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आ नौ भद्राः कर्तवो यन्तु विश्वतोऽर्दब्धासो अर्परीतास उद्भिर्दः । (RgVeda) *Let noble thoughts come to us from every side*

Science-Spirituality Dialogue Life on Other Planets



A Discussion between
Dr. Robert Mah (left),
NASA
and
Dr. T. D. Singh (right),
Physical Organic Chemist,
Founding-Director of
Bhaktivedanta Institute

Dr. T. D. Singh (henceforth TDS): One of the things that I am interested in is the exploration of the outer space. According to our Puranic or ancient Vedic culture there are living beings on other planets and in other universes. This idea is strongly supported in our scriptures. So after these missions, we have tremendous interest in finding if this is true or not (laugh). What is your impression on this?

Dr. Robert Mah (henceforth RM): This Mars mission is still within our solar system. If there is life, that is going to be found out.

TDS: What about life being beyond the solar system, on other planets in other universes?

RM: That's what I believe. We're discovering planets now. Before people thought planets were not there but now they see that planets are there. They should be able to sustain life. When you see how abundant life is here on Earth, then when you look up in the sky, you think that there has to be life over there too. This Earth can't be the only planet with life. But then as we were talking yesterday, where is the end to that universe? Then there's the universe in everybody's mind too.

TDS: According to our ancient literature, there are many types of universes. Some are small universes like ours; this is the smallest universe. And beyond, there are many other universes with living beings. This has actually been recorded. Do you believe in that?

RM: We were talking about theories. As they were saying last night, theories always change and it just depends on how strongly they are supported. The Big Bang, for

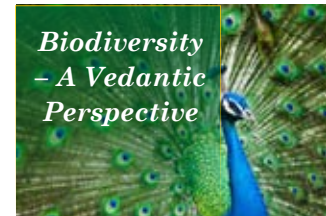
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SHOULDERS of
— GIANTS —



Srinivasa Ramanujan

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instance, was thought to be the beginning, but now it's considered differently. From Stephen Hawkins's theory, there is existence before the Big Bang.

TDS: Material concepts may be true or may not be true, depending on how we are finding that knowledge. But there is another aspect of the truth - the Absolute Truth. Once we seek out the truth, we have to find out the truth. There are many scientific conceptions about life on other planets, it is very interesting. Now we live on this earthly planet, therefore our bodies are made of earthly elements. The other planets may not be of the same type of 'matter' that we get here on this earth. The sun globe is mostly heat for example. In the heavenly systems, the components are different. Accordingly, bodies will be different. ...Modern science has developed mostly to research physical knowledge. That is not the only aspect of reality.

[Excerpt from the book, *Tattvajiñāsā* Vol-2 — Magazine of the Bhaktivedanta Institute, Kolkata]

On the Shoulder of Giants

Srinivasa Ramanujan

The Mathematical Mystic

Srinivasa Ramanujan was one of the greatest mathematicians of the 20th century. He was the second Indian to become a Fellow of the Royal Society. Ramanujan was an untutored genius who produced mathematics of extraordinary quality. He made substantial contributions to the analytical theory of numbers, elliptic functions, continued fractions, and infinite series. He left behind 4000 original theorems in notebooks full of mathematical musings that experts are still deciphering today. For his natural mathematical genius, he has been compared with great scientists like Leonhard Euler, Carl Friedrich Gauss and Karl Gustav Jacobi.

As a young boy, Ramanujan delved in mathematics far beyond his age. By the age of 12, he had mastered Loney's *Trigonometry*. At 15, he came across G. S. Carr's book on pure mathematics "*A Synopsis of Elementary Results*" that stimulated this young prodigy to venture into further realms. As he was exclusively devoted to mathematics, he failed in a few general exams at college. Despite the academic failures, unemployment, poverty, and penury, his urge for the pursuit of mathematics was irrepressible. He would often be seen hiding under the cot, doing mathematics on his slate. This was to avoid being noticed by his father who was unhappy with his lack of financial assistance to the family. For want of plain paper, he would pick up pieces of discarded newspapers or packing paper to write his mathematical notes.

His passage to fame was facilitated by Dewan Bahadur Ramachandra Rao (Collector of Nellore), V. Ramaswamy Iyer (Founder of Indian Mathematical Society), R. Narayana Iyer (Treasurer of IMS and Manager, Madras Port Trust), and several others. In 1913, Ramanujan joined the University of Madras as a research scholar. However, the turning point of his life was when Ramanujan wrote the historic letter with 120 theorems and formulas to G H Hardy, then Fellow of Trinity College, Cambridge. Hardy marveled at the extraordinarily ingenious mathematical results and invited Ramanujan to Cambridge. During his five years in



Srinivasa Ramanujan (1887 - 1920)

“*An equation has no meaning to me unless it expresses a thought of God.*”

Cambridge, Ramanujan published 21 research papers. He was awarded the B.A. degree in March 1916 for his work on highly composite numbers. In October 1918, Ramanujan was elected a Fellow of the Trinity College, Cambridge. He was the first Indian to be so elected. When Hardy was asked what his greatest contribution to mathematics was, he unhesitatingly said, “the discovery of Ramanujan”.

Ramanujan is recognized worldwide as an astonishing self-made mathematician. What sets him apart is his creativity—his ability to conjure never-before-imagined mathematical formulas. Did Ramanujan have any special secret? Any special method? Ramanujan would see all his discoveries as gracious gifts from Goddess Sri Lakshmi Namagiri. Hailing from a pious Brahmin family, Ramanujan was trained in the *vaishnava* tradition and was deeply devoted to Lord Narasimha (the man-lion incarnation of Lord Vishnu) and Sri Lakshmi Namagiri. He claimed that his family goddess Namagiri sent him visions in which mathematical formulas would unfold before his eyes so that he could set these down on paper on waking up. This pattern repeated itself over the years.

Throughout his life, Ramanujan maintained the direction and intensity of his religious and philosophical interests along with his love for mathematics. In the company of his friends and well-wishers, he would often recite passages from the Vedas, explaining the meanings in a lucid manner, or would involve in intellectual discussions about various Vedic schools of philosophy. He could also talk for hours about the intimate relationships between God, zero, and infinity. His profound faith in God and his deep admiration for mathematics are inseparable. "An equation for me," Ramanujan said, "has no meaning unless it expresses a thought of God."

Vedanta & Science

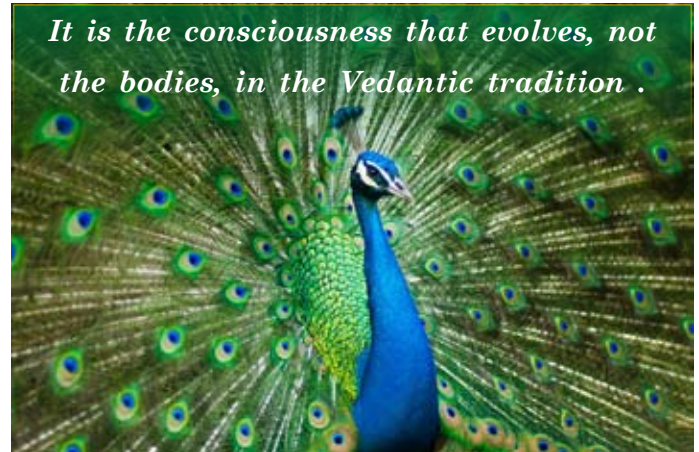
Biodiversity – A Vedantic Perspective

According to Vedic scientific views, there are 8.4×10^6 varieties of life (microorganisms, plants, aquatics, birds, reptiles, animals, humanoids and human beings) counted on the basis of different states or degrees of consciousness. According to the conscious evolutionary cosmic time scale, one gets the human form of life after passing through millions of varieties of life.

According to modern biology, biodiversity is due to genetic variation caused by occasional process of chance mutation. However, according to Vedanta, biodiversity is a process to accommodate the conscious level of each individual and there is a gradual evolution of consciousness passing from a form of less conscious state to a form of a higher conscious state according to the subtle laws of karma (cause and effect). The law of *karma* and the material modes of nature—*sattva*, *rajas* and *tamas*—goodness, passion and ignorance - are responsible for biodiversity as well as for diversity in terms of levels of intelligence, degree of development of mind and consciousness of the embodied being within the same species.

Vedanta further explains that many life forms manifest simultaneously. In other words, genetic variation is already within a cosmic plan. Werner Arber's observation that genetic mutation is not due to error or mistake corroborates with the Vedantic conceptions. He says, "Evolution does not occur on the basis of errors, accidents or the action of selfish genetic elements. Rather, the evolution genes must have been fine-tuned for their functions to provide and to replenish a wide diversity of life forms. ..." Thus, according to Vedanta, biological forms are already within the cosmic plan and it is, therefore, just the opposite of Darwin's concept of biological evolution. In fact Darwin's theory of evolution has many loopholes. Stephen Jay Gould, a prominent evolutionist from

Harvard University writes, "The extreme rarity of transitional forms in the fossil record persists as the trade secret of paleontology (study of fossils). . . . 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." It is not that natural selection and random mutation will be the cause of biodiversity. The conscious self ('spiriton' or soul) will continue to transmigrate from one form to the next until the conscious self or the spiritual particle or 'spiriton' reaches the human form where consciousness is fully developed.



Thus, contrary to evolutionary theory, it is the consciousness that evolves, not the bodies, in the Vedantic tradition. The transfer of a conscious being from one form to another takes place according to its *karma*. It is called evolution of consciousness, and it will go on until the being reaches its pure divinity of existence. There is good and bad *karma* according to the proper or improper use of one's free will. This conception is beyond the scope of modern biological sciences.

[Excerpt from the book, 'Life and its Origin — Exploration from Science and Spiritual Traditions', Bhaktivedanta Institute, Kolkata]

New Book Release

Online Store: <http://qpc.binstitute.org/qpc-volume.html>

TATTVAJIJÑĀSĀ (Vol-2)

Scientific and Spiritual Quest for Ultimate Reality

MAGAZINE OF THE BHAKTIVEDANTA INSTITUTE



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Eternal Axioms

Dr. T. D. Singh, Founder Director, Bhaktivedanta Institute

An Indispensable God

Bernard Haisch, Astrophysicist, (formerly) University of California

Science of Karma

Dr. Debashis Khan, IIT (BHU) Varanasi and
Dr. Sandeep Kumar, IIT (BHU) Varanasi



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