morphogenetic elements occurring again and again, although there is large number of participating compounds. Atoms and molecules by themselves can only account for form which is arranged, so to speak, according to spatial geometry as in fact they do in crystallography. But they can never account for form such as the skeleton of the nose, hand, or foot as specificity of organic form does not go hand-in-hand with specificity of chemical composition. In harmonious-equipotential systems, development is not fragmental but whole, even after parts have been taken away albeit at a smaller scale. As every element of one volume may play any possible elemental role in every other, it follows that each part of the whole harmonious system possesses any possible elemental part of the machine equally well, all parts of the system at the same time being constituents of different machines. This is a very strange sort of machine indeed, which is the same in all its parts. Here Driesch explains ‘*The Autonomy of Morphogenesis*’ is proven. Something else other than the constellations of single physical and chemical acts accounts for organic development. Life is not a specialized arrangement of inorganic events and biology cannot be just applied physics and chemistry. Life is something apart and biology an independent science. Driesch styles this as ‘*the autonomy of life*’. He introduced Aristotle’s concept of entelechy to explain causality of morphogenesis. Entelechy therefore governed the morphogenesis of the embryo. This is the unfailing relative condition of formative causes and recipient causes.

Morphogenic Fields

Morphogenic fields, also called morphogenetic fields, are a concept proposed by Sheldrake [7]. These are fields of thought created by everything in existence. Mass consciousness is an

example. Individually and collectively, as thoughtful and emotional beings, we constantly contribute to the development of our world. Fields of consciousness or morphogenic fields can be accessed easily according to our individuality. A high level of resonance for peace increases the possibility that we will access peace easier and draw to ourselves peaceful experiences. According to Sheldrake the most difficult part for most to accept is the fundamental idea that information, created by and retrievable by physical systems, can be transmitted and stored in a non-physical form. Experimental support for materialism has been crumbling. There is "instantaneous communication" as implied by Bell's theorem in quantum physics. Solid experimental demonstrations exist for psychic abilities. Accepting the idea of morphogenetic fields also opens the door to the scientific investigation of the idea that consciousness and mental processes can function without physical support. In the field of developmental biology there is already an intense research as to how the morphogenic fields arise. Despite long-standing interest, merely molecular mechanisms cannot explain morphogenetic fields that self-regulate embryo development. Including the foundational field of consciousness is essential in developmental biology [4]. Eugene Marais also notes in his work on white ants that whole behavior of termite is determined from without by an influence which we may call as a thread by which it is firmly tied to the queen's cell. This invisible influence streams from the organism of the queen alone and is a power beyond our senses that can penetrate all material barriers including thin steel or iron plates. Distance lessens this influence and can function only between fixed limits, while the somatic death of the queen destroys the influence immediately. Every termite is under the influence of this power. If there are two termitaries situated close to each other, the power of each queen operates in both nests. It is through this psychological power of the queen that the termites of one nest are capable of recognizing their fellow-citizens and discovering strange intruders [5].

Entelechy, Soul, and Final Cause

Aristotle's entelechy is in permanent opposition to dogmatic mechanism. In *de Anima* Aristotle explains soul as the first principle of life. Driesch concludes that it is nothing of any extensive character. He refers to entelechy as an "*intensive manifoldness*". Thermodynamics offers no special ontological problem with regard to entelechy. The true problem for Driesch is: "by what single acts does the restoration of 'equilibrium' take place here, especially in those cases in which it is proved that entelechy is at work . . ." There is a kind of overcoming of inorganic nature by the Organic. It possesses this faculty without being of the nature of energy at the same time. Soul is a qualitative, non spatial, intensive non-physico-chemical existence. Life is continuous. A certain portion of matter that stands under the control of entelechy is handed down from generation to generation. Entelechy or final cause is always active and is already there to begin with. Spirituality thus proves to be true. Driesch concludes, "Indefinitely repeated bodies must possess a specifically complex character, and must originate from

their own kind, if the processes leading to them or restoring them are to be called teleological." [6, 7]

Conclusions: Harmony of Science and Religion in 21st Century

The disagreement between different schools is how to define evolutionary novelty and understand its significance. Origin of novelties like origin of fins in fish, or the so called fin-to-limb transitions, evolution of feathers, and so on, stand disputed. There is a lack of a sufficient body of principles for translating between genes and phenotypes. In evo-devo, the demand of insights from developmental researchers has put the concept of novelty into the center of evolutionary research. A novelty is a qualitatively new structure with a discontinuous origin. This is a knowledge paradigm and a semantic debate especially in the view that information in genes is actually a message and a code [8]. The biological idea of Aristotle is that the soul is its first principle and Driesch agreed based on his experiments. Internal teleology is there in ontogeny. Vedanta calls the concept of life as *atman* and its chief symptom is consciousness. Wherever there is life, there is consciousness and wherever there is consciousness, there must be life. Consciousness is the immediate existential concept of life. That is the only practical deduction from empirical considerations of research leading up to the 21st century. Scientists are no longer afraid of a scientific critic of science.

The author is indebted to his spiritual masters Sripad Bhaktisvarupa Damodar Swami, Ph.D. and specifically to Sripad Bhakti Madhava Puri Maharaja, Ph.D. for guiding him through this work.

References

1. <http://ncse.com/news/2009/06/eugenie-c-scott-interviewed-science-004823>
2. Blechschmidt, Erich (1977), *The Beginnings of Human Life* (New York: Springer-Verlag).
3. Kalinka et. al., "Gene expression divergence recapitulates the developmental hourglass model", 9 Dec, 2010, Vol. 468, *Nature*, pp. 811-814.
4. Gilman, R., *Morphogenetic Fields And Beyond*, an interview with Rupert Sheldrake, <http://www.context.org/iclib/ic12/>
5. Marais, E.N., *The soul of the white ant*.
6. <http://www.giffordlectures.org/Browse.asp?PubID=TPSAPT&Volume=0&Issue=0&ArticleID=7>
7. <http://www.giffordlectures.org/Browse.asp?PubID=TPSAPO&Volume=0&Issue=0&ArticleID=4>
8. Brigandt, I., *Beyond reduction and pluralism: toward an epistemology of explanatory integration in biology*, Dept. of Phil., University of Alberta, Edmonton, Canada.



A Scientific Basis for the Vedantic View of Biodiversity

Bhakti Niskama Shanta, Ph.D.

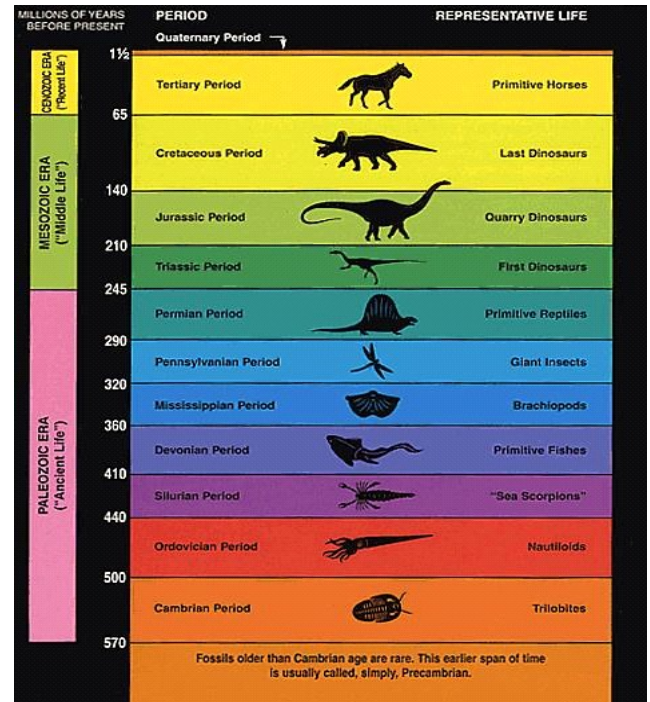
In the January 2013 issue of *The Harmonizer* we responded to the criticism of one evo-devo expert who surprisingly stated that “even Darwin recognized that geology provided the *least* amount of evidence for evolution”. Despite the well recorded fact of the continual grand propaganda of Darwinism based on fossil evidence for more than 150 years, in recent times a few biologists are surprisingly coming up with such statements, based on their confidence that evolution can be explained purely by the genealogical-genomic record provided by modern molecular biology. Still many respected journals (e.g., the *Nature* article by Retallack, 2013) continue to publish articles on fossil evidence to support Darwinian evolution. These incoherently diverse claims prove that Darwinists are struggling with unscientific ideological approaches to explain biodiversity.

Darwinian evolutionary theory is not only the basis of modern biology, but also acts as the guiding principle of science and intellectual reasoning for modern civilization. Hence, a scientific understanding of the breakdown of the Darwinian theory of objective evolution is very important for overcoming the traditional scientific temper of mechanistic intellectualism that characterizes this ideology. In my article “21st Century Biology Refutes Darwinian Abiology” (published in two parts in November and December 2012 issues of *The Harmonizer*) it was noted that several recent findings challenge the credibility that random mutations and natural selection can provide a valid basis for justifying the naturalistic evolution of species. The present article summarizes the problems associated with the fossil record and dating techniques, and its implication on the neo-Darwinian, mechanistic misconception of biological life as mere molecular chemistry or abiology. An alternative approach based on the *Vedāntic* view for explaining biodiversity in the light of 21st century biology is also discussed in the end of the article.

Geological Chronology

To illustrate the timing and relationships between events that have taken place throughout the history of the globe, geologists, paleontologists, and other earth scientists use the geologic record represented by consecutive layers of rock strata to provide a scheme for chronological measurement. The geological column is also known as the stratigraphical column and is the most commonly used representation for estimating geological time (Cambrian, Ordovician, Silurian, Devonian, Carboniferous, Permian, Triassic, Jurassic, Cretaceous, and Tertiary). A doctrine that is called uniformitarianism was first proposed by James Hutton in his ‘*Theory of the Earth*’ in 1795 and developed further by Charles

Lyell in ‘*Principles of Geology*,’ first published in 1830. This doctrine explains that the causes that changed the Earth’s



surface in past geologic times are identical to causes now producing changes on the Earth’s surface. Following this assumption, geologists believe that because sediments are presently observed as being laid down layer by layer, so they must have for all time been laid down gradually in a similar way. By estimating the rate of this sedimentary process they calculate that a certain thickness of sedimentary rock must symbolize, in certain circumstances, millions of years of time. This hypothetical representation of Earth’s surface as an ‘onion skin’ with successive layers representing the events throughout the history of the globe was, however, never substantiated with enough experimental or empirical evidence. Now, recent developments in the field are providing the greatest challenge to this widely used archaic methodology and its conclusions.

Fossil Record

The number of species known through fossil records is insignificantly small as compared to total species. Raup (1981) stated in his paper in *Science*, “In the years after Darwin, his advocates hoped to find predictable progressions. In general, these have not been found—yet the optimism has died hard, and some pure fantasy has crept into textbooks.” The fossil

record suffers four major defects that are principally incompatible with gradualism: (a) stasis, (b) sudden appearance of forms, (c) sudden disappearance of forms, (d) relative absence of transitional forms. Stephen J. Gould (1977), Professor of Zoology and Geology, Harvard University, USA, stated that the history of most fossil species is particularly inconsistent with gradualism: "Stasis. Most species exhibit no directional change during their tenure on earth. They appear in the fossil record looking much the same as when they disappear; morphological change is usually limited and directionless." Many similar observations in the literature establish that species preservation is a natural characteristic of life. Life's ability to preserve its own species over the period of hundreds of millions of years ('Stasis' in the fossil record) offers a significant challenge to Darwinian gradualism. Empirical evidence substantiates the fact that the new species did not evolve but suddenly appeared in geologic column. This is also famously known as 'Darwin's Dilemma.' Darwin (1869) himself was perplexed that the fossil record disagreed with the claims of his evolution theory and believed that future fossil discoveries would help solve this major problem. However, Gould (1995) reported just the opposite: "The Cambrian explosion occurred in a geological moment, and we have reason to think that all major anatomical designs may have made their evolutionary appearance at that time. . . not only the phylum Chordata itself, but also all its major divisions, arose within the Cambrian Explosion. So much for chordate uniqueness. Contrary to Darwin's expectation that new data would reveal gradualistic continuity with slow and steady expansion, all major discoveries of the past century have only heightened the massiveness and geological abruptness of this formative event." The fossil record also reveals that in the history of life, several flourishing species were often suddenly wiped out. For example (Web Reference, 2), Ordovician-Silurian mass extinction (third largest extinction in Earth's history), Late Devonian mass extinction (Three quarters of all species on Earth died out), Permian mass extinction—The Great Dying (96% of species died out) and Triassic–Jurassic mass extinction (50% of species died). This is a big setback to conventional gradualistic mechanisms of Darwinian evolution. The same is reported by Fitch and Ayala (1995), "Many of the extinctions recorded in the fossil record are of species or large groups of species that were ecologically tolerant and occurred in great numbers in all parts of the world. If these extinctions were caused by slow declines over long periods of time, as Darwin thought, they might be explicable in terms of the cumulative effect of very slight deficiencies or disadvantages. But it is becoming increasingly clear that successful species often die out quickly." Moreover, convincing transitional forms are never observed to substantiate gradualist mechanisms of Darwinian evolution. Gould (1977) confirms the same: "In any local area, a species does not arise gradually by the steady transformation of its ancestors; it appears all at once and 'fully formed.'"

The role of geological chronology

Following Darwin's ideas that evolutionary changes are gradual and slow, macro-evolution is often explained on the scale of

geological time—measured in hundreds of millions of years (Web Reference, 3). However, as explained above, the evidence from the fossil record is substantially in disagreement with this gradualist, uniformitarian assumption of Darwinism. Recently, Kuhn (2012) in his article "Dissecting Darwinism" raises suspicion about the validity of the fossil data: "A reliance on gross morphologic appearances, as with fossils, drawings, and bone reconstructions, is severely inadequate compared to an understanding of the complexity of the DNA and coding that would have been required to mutate from a fish to an amphibian or from a primitive primate to a human." In the midst of many such perplexities, what is lacking is a thorough investigation into the accuracy of the dating technologies that are often presumed. Geologic chronology or a coherent history of the Earth is heavily dependent on the accurate understanding of the ages of rock formations. Radiometric dating and Stratigraphy are the two pillars of geological chronology and they are often employed to date fossils without considering the accuracy of these techniques. A general notion among academic circles is that radiometric dating is extremely trustworthy. However, the reality is completely the reverse. Way back in 1950 it was famously stated that radiometric dates are like railway timetables and they are subject to change without notice (Whitten and Brooks, 1972). Hence a thorough investigation into the accuracy of geological chronology is very much essential. To date there are only a very few discussions in the literature on the authenticity of geological chronology. In the light of recent finds and reported empirical evidence, the author made an attempt to summarize the current standing of the two pillars (Radiometric dating and Stratigraphy) of geological chronology. **The complete article can be found online.** This article is an abridged version of the same.

The Roles of Stratigraphy and the Geologic Column in Darwinian Evolution Theory

In his book, *A History of Geology* (1990), Gabriel explained that the rate of deposition of sediments determines the geological ages and not biological evolution or orogeny. Therefore Stratigraphy remained the only basis of geological dating. In the 17th century Danish scientist Nicolas Steno (1669) formulated the basic principle of Stratigraphy based on three major assumptions: (1) Principle of superposition, (2) Principle of continuity, and (3) Principle of original horizontality. Steno, by assuming all rocks and minerals had once been fluid, theorized that rock strata were formed when sediments in a fluid such as water fell to the bottom. Obviously this method would lead to horizontal layers and is the reason why Steno's principle of original horizontality states that rock layers form in the horizontal position. Nicolas Steno also stated that if a solid body is enclosed on all sides by another solid body, of the two bodies, that one first became hard which, in the mutual contact, expresses on its own surface the properties of the other surface.

Steno's explanation popularized the idea that fossils and crystals must have solidified before the host rock that contains them was formed. In geology a stratum is known as a layer of rock with consistent uniqueness that distinguishes it from the

adjacent layers. Following Steno's idea, scientists believe that these parallel layers rest one upon another in the rocks due to natural forces. In cliffs, road cuts, quarries, and river banks, strata can be characteristically observed as bands of dissimilar colors or differently structured substances. In general, geologists analyze the rock strata by categorizing the layers with respect to the material content within them. Each layer represents a particular type of deposition of beach sand, sand dune, river silt, coal swamp, lava bed, etc. A typical stratigraphic column shows a series of sedimentary rocks, with the oldest rocks on the bottom and the youngest on top. Thus stratum is an essential fundamental element to study geologic time scale. Geologists, paleontologists and other earth scientists use the stratigraphic principle to describe the timing and relationships between events that have occurred during the history of the Earth. Evolutionists recognize the age of the fossil according to the geologic time scale based on the vertical location of the strata in which the fossil was discovered. Hence fossils obtained from the bottom of the geologic column are recognized by evolutionists as the most ancient fossils.

Practical Defects in Nicolas Steno's Principles of Stratigraphy

Steno's three basic assumptions on which stratigraphy stands were never substantiated by either experimentation or empirical evidence. French sedimentologist Guy Berthault



Guy Berthault

recognized these defects in Steno's assumptions and carried out the most fundamental experiments on sedimentation at Colorado State University with Pierre Julien (Professor of hydraulics and sedimentology) to evaluate the validity of Steno's assumptions (Berthault, 1986; Berthault, 1988; Julien and Berthault, 1993; Julien et al., 1993; Berthault, 2002). The technical problems with each of these three assumptions by Steno (1667) are discussed below.

Defects in Steno's First Assumption – Principle of Superposition [(i) *At the time when one of the high strata formed, the stratum underneath it had already acquired a solid consistency, and (ii) At the time when any stratum formed, the superincumbent material was entirely fluid, and, due to this fact, at the time when the lowest stratum formed, none of the superior strata existed* (Steno, 1667, p. 30, CII. 3.d.)]:

A stratum is considered as thick if its thickness is about 50 to 100 cm. Following the first part of Steno's first assumption we would expect solid strata after a few meters in the seabed. However, the evidence recorded from the submarine drillings of deep seabed reveal that the first semi-consolidated sediments are found between 400 - 800 m. Isolated, hardened chert beds are found below 135 m of unconsolidated sediments (Logvinenko, 1980). These sedimentological evidences challenge Steno's successive hardening assumption which extends significantly the total time of deposition.

The second part of Steno's first assumption is not found to be in line with experimental data obtained by Guy Berthault in Colorado State University. Steno mentioned that "Strata owe their existence to sediments in a fluid" (Steno, 1667, p. 30, CII.3c). However, Steno's stratigraphic model completely overlooked the fluid current and its chronological effects, which is the major variable factor in oceanic fluid. We cannot find an ocean without current and it is well known from a long time that oceanic currents erode, transport and deposit sediments (Strakhov, 1957). When the experiments were carried out by Guy Berthault in a hydraulic channel with a horizontal current under constant discharge condition, it was observed that laminated layers developed laterally in the direction of the current. It was observed in the experiments that by varying the current velocity a superposed stratification can be obtained based on the segregation of particles by size. It must be noted that the experimentally observed superposed stratification is completely independent of time of deposition of heterogeneous particles and thus disproves Steno's principle of superposition as an indication of relative time. The videos (Web Reference, 5) in flume experiments clearly show that in the presence of a variable current, stratified superposed beds progress simultaneously in the direction of current. If we take a horizontal cross section of the deposition we can clearly visualize the stratification, and each of those beds from top to bottom were deposited at the same time. Following the trend, it is obvious that the deposition in the downstream of fluid flow is always younger than the deposition in the upstream. These fundamental experiments in sedimentation prove that the chronology of deposition is dependent on the direction of growth of superposed beds (direction of fluid current) and is independent of thickness of deposition.

Defects in Steno's Second Assumption – Principle of Continuity

[Strata owe their existence to sediments in a fluid. At the time when any stratum formed, either it was circumscribed on its sides by another solid body, or else it ran around the globe of the earth (Steno, 1667, p. 30, CII.3c.)]:

This is certainly an unrealistic assumption because we cannot find any single evidence where a sedimentary layer is extended globally (all around the Earth). Long back in the 19th century, geologists concluded that facies alteration is a direct refutation of Steno's principle of continuity. Geologists (Young, 1982, p. 44, 51-54; Mintz, 1977, p. 6-7, 18-19) accept that, "At the time when any stratum formed, either it was circumscribed on its sides by another solid body, or else it ran round the globe of the Earth." There are also cases in which even though continuity was established, they suffer from a time-equivalence crisis (Dunbar and Rodgers, 1957, p. 272). Byers (1982, p. 219) also states,

"For over a century we have known about facies change. Facies change is a violation of the purest form of lateral continuity, which says that strata extend without change to the basin margin."

Defects in Steno's Third Assumption – Principle of Original Horizontality

[At the time when any stratum formed, its lower surface, as also the surfaces of its sides, corresponded with the surfaces of the subjacent body and lateral bodies, but its upper

surface was (then) parallel to the horizon, as far as it was possible (Steno, 1667, p. 30. C.II. 3.4.).]:

This assumption is also far from confirmed by empirical observations. The horizontality assumption demands a uniform sedimentation rate globally. In reality, sedimentation involves extremely complex phenomena and rate of sedimentation depends on several local physical and biological factors (Schneidermann et al., 1976). The rate of sedimentation cannot be identical in different oceans all around the Earth. Geologists unanimously admit that Steno's assumption about global scale horizontal layers is generally untrue (Press and Siever, 2001, p. 392, 396). A basic geology textbook by Press and Siever (2001) explains that seismic cross-sections of continental slopes and other areas of the ocean floor confirm that sediment layers are often not deposited in a strict horizontal direction. Furthermore, submarine coring and seismic analysis reveals that strata in oceanic sediments are not always horizontal (Web Reference, 6). G.K. Gilbert explained long back in 1885 (Boggs, 1995, p. 362) that sands are time and again not deposited horizontally. Berthault (2002, p. 445) also reported:

"the experiments reported in my second paper to the Academy of Sciences, as well as experiments conducted by P. Julien and presented as the video, Fundamental Experiments on Stratification, at several sedimentological conferences, clearly shows that up to the limit of the angle of repose (30 degrees to 40 degrees for the sands), the lamination of sediments is parallel to the slope... The principle of horizontality does not apply in this case."

Is the "Chronology of the Geologic Column" Drowning in the Mud?

The simplistic model based on Steno's erroneous assumptions ignores the effects of fluid and sediment parameters. Recently, a series of experimental observations in sedimentation reveal the vital role of those ignored parameters on the pattern of stratification. Guy Berthault's inspirational work (Berthault, 1986; Berthault, 1988; Julien and Berthault, 1993; Julien et al., 1993; Berthault, 2002) on the most fundamental experiments on sedimentation created a revolution in experimental sedimentology and thus instigated a more rigorous experimentally-based approach in this field. For example, the world's leading scientific journal *Nature* also published (Makse et al., 1997; Fineberg, 1997) similar experimental work that Berthault initiated. The geological chronology based on Steno's simplistic theoretical model did not incorporate the influence of fluid and sediment parameters that are reported by these experiments. Hence, these prestigious publications and their conclusions further invalidate the widely used naive geological chronology.

Much beyond that, shale sedimentology is undergoing abundantly rapid paradigm shifts and a series of novel sedimentology experiments and observations on this are reported by Juergen Schieber from Indiana University, Bloomington and his colleagues (Schieber et al., 2007; Schieber and Southard, 2009; Schieber and Yawar, 2009; Schieber et al., 2010; Schieber, 2011). It is very important to note that the

majority of the sediments in the world are mudstones (Schieber et al., 2007), which include shale and clays. Despite much advancement in the field, sedimentologists still believe that muddy sediments are highly complex systems and a staggering 32 variables and parameters are required to be considered for a reasonable physicochemical interpretation (Berlamont et al., 1993). Being ignorant about this complexity and also significantly influenced by Steno's simplistic ideas, in the past geologists presumed that mudstones formed only in tranquil, unruffled seas. Disproving this now outmoded model and practically confirming this complexity in his experiments, Schieber (2011) concludes,

"Essentially, the experiments presented here demonstrate that many long-held assumptions about mud deposition and erosion do not agree with physical realities. Examination of the rock record increasingly shows that, once studied in some detail, shales and mudstones contain such a bewildering variety of textures and structures that one may indeed wonder whether the inherent questions about depositional conditions have any hope to ever be answered in full. By necessity, experimental approaches to the sedimentology of shales will therefore have to be as varied as these rocks themselves."

Schieber and Southard (2009) reported in *Geology* that mudstone particles can produce ripples, identical to those found in sand. Thus shales or mudstones are vulnerable to climatic conditions and hence are very much defectively understood compared to other types of sedimentary rocks. Schieber et al. (2007) reported a unique experimental study in *Science*, which states, "Our observations do not support the notion that muds can only be deposited in quiet environments with only intermittent weak currents. . . . Instead, bedload transport of flocculated mud and deposition occurs at current velocities that would also transport and deposit sand." Schieber et al. (2007) finally conclude,

"This, in turn, will most likely necessitate the reevaluation of the sedimentary history of large portions of the geologic record."

These novel experimentations and observations are clearly making 'Chronology of the Geologic Column' to drown in the mud. Macquaker and Bohacs (2007) fittingly remarked in *Science* concerning this article (Schieber et al., 2007) in the same issue:

"The results call for critical reappraisal of all mudstones previously interpreted as having been continuously deposited under still waters. Such rocks are widely used to infer past climates, ocean conditions, and orbital variations."

Hence, the stratigraphic model is found to be based on completely false assumptions. It is also observed from the evidence that radiometric dating techniques are not at all reliable. The age of the rocks and fossil ages based on such anomalous theories are no longer trustworthy. The plain fact is that geology does not have any credible dating technique at the present time. Modern geological evidence clearly reveals the crumbling pillars of geological chronology (radiometric dating and stratigraphy) and thus, rather than supporting, completely undermines the "Chronology of Geologic Column,"

which has several important fundamental applications in geology and many other fields.

Vedāntic View of Biodiversity in the Light of 21st Century Biology

The intemperate view in science, that we can, and in the future will provide a necessary, complete explanation of the universe (including life) has actually lead to the degradation of modern civilization. In general, anthropocentric scientism indefatigably overlooks the boundaries of science in its dogmatic claims. However, as we are regularly presenting in *The Harmonizer*, there is convincing scientific evidence for honest scientists to emphatically challenge the attitude of “dogmatic scientism” that has hijacked the true method of science. Scientists who try to understand nature utilizing a purely reductionistic approach employ ontological, methodological and epistemic reduction (Nagel, 1998). By assuming ontological reduction, scientists are able to think of an organism as being nothing more than a combination of molecules and their interactions. Based on this presumption biologists employ methodological reduction by only studying the separate contents of an organism independent of their integral context. However, continually mounting evidence only refutes the idea of an epistemic reduction of an organism by appeal to the unification of ontological and methodological reduction. In fact, frontier biology confirms that all living organisms are sentient and hence cannot be reduced to mere physics and chemistry.

Living organisms are cognitively adaptive systems, a characteristic which is absent in inanimate or dead objects. Even the smallest living cells obtain information of their external environment and accordingly monitor their internal processes (Shapiro, 2011). For more than 150 years, following a reductionistic approach, Darwinism has considered only an insentient view of the living organism or abiology. On the other hand, 21st century biology rejecting the abiology of Darwinism, now accepts all living organisms including the smallest cells as sentient beings (Shapiro, 2011).

In the November 2012 issue article, “21st Century Biology Refutes Darwinian Abiology” the failure of the Darwinian theory to explain how novel regulatory elements arise was explained as being one of the major blows that late 20th century molecular biology presented to Darwinism. Each species of life has its own unique gene regulatory network, such that from its initial stage to maturity the particular species develops in accord with processes unique to that species only. Evo-devo experts primarily try to understand the appearance of developmental networks and the emergence of novel protein domains at decisive steps of embryological development in an organism. In applying this process to evolution Shapiro (2011) explains the difficulty,

“To have new subprotein domains arise in the course of evolution, a process is needed for generating novel exons that can encode extended polypeptide structures to be incorporated into proteins in combination with other exons. Exon generation cannot occur efficiently by the gradual accumulation of single amino acid changes in existing protein chains because the probability of losing the original functionality is too high and

of gaining a new functionality too low. A more rapid, facultative process is needed—and has in fact been discovered.”

The new facultative process Shapiro calls “natural genetic engineering,” but this clearly exposes the naïveté of Darwinian abiology based on the assumption of gradualism. Gene regulatory networks are not a result of gradual evolutionary progress. Even unicellular simple creatures like bacteria have their own unique and extremely sophisticated regulatory networks. Smith and Hoover (2009) stated, “Synthesis of the bacterial flagellum is a complex process involving dozens of structural and regulatory genes. Assembly of the flagellum is a highly-ordered process, and in most flagellated bacteria the structural genes are expressed in a transcriptional hierarchy that results in the products of these genes being made as they are needed for assembly. Temporal regulation of the flagellar genes is achieved through sophisticated regulatory networks that utilize checkpoints in the flagellar assembly pathway to coordinate expression of flagellar genes.” Hence, the belief that all life forms arrived from a common ancestor following a trajectory of mere objective evolution is rather unreasonable and more the result of a dogmatic imposition of an ideology.

In the context of multicellular organisms, Shapiro (2011) states, “Without an elaborate sensory apparatus to pick up signals about chemicals in the environment (nutrients, poisons, signals emitted by other cells) or to keep track of intracellular events (DNA replication, organelle growth, oxidative damage), a cell’s opportunity to proliferate or contribute to whole-organism development would be severely restricted. Life requires cognition at all levels”. The last sentence, “Life requires cognition at all levels” is the same paradigm that *Vedānta* has advocated since antiquity. In *Vedānta* it is described that the *ātma* (soul) is responsible for animating the bodies of all living organisms, from the simplest single cell to complex multicellular organisms. The immortality of *ātma* is explained in *Bhagavad-gītā* verse 2.20 and the same is also described in *Kaṭha Upaniṣad* verse 1.2.18, *na jāyate mriyate vā vipaścin nāyaṁ kutaścin na babhūva kaścit ajo nityaḥ śāśvato 'yaṁ purāṇo na hanyate hanyamāne śarīre* – “For the soul there is neither birth nor death at any time. He has not come into being, does not come into being, and will not come into being. He is unborn, eternal, ever-existing and primeval. He is not slain when the body is slain.”, where the word *vipaś-cit* means learned or with knowledge. According to *Vedāntic* understanding *ātma* is eternal and fully cognizant.

Vedānta explains that consciousness is one of the symptoms by which the existence of the *ātma* can be inferred. Although scientists cannot sensually perceive the *ātma*, still they can infer its existence just from the presence of consciousness in all biological systems. As the presence of the sun can be inferred from the sunlight, similarly existence of the *ātma* can also be understood from the presence of the different varieties of consciousness in various living organisms. Furthermore, *Bhagavad-gītā* verse 18.61 states, *īśvaraḥ sarva-bhūtānāṁ hṛd-deśe 'rjuna tiṣṭhati bhrāmayan sarva-bhūtāni yantrārūḍhāni māyayā* – “all living forms (*sarva-bhūtānāṁ*) are machines (*yantrā*) made of material energy (*māya*) of a Unitary Supreme Cognizant Being, Kṛṣṇa (*īśvara*), and Kṛṣṇa’s

Paramātmā (super-soul) feature is guiding the conditioned *ātma* situated within that machine". Hence, *Paramātmā* (infinite consciousness) is also known as the ground or sustainer of the *ātma* (finite consciousness). This explanation of *Bhagavad-gītā* is self evident from the scientific evidence described above. Living entities, from bacteria to humans, do not have full knowledge or control over the complex biological process that are sentiently going on within their bodies and yet those processes go on very perfectly. This perfect maintaining principle is *Paramātmā*. However, *Vedānta* explains laws of *Karma* (actions and reactions of good and bad activities performed by the living being) as the cause of any abnormal condition (diseases, errors in biological process, cancer, etc) that affects the body of an organism.

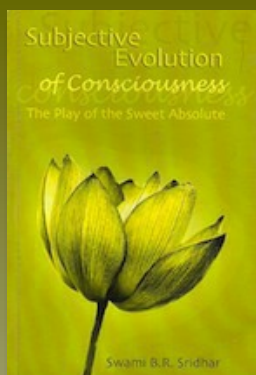


Different Bodily Forms

It should be noted that the machine-like description of different bodily forms in the above verse for different species should not be misunderstood with being like the machines that a human could manufacture artificially. Unlike artificial machines, the bodies of all living organisms (from bacteria to humans) are inimitably complex. A frog's zygote will never develop into a puppy. Life intrinsically preserves its species type. Darwinian objective evolution theory using the laws of physics and chemistry cannot explain why species like bacteria, fish, frogs, banyan trees, lions and so on appeared. On the other hand, the conception of *Vedānta* holds that different forms (species) are original archetypes that accommodate different varieties of consciousness through

which the transmigration of the soul (*ātma*) takes place on the basis of the evolution of consciousness. For example, *Viṣṇu Purāṇa* states, "jala-jā nava-lakṣāṇi sthāvarā lakṣa-vimśati kṛmayo rudra-saṅkhyakāḥ pakṣiṇāṁ daśa-lakṣaṇam trīṁśal-lakṣāṇi paśavaḥ catur-lakṣāṇi mānuṣāḥ – There are 900,000 species living in the water. There are also 2,000,000 nonmoving living entities (*sthāvara*), such as trees and plants. There are also 1,100,000 species of insects and reptiles, and there are 1,000,000 species of birds. As far as quadrupeds are concerned, there are 3,000,000 varieties, and there are 400,000 human species." According to *Vedānta*, species identification and classification are based on a cognitive paradigm, where the body is a biological expression of the consciousness of the soul (*ātma*). Therefore, the different species described in the above verse are representations of different varieties of consciousness. The transmigration of the soul (*ātma*) is described in *Bhagavad-gītā* 8.6: *yaṁ yaṁ vāpi smaran bhāvaṁ tyajanty ante kalevaram taṁ tam evaiti kaunteya sadā tad bhāva-bhāvitah* – "The soul (*ātma*) obtains a body in next life based on the consciousness in which it left the previous body." Animals and lower species of life do not have enough intelligence to understand these descriptions of ancient wisdom. However, a sober human being may easily understand his/her entanglement in the dangerous cycle of endless transmigration and thus inquire about their true identity as the immortal soul under an expert spiritual guide. *Vedānta* advocates this scientifically verifiable subjective evolution of consciousness, while the unscientific Darwinian objective evolution of bodies is only a misconceived perverted reflection of this subjective evolution of consciousness. A lot of energy and time are already wasted for more than 150 years following the dogmatic imposition of Darwinian abiology and now the scientific evidence is forcing honest scientists to understand genuine biology based on cognition as revealed in-depth within ancient *Vedāntic* literature.

Evolution is generally thought of as something merely objective. But objective evolution is a misperception of reality. Evolution is actually based on consciousness, which is subjective. Subjective evolution, however, seems to be objective evolution to those who are ignorant of this perspective. Consciousness seems to be the unessential embedded in a concrete substance, but actually it is just the opposite. Consciousness is the substantial and its objective content or world is floating on it connected by a shadowy medium like mind. This view finds surprising support in advanced modern science from which physicists like Paul Davies have concluded that it is necessary to adopt "a new way of thinking that is in closer accord with mysticism than materialism."



Subjective Evolution of Consciousness

Evolution is generally thought of as something merely objective. But objective evolution is a misperception of reality. Evolution is actually based on consciousness, which is subjective. Subjective evolution, however, seems to be objective evolution to those who are ignorant of this perspective. Consciousness seems to be the unessential embedded in a concrete substance, but actually it is just the opposite. Consciousness is the substantial and its objective content or world is floating on it connected by a shadowy medium like mind. This view finds surprising support in advanced modern science from which physicists like Paul Davies have concluded

that it is necessary to adopt "a new way of thinking that is in closer accord with mysticism than materialism."

The dynamic super-subjective living reality that produces as much as is produced by its constituent subjective and objective fragmental parts or moments is in and for itself the embodiment of ecstasy, that is forever beyond the static reification of materialistic misunderstanding. With an irresistible passion for truth, Sri R. Sridhar Raksak Sridhar Dev-Goswami Maharaja, the author of *Subjective Evolution of Consciousness* takes us to an incomparable synthesis of thought from Descartes, Berkeley and Hegel in the West to Buddha, Shankara, and Sri Chaitanya in the East to reveal the ultimate conception of reality in all its comprehensive beauty and fulfillment.

To obtain a copy of the book *Subjective Evolution of Consciousness* please contact us at:
editors@scienceandscientist.org