

# Science of Spirituality

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## Reason or Religion?

In a lecture given in England, Swami Vivekananda made a very interesting observation on Reason vis-à-vis Religion. He said,

Is religion to justify itself by the discoveries of reason, through which every other science justifies itself? Are the same methods of investigation, which we apply to sciences and knowledge outside, to be applied to the science of Religion? In my opinion this must be so, and I am also of opinion that the sooner it is done the better. If a religion is destroyed by such investigations, it was then all the time useless, unworthy superstition; and the sooner it goes the better. I am thoroughly convinced that its destruction would be the best thing that could happen. All that is dross will be taken off, no doubt, but the essential parts of religion will emerge triumphant out of this investigation. Not only will it be made scientific—as scientific, at least, as any of the conclusions of physics or chemistry—but will have greater strength, because physics or chemistry has no internal mandate to vouch for its truth, which religion has.<sup>1</sup>

These are indeed very powerful and thought-provoking words. At the time they were uttered they might have appeared to be unjustified remarks. But, very soon, within a few decades, Science could demonstrate with convincing proof the veracity of Swamiji's statements. The object of this article is to present how this came about.

## Can Science and Religion be Compared?

At first sight, the task appears to be hopeless. After all, Science and Religion have very little in common. Science is based on hard facts, leading to analysis verified by experiments. Whatever is not confirmed by experimental verification is thrown out unceremoniously by Science, because experiment is the final test of all theoretical hypotheses.

Religion, on the other hand, is based on faith, which is sometimes also called blind belief. There are no established methods of experimental verification, universally accepted by all. Science is the same irrespective of people or country. On the other hand, there is a multiplicity of religions, all of them at disagreement with the others. It is the diversity in these faiths that is responsible for major conflicts among nations. With such a wide divergence between these two disciplines how can there be a comparison at all?

Every religion has two components—theory and practice. The theory also goes by the name of philosophy. The practice is a set of rituals specific to that religion, most of the times becoming rigid leading to a dogma and a theology. If there has to be a comparison with Science, it is only with the philosophical part of it. Where the philosophy and the dogma are mixed up, such a comparison is almost meaningless.



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Unfortunately, there are very few religions in which these two components are clearly separated. It is only in such cases that a comparison is meaningful and worthwhile. Religion shorn of all dogma goes by the name of Spirituality. It is only this aspect of Religion that can be measured against Science.

But, there are a few exceptions, like Sanatana Dharma or Hinduism, in which this separation is possible and has been effectively done. Most of the dogma to be found in this religion occurs in that literature, known as the Smriti texts. The non-dogmatic or spiritual part constitutes what is known as the Shruti. Any comparison with Science is possible only with the Shruti texts [i.e., Gita and Upanishads or Vedanta in general] and not with Smriti texts [such as Smritis attributed to Manu, Yajna-  
valkya, Raghu, Bodhayana and others].

### The Scientific Method

Before one can take up this comparison, one should be clear in one's mind as to how Science tries to establish Truth. Any scientific investigation commences with the observation of phenomena, recording of measured data, their analysis, enunciation of a hypothesis followed by verification through the use of further data, and finally the enunciation of principles. It is an elaborate process. Each one of these steps is equally important. It is known as the Scientific Method, and is an invention of Europe in the middle Ages. This is the

procedure in use even today in the scientific community all over the world.

Is there any similar methodology in Religion or Spirituality? This is a difficult question to answer. Science is a product of modern times, which has a tradition of recording all results in a written form. This facilitates exchange of information and better communication. On the other hand, most of the ancient cultures and religions had an oral tradition. This is especially true of the Vedic culture, which has always had an oral tradition.

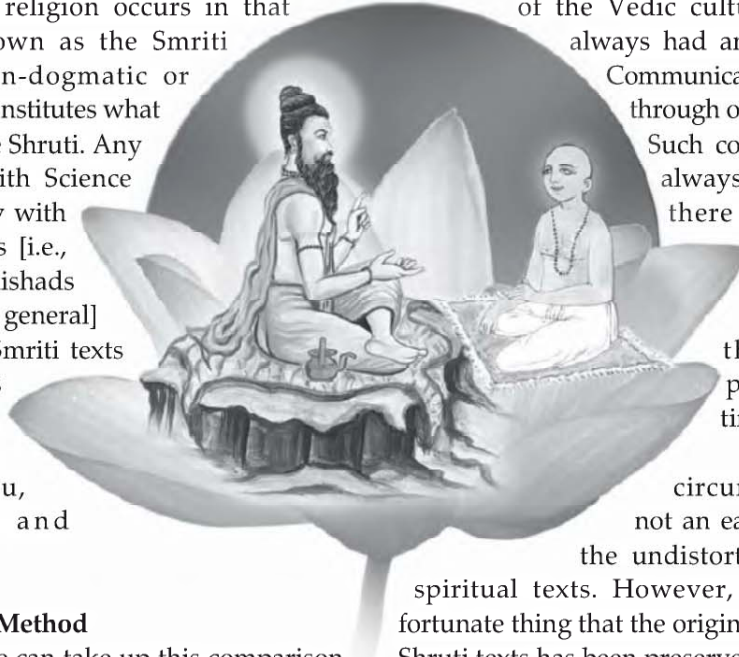
Communication was always through oral transmission.

Such communication is always risky, because there is always the possibility of distortions occurring, and this has happened several times earlier.

Under such circumstances, it is not an easy job to locate the undistorted contents of spiritual texts. However, it is indeed a fortunate thing that the original version of the Shruti texts has been preserved very carefully and is now in printed form along with translations. The oral tradition also has not been given up. But, the question still remains unanswered as to how the ancient sages of India came across these results. Normally, these results of their mental cogitations are considered to be 'revelations'.

### The Idea of Creation

As one goes through the Shruti texts, one comes across certain revelations, which startle



us and which can easily stand comparison with the results of modern science. An example can be cited here. Ever since the dawn of human culture, people have wondered how the entire creation came about. Every culture has practically its own model, none of them based on any scientific basis.

Take, for example, the first chapter of the Old Testament, the Book of Genesis. According to this book, the whole creation came into existence in six days, the seventh day being a day of rest. Both the Old and the New Testaments have given certain genealogies, the first from Adam, the first human being, to King David, and the second from King David to Jesus Christ. Based on this model, Bishop Ussher of Ireland made an estimation. Taking the period of Jesus as 1A.D, and working backwards giving each generation about 20 years, he came to the conclusion that the period of Adam must have been 4004 BCE. This became the standard yardstick for the Roman Catholic Church.

This hypothesis received a jolt with Darwin's Theory of Evolution, according to which species of creatures evolve into one another, the last step of the ladder of evolution being the human being. The time scale got extended, since evolution is a slow process. Ultimately, it was recognized that creation must be much earlier than the date given by the Bible. All this speculation took place in Europe at a time when the scriptural literature of Hinduism was not yet known to the westerners.

The first translation of the Bhagavad Gita from Sanskrit into English was published towards the end of the eighteenth century in London. This book influenced a large number of English poets of the Romantic period, but was totally ignored by the scientific community. It was only in the 20<sup>th</sup> century

that it came to be known to the scientists, through Robert Oppenheim, the leader of the Manhattan Project. He was already an avid student of the Gita and was familiar with the text. It was at the time of the testing of the first prototype of the Atom Bomb that Oppenheim saw the famous plume accompanied by the blinding light, which reminded him of the description of the Cosmic Form of the Gita. He even remarked about it, but none of his scientist colleagues could understand him, since they were not familiar with the Gita.

The Gita had probably an even greater influence on another famous Astrophysicist, Subramanian Chandrasekhar. Even as a student at Cambridge University in England, he had done research on the origin of the Universe, and had given a very preliminary analysis, which later developed into the famous Big Bang Theory. He later moved over to the Chicago University in the USA, and became the Head of the Yerkes Observatory. He went on to win the Nobel Prize in Physics for the work he had done in Cambridge.

Chandrasekhar, even though born in India in an orthodox Brahmin family, had the reputation of being an agnostic. This could be probably because he had noticed the vast gap between concepts concerning the Universe as enunciated by religious texts and Astrophysics of Science. It was only towards the end of his life that he made a detailed study of the Gita. The description of the Universe in this text fascinated him. Two things struck him. The first was the concept of Chaturyuga, which spoke of the vastness of time. The second was the periodicity of Creation and Dissolution. These accorded so well with the discoveries of Science, that he became a regular student of the Gita.

During the 20<sup>th</sup> century there was a galaxy of Physicists in Europe, who were

fascinated by the Theories of Relativity and Quantum Mechanics. Some of them at that time became students of Vedanta, because they felt that the concept of an Impersonal Creator of Advaita Vedanta was acceptable to Modern Physics. This brought the two subjects closer to each other.

### **The Big Bang Theory<sup>2</sup>**

There is one aspect of closeness of this type that can be found between the model of Creation in Taittiriyanishad and the Big Bang Theory, which has so far not been noticed. But, before comparing these two principles, one needs to know what they are. We will consider the Big Bang Theory first. According to this theory, the Universe came into existence about 14-16 billion years ago. The Special Theory of Relativity of Einstein had shown that Mass and Energy were equivalent and inter-convertible. When the Universe came into existence, all matter existed in the form of Energy, concentrated at a point known as the Singularity. This corresponds very closely to the concept of the Cosmic Egg as mentioned in the mythological texts of Hinduism.

When this energy manifested itself it was supposed to be in the form of a Big Bang. It is difficult to visualize this, because the whole thing is supposed to have been a multi-dimensional phenomenon. Over a period of time, this energy spread over the newly created space-time manifold. With the expansion, the system started generating mass at extremely high temperatures, which gradually started cooling. The mass was originally in the form of fundamental particles, which started combining among themselves, giving rise to Plasma, Gases, Liquids and ultimately solids. About four and a half billion years ago, the mass that later formed the solar

system came into existence. This mass later expanded by centrifugal forces forming the nucleus of the planets. The Earth itself came into existence about one and a half billion years ago as part of the Solar System.

When one examines the structure of the planets, one observes the gradual process of the evolution of the Earth. Planets closer to the Sun than the earth are in a gaseous state and very hot. Those in the outer regions are cold and literally frozen. The Earth is at such an optimum distance that it alone can sustain an atmosphere that can sustain Life of various forms. Astrophysicists have not given up hope that there may be other bodies also that have the same conditions capable of sustaining life. But all such attempts have turned out to be mere speculations.

### **Creation According to Scriptures**

We turn now our attention to what our own scriptures have to say. There are several mythological texts, of which nine are considered major and nine minor. An important characteristic of these is that they must follow a regular structure. Each must contain a description of Sarga, primary creation, and Visarga, secondary creation. These two sections contain a detailed description of how the Earth and human beings originated and evolved. All of them start from a creation of the Universe, but very quickly confine themselves to the Earth. To the modern mind with exposure to Science, these descriptions appear very fanciful and unreal.

One finds in a few Upanishads also a description of the creation of the Universe, but these are brief, since they are not the main objective of the Upanishads. There is one description, however, in the Taittiriyanishad that comes closest to Science.<sup>3</sup>

In brief, it runs like this:

In the beginning That alone existed. From it was born Akasha or Space. From Space evolved Vayu or Energy. From this came Agni or Fire. Agni gave rise to Apaha or Water. Finally, water gave birth to Prithvi or Earth.

We will now examine if this model is acceptable by comparing to the Big Bang Theory of Science.

According to this theory, the first thing to emerge was the Space-Time manifold (Akasha), the playground for the rest of the action. The condensed Energy (Vayu) then made its appearance with temperatures extraordinarily high. The energy field then started spreading and cooling at the same time until the whole system resembled a burning set of masses (Agni). With further spreading and cooling, the burning masses started forming Galaxies containing billions of stars. The Law of Gravitation, valid and active all the time, brought some of the burning masses together, forming systems, of which our own Solar System is the closest example. In the solar system itself, there are a few planets with high temperatures and a gaseous atmosphere. There are a few cool enough to form water, like the Earth. Some have become solid masses, again like the Earth.

One fact emerges from a comparison of these two models. The Big Bang Theory talks of the emergence of the Cosmos, whereas the Upanishadic model confines itself to the emergence of our planet. But, the procedure appears to be similar. The question is not so much about whether the Vedic sages were aware of Science. The wonder is how something that evolved from pure 'Revelations' could correspond to derivations from a purely mathematical structure! It is, indeed a fertile field for research!

Another striking similarity is the periodicity in both the models. The Gita describes

how the Universe reverts to its pure pristine origin. Similarly, the Big Bang Theory leads in the distant future to the Big Crunch, when all matter gets converted to energy ending in the Singularity. The current point of interest is to predict how precisely this happens. This is the cause for the current excitement about the Higgs Boson, otherwise known as the 'God Particle!'

This may not be the only instance. There may be many more in subjects like Medicine, Psychology and similar subjects. These need to be fished out and analyzed by the joint efforts of Vedic scholars and Scientists. For example, it is often claimed that the cadence of Vedic mantra recitation has beneficial influences on the foetus inside the womb. Modern Psychology talks of the 'Mozart Effect' that many compositions of Mozart have a soothing effect on the foetus. Many CD's have appeared under the category 'Music for the Babies'! This certainly is a fertile field of research.

It is also generally believed that soft music has a soothing influence on the human mind. This is also believed about the Vedic mantras. What is the basis for this? It is based only on one's subjective experience. But can it be established scientifically. A few years ago, Swami Vivekananda Yoga Anusandhana Samsthana at Bangalore commenced a project on recording Vedic mantras, starting with Omkara, the ten Shanti Mantras, the Gayatri Mantra, the Mahamrutyunjaya mantra and mantras from the Samaveda. All of them were spectrally analyzed according to the standard software available. The pattern revealed certain characteristics of gradual transitions very similar to that found in music, showing that the Vedic mantras have the same kind of soothing effect as music. This also is a rich field of research.

### Concluding Remarks

It is obvious that there must be several more such examples, where the ancient Vedic people have come across several results, which have been rediscovered later. For instance, there is a well-known theorem in Euclidean Geometry called the Pythagoras Theorem. It is now realized that this is only a restatement of a Sutra from an ancient book of Vedic times known as the Shulba Sutras. It is also known that Pythagoras had visited India and spent some time in Takshashila.

More work is needed in this field to place our ancient scriptures in the proper scientific setting. This is being done in the field of Yoga and Ayurveda at the Swami Vivekananda

Yoga Anusandhana Samsthana, Bangalore, and this culture is spreading throughout the globe. The fact that our ancient culture can be tested according to Science has brought it global respect, at a time when the world is still being threatened by dogma and superstitions.

Needless to say, all these developments arose because of Swami Vivekananda's observations quoted at the beginning of this article. There are many more such jewels hidden in the speeches of Swamiji that need to be culled out and studied. At this time, when the echoes of the 150<sup>th</sup> birthday celebrations of Swamiji are still being heard, this would be the best tribute one can offer him. □

### References

1. CW, 1.367
2. *In Search of the Big Bang*, Gribbin, John, Corgi Books, London, 1991.
3. *Taittiriyaopanishad*: Brahmanandavalli, Anuvaka 1, Mantra 1.

### 'Such were the writers of the Upanishads'

Fanatics little understand the infinite power of love in the hearts of these great sages who looked upon the inhabitants of this world as their children. They were the real fathers, the real gods, filled with infinite sympathy and patience for everyone; they were ready to bear and forbear. They knew how human society should grow, and patiently, slowly, surely, went on applying their remedies, not by denouncing and frightening people, but by gently and kindly leading them upwards step by step. Such were the writers of the Upanishads. They knew full well how the old ideas of God were not reconcilable with the advanced ethical ideas of the time; they knew full well that what the atheists were preaching contained a good deal of truth, nay, great nuggets of truth; but at the same time, they understood that those who wished to sever the thread that bound the beads, who wanted to build a new society in the air, would entirely fail.

We never build anew, we simply change places; we cannot have anything new, we only change the position of things. The seed grows into the tree, patiently and gently; we must direct our energies towards the truth, and fulfil the truth that exists, not try to make new truths. Thus, instead of denouncing these old ideas of God as unfit for modern times, the ancient sages began to seek out the reality that was in them. The result was the Vedanta philosophy, and out of the old deities, out of the monotheistic God, the Ruler of the universe, they found yet higher and higher ideas in what is called the Impersonal Absolute; they found oneness throughout the universe.

—Swami Vivekananda

