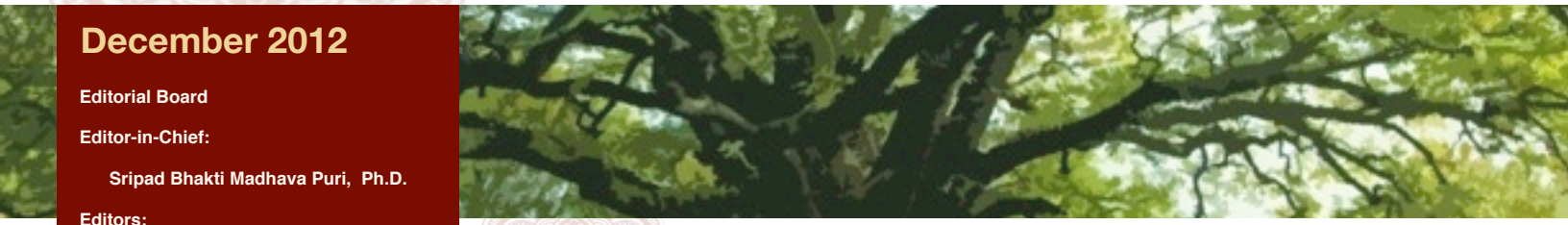
Sri Chaitanya Saraswat Math

Bhakti Vedanta Institute

THE HARMONIZER

Science, Philosophy, Religion and Art

All Branches of the Same Tree of Knowledge



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Spiritual Biology: Reply to Critics – Part One

B.M. Puri, B.V. Muni, B.N. Shanta

We received several critical comments regarding the articles in our November 2012 issue of *The Harmonizer*. We reply to those criticisms in this issue in order to further clarify some of the important points that were made. It is only to be expected that a strong emotional response may be evoked by the revolution in scientific thinking that the modern paradigm of cognitive biology presents. We have to be prepared to accept that, and maintain the integrity of the scientific approach.

Critic: *It is sad that you should have to lie and obfuscate to promote your religious views.*

Reply: In our newsletter we have presented the observations and conclusions of modern scientific research. We believe that, as scientists, we must have the utmost respect for the authenticity of peer-reviewed scientific literature. The significance of these findings for religion is a matter of logical induction. The evidence we have cited does not come from religion, but from scientific observations which support a natural cognitive interpretation.

Critic: *Instead of denying the truths of biology, which you are doing in your newsletter, you should be embracing them as PART of the universal truth. By denying the physical part of the universal truth, you will (1) disenfranchise most educated people, (2) promulgate bad religion and poorly argued philosophy, and (3) have to lie and obfuscate and misrepresent the actual research (which you have done here).*

Reply: There was neither any intent nor attempt to deny physical reality or biological truths, but only to present the newly recognized truths of biological reality deriving from the last 50 years of scientific discovery involving the role of cognition in the biomolecular chemistry of organisms.

Your statement would be perfectly right, if anyone were to deny the physical world. But neither we nor the scientific research we presented are doing that. In the Vedantic view (which we are introducing), universal consciousness is the foundational concept and its objective content is the physical world. The mind is considered the shadowy or ephemeral plane that connects the two.[1] This view corresponds to our experience and reason, for without consciousness there could be no experience, and without experience the mind could not form the stable, rational concept we call the "world" – the totality of those experiences.

[1] Bhakti Rakshak Sridhar, *Subjective Evolution of Consciousness — The Play of the Sweet Absolute*. Published by Sri Chaitanya Saraswat Math (1989).

Critic: *As humans, we can transcend the boundaries of our genes…by transcend I mean "an emergent property of" biology, not outside the universe.*

Reply: Here we find a point of difference in our understanding. Consciousness or any spiritual quality, in general, does not emerge from biology, genes, molecules, etc. Rather biology, an so on, emerges or manifests from consciousness (universal and individual), according to the Vedantic view (and in

certain interpretations of quantum mechanics). The Absolute Godhead is also simultaneously within or intrinsic to the universe (as in pantheism) and outside of or transcendental to it (as in panentheism). This viewpoint may not presently be understandable to modern scientists without sufficient philosophical skill and experience, but what we are trying to scientifically prove is congruent with the results of modern research.

Critic: *An underlying misrepresentation that you make is that biology, as it currently exists or is taught, somehow pretends to provide moral guidance.*

Reply: In general, one's understanding of biology (life) certainly does influence our understanding of morality and ethical behavior (as, for instance, in the cases of our attitudes towards abortion, euthanasia, etc.). The Greek word bio means life. So the study of biology is the study of life, not merely of chemistry and physics. If you disagree with this then biology should be called molecular chemistry or abiology, but not biology. If you agree that life is indeed the subject of biology, then certain moral principles become intrinsically associated with it.

Michael Behe

Barbara McClintock

Critic: *You fail to call attention to the fact that Dr. Behe is discredited by nearly the entire scientific establishment.*

Reply: Professor Michael Behe is a tenured, qualified scientist at an accredited university who has published his research in peer-reviewed scientific journals. That the "entire" scientific establishment disagrees or discredits him is certainly not true. There are many scientists who credit him with the courage and integrity to deftly challenge the reigning paradigm of reductionist biology.[2] He represents the non-reductionist, non-materialist, non-mechanistic concept of living organisms that a majority, consisting of many biologists (from systems biology, cognitive biology, etc.) and those outside of biology, acknowledge.

Historically, rejection of revolutionary new ideas in science has occurred in almost every case, extending to even Einstein and Planck when they presented their theories. It is the same behavior that was displayed towards revolutionary scientist and Nobel Prize winner Barbara McClintock.

> "Though her research was often dismissed as wildly unorthodox, she pursued it, making discoveries that changed the map of modern genetics. In 1983 she was awarded the individual Nobel Prize in Physiology/Medicine…. The community lens identified how the scientific community reacted to her scientific discoveries and radical theories. This narrative of Barbara, as a non-stereotypical scientist, is useful in the classroom because it helps students to understand that doing science is far more than an objective, dispassionate and disconnected process."[3]

[2] http://www.discovery.org/scripts/viewDB/filesDB-download.php?command=download&id=660

[3] Jane, B., "Science as a way of knowing : a narrative about community and connectedness." *AARE 2008 International education research conference, Brisbane: papers collection* (2008) (175346), (ISSN: 1324-9339). Refer: http://www.aare.edu.au/08pap/jan08135.pdf

Critic: *But more than this, you fail to provide any critical analysis regarding the 'Irreversible complexity' (IC) concept.*

Reply: We have only presented a brief review of the research findings in the field of cognitive biology that demonstrate the role of consciousness in biology, not a complete study of the controversies that afflict evolution. Furthermore, we have not seen any challenges to IC that are convincing enough in their details, or that Behe, himself, has not confuted. However, we thank you for bringing up this disputation. In the future, if it is necessary to make this point more objectively, we will include a footnote about the controversy and our perspective on it.

Critic: *IC does not even work for DESIGNED objects, let alone evolved ones! My favorite example is the electric iron. If you remove the plug, the iron will fail to work. But the electric iron design DID evolve in a stepwise progression of modifications of prior designs that were not electrified. Thus, the whole concept is fallacious that contingency implies lack of intermediates.*

Reply: The evolution of the design for an electric iron is the result of intentional development not random mutations. Can an inert iron evolve on its own without the help of a designer to transform it in various ways? Your comparison of mechanical systems with biological systems is inapt. You are a biological system and that is why you are defending your ideas with sentiments and reason. But we cannot expect that type of behavior from an insentient machine like a computerized robot.

In mechanical systems the purpose (which a designer determines) is external to the system, but in living organisms or biological systems purpose is intrinsic and innate (what Kant called *Naturzweck*, or embodied natural purpose). This means that mechanical systems conform to external

teleology, while biological systems exhibit internal teleological activity. A cogent presentation of this difference in given in the article "The logic of life"[4]. The theory of the objective evolution of bodies is considered an inverted misconception of the subjective evolution of consciousness by which the Vedantic viewpoint explains the variety of species.[5]

[4] Bhakti Madhava Puri, "The logic of life." *Science and Scientist – Inquiring into the Origin of Matter and Life, January – March 2008.* Refer: http://scienceandscientist.org/download.php?get=Science_and_Scientist-2008_Issue-1.pdf

[5] Bhakti Niskama Shanta, "Sorry Darwin: Chemistry never made the transition to biology." Refer: www.scienceandscientist.org/biology

Critic: *You pull out some 'data' without any reference: ... mutations generally result in debilitating or lethal effects to the cell. Where's the reference?*

Reply: The unfavorable result of mutations is commonly and widely known, for example, from the years of experiments on the numerous generations of *Drosophilia*. This is old news, for instance:

> "Most biologists would agree that the majority of mutations that change protein sequences or alter gene expression are harmful, because they perturb highly adapted biochemical and physiological systems.... Deleterious mutations impose a 'load' (selective reduction in fitness) on populations — individuals either die or fail to reproduce, because they carry harmful mutations, a process Muller termed 'genetic death.'"[6]

[6] Keightley, P.D., Eyre-Walker, A., "Terumi Mukai and the Riddle of Deleterious Mutation Rates," *Genetics Oct.1, 1999* (153), no. 2, pp. 515-523.

Critic: *In actuality, MOST mutations are expected to be largely neutral, or to be largely buffered by canalization. Thus, this is simply a misrepresentation of biology.*

Reply: Evolutionists generally employ this outdated idea just to save the concept of random mutations, which they know have been proven to be deleterious or lethal. But we also now know that the idea of neutral mutations is highly speculative in biology. In reality, or in vivo, no mutations are ever neutral, because it is not only chemical equivalence, but sequence timing, chemical reaction rates, systemic functionality, and sensitivity to stereochemical factors that complexify the living state. For example, the Neutral Sequence Fallacy conflates functional constraint and selective neutrality, which leads to the mistaken description of functionally unconstrained sequences as being neutral. The controversy over the neutral-selectionist theory is still debated in biology.[7] Therefore this is a controversial subject that is not conclusive. Neutrality is often used only as a simplifying theoretical assumption for averaging probabilities rather than as a conclusive truth of actual observation.

[7] Martin Kreitman, "The neutral theory is dead. Long live the neutral theory," *BioEssays, Vol. 18 no. 8*, pp. 678-683 (1996).

Critic: *Also, it is a misrepresentation (indeed, simply fallacious) that "randomness at the cellular level is dele-terious or lethal". In fact, the generation of variation (which has been demonstrated to be advantageous) requires randomness. For example, independent assortment involves random associations of homologous chromosomes in the gametes!*

Reply: Randomness is not the governing factor in determining variety in meiosis or recombination; rather there are numerous regulatory functions involved. For instance, Jordan writes:

> "...homologous chromosomes must be paired and become tightly linked to ensure reductional segregation during meiosis. Therefore initiation of homologous chromosome pairing is vital for meiosis to proceed correctly. A number of factors contribute to the initiation of homologous chromosome pairing including telomere and centromere dynamics, pairing centres, checkpoint proteins and components of the axial element."[8]

[8] Jordan P, "Initiation of homologous chromosome pairing during meiosis." *Biochem Soc Trans.* Aug: 34 (Pt 4), pp. 545-549 (2006).

Critic: *You are misrepresenting evolution as "proceeding by way of random mutations." This is NOT sufficient for Darwinian or 'NeoDarwinian' evolution, or even evolution of the "Bush of Life" referred to later. In all cases, Natural Selection depends on HEREDITY, which is very nonrandom. Indeed, you even admitted that DNA replication is highly nonrandom. If evolution involves the mechanism of natural selection, which depends on the NONrandom process of inheritance, then characterizing the process as fully due to "random mutation" is a misrepresentation, and as such is disingenuous and an obfuscation.*

Reply: This criticism seems to refer to the fine point presented in one of our articles, "The Science of Spiritual Biology," from our previous newsletter,

> "The remarkable fidelity of the DNA replication process such that only one mistake is made for every 10^9 nucleotides copied, demonstrated the highly regulated and controlled nature of the cell. The reason is that random mutations generally result in debilitating or lethal effects to the cell. The existence of such tightly regulated and controlled systems not only challenges the idea of a sequential evolutionary

development of life, but implies that randomness at the cellular level is deleterious or lethal to such systems. The idea that evolution could proceed by way of random mutations in the fundamental genetic makeup of the cell is thus called into serious doubt."

In your comment, you use the phrase "fully due to random mutation," which fails to represent what was either stated or implied in the quote above. It is random mutation that creates the progressive varieties that natural selection filters out according to fitness in Darwin's theory. So randomness does play the leading role in how evolution proceeds or progresses, according to the Darwinian theory, while selection has to wait upon the right mutations to arise. But what we are representing is that, according to research in modern biology, randomness does not play a significant role in the living cell due to the very strict hierarchical levels of regulation and control that have been discovered in the living organism.

Salthe, Fodor, Lewontin, Pigliucci, and many others are harsh critics of the obfuscation that remains especially in the Darwinian theory of natural selection. As for the idea of random mutations, a recent article affirms our remarks:

"It has long been accepted that natural selection acts on variation produced as a result of random mutation. However, the origins of this variation and the factors that determine whether it can be passed onto the next generation have never been thoroughly studied. … It is proposed that these non-random and epigenetic influences on heritable mutation should be integrated into a modernized neo-Darwinism."[9]

[9] Brinkworth, M. H., Miller, D. and Iles, D., "Implications of recent advances in the understanding of heritability for neo-Darwinian orthodoxy." Brinkworth, M. H., and Weinert, F. (eds.), *Evolution 2.0: Implications of Darwinism in Philosophy and the Social and Natural Sciences*. Springer, pp. 249–253 (2012).

Critic: *You state, "…horizontal gene transfer from the environment undermined the whole concept of linear descendants of species…." This is garbage! HGT occurs predominantly in bacteria, and only rarely affects genes in multicellular eukaryotes…unless you somehow believe that you look more like bacteria from the perspective of the environment than like your parents.*

Reply: Bacteria are prokaryotes. There are numerous examples where HGT (LGT) has been identified in eukaryotes[10]: *Apicomplexa, Chloroarachinophytes, Ciliates, Diplomonads, Entamoeba, Euglenozoa, Fungi, Metazoa, parabasalids, Plants (nicotena), Hydra (animals), Chlorarachinophytes, Dianoflagellates, Mycetozoa,* several plants.

It is also found that the transfer of genetic material across the normal reproductive barriers occurs between more or less distantly related organisms. Furthermore, according to the peer reviewed journals, the occurrence of HGT in eukaryotes has been vastly underestimated since the onset of genomics due to a variety of reasons[11].

[10] Andersson, J. O., "Lateral gene transfer in eukaryotes." *Cell. Mol. Life Sci.* 62, 1182–1197 (2005).

[11] Keeling, Patrick J. and Palmer, Jeffrey D., "Horizontal gene transfer in eukaryotic evolution," *Nature Reviews, Genetics vol. 9, 605*, August 2008.

One further reference we would like to cite in regard to LGT involving multicellular organisms:

"In multicellular organisms, the eukaryotes, horizontal gene transfer is a little more complex. One form of horizontal gene transfer is the movement of genes via viruses or 'jumping genes,' movable elements that shift from one chromosome to another, sometimes between species. These movements of jumping genes are a concern with regard to genetically engineered crops, since some people worry that they will cause a modified gene to jump into other species. Another method is the transfer of genes from bacteria to multicellular organisms. This has been seen with fungi, especially *Saccharomyces cerevisiae*, a yeast, which has picked up a variety of genes from bacterial species."[12]

The fact that the human organism is comprised of almost 90 percent bacteria[13], means that if you think that HGT involves only bacteria, then it must certainly be influencing the human body in a major way. Still the evidence is that it plays a role at the eukaryotic level as well, as mentioned above. Whether we think or prefer that the environment treat us as related to our parents or not, scientific conclusions need not conform to such social conventions. In fact, the spiritual implications of this finding confirm that provincial interests in family, society, etc. condition or limit the awareness of our ultimate qualitative identity with the universality of Life and the Absolute.

[12] Bridget Coila, "Horizontal Gene Transfer and Symbio-genesis," *Genetics & Evolution*, Nov 3, 2009

[13] Stoneking, Mark, "What we can learn from spit: Diversity in the human salivary microbiome," *Forschungsbericht - Max-Planck-Institut für evolutionäre Anthropologie* (2011).

Critic: *You write "…today, a more mature understanding of biology has brought with it the realization that Nature can not be the product of a gradual development, i.e. evolution, based on the reductionist principles of chemistry and*

physics." This could not be further from the truth. As we have sequenced genomes and started to dissect how genes regulate each other in genetic networks, and compare these data among organisms, there is more and more convergence toward an evolutionary framework for understanding the history of life. You fail to cite even basic experiments demonstrating how these networks have evolved through simple modifications at regulatory elements (e.g. the work of Sean Carroll et al.).

Reply: Perhaps you are unfamiliar with the book by Koonin and Galperin in which they confirm the point that we make:

> "…just like many modern developments in evolutionary biology itself, the new picture promulgated by genomics **defies** the exclusive emphasis on small, gradual mutational change, which was part of Darwin's message in *The Origin of Species* and had been further elevated in status by the neo-Darwinian synthesis."[14]

As regards Sean Carroll's views, they are not beyond reproach. Michael Behe critiques Carroll's review of his book:

> "Carroll cites several instances where multiple changes do accumulate gradually in proteins. (So do I. I discuss gradual evolution of antifreeze resistance, resistance to some insecticides by 'tiny, incremental steps — amino acid by amino acid — leading from one biological level to another', hemoglobin C-Harlem, and other examples, in order to make the critically important distinction between beneficial intermediate mutations and detrimental intermediate ones.) But, as Carroll might say, it is a *non sequitur* to leap to the conclusion that all biological features therefore can gradually accumulate. Incredibly, he ignores the book's centerpiece example of chloroquine resistance, where beneficial changes do not accumulate gradually."[15]

[14] Koonin, E.V. and Galperin, M.Y., *Sequence–Evolution–Function: Computational Approaches in Comparative Genomics.* Boston: Kluwer Academic. Chapter 6, "Comparative Genomics and New Evolutionary Biology" (2003).

[15] Behe, M.J. (26th June 2007). "Response to Critics, Part 2: Sean Carroll": http://behe.uncommondescent.com/2007/06/response-to-critics-part-2-sean-carroll

Critic: *Ascribing any "degradation of moral order" to evolutionary theory is simply preposterous, since there is NO moral reasoning espoused in evolutionary theory and indeed there is no logical connection between the principles of evolution and how we humans should construct our moral order. If someone does in fact find that one of your physical laws is not true, then, because you've made your moral code contingent upon this principle, it is no longer valid. Much better would be to construct a moral code that is INDEPENDENT of biology! (Gould's "non overlapping magisterial", NOMA). So what you are doing is not only bad science, it is bad religion!*

Reply: No reasonable person can deny that ideas that we learn in our educational system have consequences in our lives. Many young people have said that they became atheists due to learning the scientific theory of evolution — even those who were formerly theists. Religion comes with a whole tradition of moral teachings, so it is erroneous to say that there is no connection between evolution and morality. To teach that Man is simply an enclosed membrane filled with chemicals affects how people think about themselves as spiritual beings, and influences their ideas on abortion, euthanasia, bioethics in research, medicine, cloning, modification of food that we eat, animal rights, etc.

Darwin's objective evolution theory fails to provide a practical pathway to guarantee that humans developed trustworthy, true beliefs about reality.[16] This fact is evident from the statement of world-renowned biologist Francis Crick:

> "Our highly developed brains, after all, were not evolved under the pressure of discovering scientific truth, but only to enable us to be clever enough to survive and leave descendants."[17]

Darwin's insecure position on this issue is very clear from his own statement:

> "With me the horrid doubt always arises whether the convictions of man's mind, which has been developed from the mind of the lower animals, are of any value or at all trustworthy. Would anyone trust in the convictions of a monkey's mind, if there are any convictions in such a mind?"[18]

[16] Plantinga, A. *Warrant and Proper Function.* New York: Oxford University Press, chapters 11–12 (1993).

[17] Crick, F. *The astonishing hypothesis.* New York: Touchstone, P. 262 (1994).

[18] Charles Darwin to W. Graham, July 3, 1881, in *The Life and Letters of Charles Darwin*, ed. Francis Darwin (1897) repr., Boston: Elibron, 2005), 1:285.

To be continued…