Exploration of General Systems Theory and Jain Philosophy Could Provide New Ways of Looking at the Field of Bioethics

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This paper is dedicated to my mother, Shrimati Lahar Kunwar Pokharna, who expired on October 30, 2012. It is through her inspiration and education that I learned Jainism and Science both.

Abstract

Bioethics is a field which involves medical sciences on the one hand and disciplines like religion, philosophy, and politics on the other. General Systems Theory (GST) is an attempt to combine these different and somewhat opposite disciplines in a unified way. In this formalism of GST, information and entropy/order alone are the only measurements which are primary in nature. Jainism, which evolved from India, appears to be compatible with GST. Jainism talks about spiritual evolution of soul where, knowledge and orderliness seems to increase not only at an individual level but also at a global level. An example of shatavadhan is given which demonstrates higher stages of consciousness, which also imply an increase in knowledge and order. Jains' principle of evolution of soul is compared with Darwin's principle of evolution. The whole formalism could provide new avenues of thought to look at the whole discipline of Bioethics.

Introduction

The issue of Bioethics essentially involves developments in the field of medical sciences and their impact on society along with the response of society towards these developments. They involve biological systems like men, animals, and society. They also involve philosophy, religion, politics, economics, and others. These disciplines are very different from the physical disciplines like physics and chemistry for which methodologies of science have been developed initially. Hence General Systems Theory is being used to study these widely different disciplines by treating them as systems. In the process, limitations of scientific knowledge and scientific methodology are specified which involve conservations laws, limitations caused by Gödel's incompleteness theorems.

The ideas of Jainsim are then mentioned. As per Jainism, all living beings have an underlying unity through the presence of a soul which is there among all living beings, like an ant, or an elephant, or a human being. It is due to material particles attached with the souls that distinctions are made among living beings. It is also assumed that the real knowledge is structured in the soul, and the material mixed with souls comes in the way of true realization of this knowledge. Jains talk of a process of evolution through which an ordinary soul can become a pure soul by relinquishing all material particles attached to one's soul from the infinite past.

An example of Shatavdhan is given which characterizes a small example of this process of evolution. In this state, a person's mental capabilities become extraordinary remarkable. This type of spiritual evolution is therefore compared with Darwin's principle of evolution. The differences are clearly brought out. Jains' principle of evolving towards a pure soul and acquiring a moksha is an idea very similar to the idea of a Goal discussed for irreversible systems under the General Systems Theory.

Limitations of physical sciences as they are applied to living systems: The Need to explore General Systems Theory for better understanding of Bioethics:

Actually scientific knowledge is based on compartmentalization, reductionism, and passivism (Goldsmith, 1990), ignoring openness and dynamism of the biological and human systems (Bertlanffy, 1976). Biological systems and human systems are essentially: (a) open systems compared to the physical systems which are closed; (b) they are also irreversible in nature (that is, they grow and decay); (c) here total system is more than the sum of the parts, that is a system is not reducible into parts; (d) such open systems are also goal directed systems where the effect determines the cause and not the other way around, which we find in scientific studies where cause determines the effect; (e) human systems also have memory, which makes them completely irreversible; and (f) due to thought processes, there can be infinite amplification in human systems, and it is very difficult to carry out any planned scientific experiments on them (Gigch, 1978).

Hence the problem becomes very complex when biological, human, and social systems come into the picture and the way they are being influenced by other human systems. To handle such complex issues, General Systems Theory (GST) should be explored for better understanding. GST takes some of the above factors into account and defines a new formalism where information/knowledge and order/entropy are more important than any other parameter. Even energy comes next to them, if required.

Actually the physical systems like physics, chemistry, and mathematics are called "hard systems," whereas social systems like sociology, biology, religion, political science, and economics are called "soft systems." Thus religion and science can be put together in this formalism.

Hence all the issues of Bioethics should be better analyzed using General Systems Theory, where compartmentalization is diluted and interaction is given higher priority.

Furthermore, the concept of development and evolution needs to be studied in terms of Entropy and Order. It is here that Jainism comes into the picture.

Limitations of scientific methodology due to conservations laws, when used to study biological systems

Any phenomenon is called scientific if it can be verified in a laboratory under given set of controlled conditions and is reproducible at any point of time and at any place. This condition is

called space-time invariance condition in science. In addition, we define conservation laws in physics which are foundation of all scientific measurements. So we have conservation laws for energy, linear momentum, angular momentum etc. Now all these conservation laws are defined for isolated closed systems, thus approximating the nature (Landau and Liftiz, 1964). Thus energy is defined as that variable of a closed isolated system which does not change over time. But in principle we can never have a totally closed isolated system (at least in the case of biological systems, this will be a distortion of reality) as all parts of the world (biological systems) are interacting among them and constantly influencing each other. Similarly linear momentum is defined as that property of a closed isolated system which remain invariant with any spatial displacement and so on. Hence the mere definitions of conservation laws are not exactly applicable to study the open systems perfectly because they first divide the world into parts and then try to define it. The interaction among these parts is then studied by considering the nature and magnitude of the interrelation among them. For biological systems that are so strongly interacting with each other, this type of formalism cannot be applied in a satisfactory way in a real sense.

Gödel's incompleteness theorems bring in more limitations on scientific methodology

> The most attractive aspect of scientific knowledge is its mathematical basis. We generally feel that this mathematical representation of various scientific facts make our knowledge more precise and accurate. However, from the following incompleteness theorems that have been put forward by the great mathematician Kurtz Gödel, we find that any mathematical representation of any physical reality limits our knowledge of that reality. Not only this but the theorems also imply that none of the languages or representation can express the reality of nature with perfection. Complete knowledge must necessarily have its foundation in an unexpressed, unmanifest field of intelligence. Hence the concept of consciousness or soul as discussed in Indian philosophy also comes into the picture. (Sri Arbindo, 2011 and Pokharna, 2010 and 2012).

Need to realize that scientific knowledge is only a subset of the total knowledge system, and actual Knowledge is structured in the consciousness

> With the advent of science and the resulting technology, a misunderstanding and misconception has developed among the masses that the scientific knowledge is the only ultimate knowledge in the world. Not only this, it also presumed that the knowledge which is experimentally verifiable and repeatable at any place and at any time alone is the actual knowledge. This is far from the truth. The fact is that the so called science is just around 200 years old and the concept of knowledge existed much before that for several centuries. Vedas, Upnishads, Puranas,

> Agamas, Mahabharat and Ramayana, Koran, and the Bible have a lot of knowledge about life and controls to be followed. Similarly technology of gold manufacturing in the ancient India, design of old temples, etc involve knowledge, which need not be scientific (Pokharna, 2010 and 2012).

Actually the recent developments in computer science and neurobiology clearly show that knowledge is nothing but information organized in some way (Goldsmith 1990). And in turn, information is just organization of data in some fashion. It is also realized that human consciousness (and even animal consciousness) is capable of organizing these data and can generate information and hence knowledge in some way. Therefore what we call scientific knowledge is just a subset of this grand concept of knowledge, which can exist in the human consciousness (Penrose 1990), because all interpretations of all scientific experiments are ultimately done by human consciousness.

Soul-Matter interaction and ideas of knowledge and evolution in Jainism

At this juncture, let us look at the ideas of knowledge, soul (consciousness), and evolution in Jainism. In Jainism, the world is assumed to consist of six elements. They are: Dharmastikaya (Medium of motion), Adharmastikaya (Medium of rest), Akashastikaya (Space), Pudgalastikaya (Matter), Jeevastikaya (Living beings) and Kala (Time) (Mehta, 1976). Jainism has defined the soul as a basic constituent of all living beings. According to their concept, a perfect soul has infinite knowledge, infinite intuition, infinite bliss, and infinite power. Therefore, as per Jainism, what we call as scientific knowledge appears to be just a subset of a broader concept of knowledge, which can exist in the human consciousness (soul here), because all interpretations of all scientific experiments are ultimately done by human consciousness.

In addition, as per Jainism, all species may be physically different but exist in the world from an infinite past. It is due to their attachment through material particles known as karma that they take birth in the world again and again. However, if we ignore these material particles, then all living beings have identical souls, and all worldly souls can evolve towards a pure soul. The direction of evolution should be towards a goal of liberalizing the soul from all material particles that is all karmas. Jainism talks of evolution of soul through fourteen stages of consciousness (known as Gunasthanas). It is also claimed that a soul never dies at the time of physical death but just changes one body and goes into another body. Hence concepts like physical death should not be given great significance . The approach should be always to go towards a higher state of consciousness even after death.

It is proposed that on the basis of General Systems Theory (GST), one can explain the evolution of soul in Jainism as a process which is accompanied by an increase in knowledge and orderliness of some kind and reduction in the rate of entropy production in general. In particular, it also means that there appears some kind of order in the brain which can be described by a very high signal to noise ratio. Example of Shatavadhani is given to illustrate this

state of orderliness. This order can be then linked with the order prevalent in the biosphere or order in the life supporting system.

Shatavdhan- A highly developed state of mind:

The oncept of Shatavadhan is very popular in Jainism (Kalarthy Mukul, 2004). Actually *Shat* in Sanskrit implies 100 and *Avdhan* means concentration of mind. It is actually a mental state of mind to cover 100 different activities in a single act of attention. One who reaches the stage of shatavadhan is called Shatavadhani. A shatavadhani can remember 100 different things, activities, subjects, phenomenon in different orders, spoken, tested, or conducted by 100 different persons. Shatavadhan is the ability to receive and retain 100 activities accrued through eyes or ear during one period of attention and carried from the conscious to the subconscious. This unbelievable power has been attained by a handful of people over human history because it needs very high stage of spiritual development. This is possible only when one is able to have an extraordinarily strong spiritual control for several years. According to the modern scientific belief, a normal human being utilizes hardly 2% to 3% of his total mental potential. A common man can hear and remember serially 3 or 4 questions or statements at a time. This is based on conscious mind. Anyone with exceptional intellect can extend this number from 3-4 to 10-11. However, taking this number to 100 is beyond the powers of most of the people. A Shatavdhani can utilize maximum of mental potential that demands immense concentration. That is the reason that history can name only countable shatavdhanis.

In Jain tradition one can name Shrimad Rajchandra, (born in 1867 and died in 1901) who was given very high respect by Mahatma Gandhi (Kalarthy Mukul, 2004) from whom he learned the concept of ahimsa (non-violence). Shrimad exhibited his mnemonic powers in late 19th Century in Mumbai. Gandhiji had great impact of Shrimad on his religious beliefs. This is also narrated in his autobiography (M K Ghandhi 1997). Rajachandraji was also known as Raychand *bhai* ("brother"). There are more such shatavdhanies, but Shrimad is one whose acts are listed and available as on today. The author also knows Mahendra Muni who is living today and has this power.

The procedure adopted by Shrimadji in giving these demonstrations of his rare powers was indeed most excting. In one demonstration, he could carried out fifty two activities in a sequence (Kalarthy Mukul, 2004 - due to space restrictions, they are not mentioned here). He would begin all one hundred activities at once, simultaneously. He would attend to a portion of each task at a time. He will then attend another second task, next move on to yet another third task, fourth task, and so on. After some time, he would return to the first task. He would cover these rounds, one after the other, until he had covered all the fifty two task. He made it a rule not to put down any points on paper while attending to these various activities, nor to take any notes and to ask any one to repeat anything.

In 1887 AD, Shrimadji reached the peak of his achievements in this direction. He was in Mumbai (it was called Bombay at that time) and gave there a demonstration of his powers (author could not get the list of these hundred activities).

After one hundred and twenty five years of performance of shrimad Rajchandra, at the age of 19, another shatavdhani is creating history, again in the same age range. This great young shatavdhani is Parampujya Yuva Shatavdhani Munishri Ajitchandrasagarji Maharajsahebji. He can reproduce not only 100 questions, statements, quotes, and events, but 108 in ascending, descending, and random order. The details of questions are given in the Appendix 1. This demonstration was done twice in Ahmadabad (Nov 16, 2008 and January 9, 2009). (The former was held in Town Hall and author was present there.) Recently on March 4, 2012, he gave a demonstration of 200 questions, situations, and events at Shan Mukhanand Hall in Mumbai and again the author was present there in presence of around 5000 persons. It was a mindboggling experience for a scientific mind. Several reputed scientists and prestigious persons were present in this program. The whole program was recorded on video also.

Form this phenomenon, we find that Jain monks have spiritually ordered minds, and if we look at their behavior and daily practices, then we find that they consume minimum resources and hence causes least disturbances in the environment. As they go to higher and higher stages of spiritual evolution, their resource consumption goes on reducing. We seriously feel that the various religious and spiritual practices developed by the ancient Indian seers like Yoga, Meditation, Sadhna, and others are all aimed at an overall increase in some kind of order in the brain, and this might be closely related with decrease in the rate of entropy production in this biosphere. In addition, this may be accompanied by the appearance of a new kind of order, which is being described above and could be linked with an orderly state of consciousness.

Darwin's principle of evolution and Jain's principle of evolution

Hence Jainism has a profound principle of "live and let live," which explains their concept of ahimsa (Non-violence) and respect for all living beings. It is totally different from Darwin's principle of evolution, expressed through the statement "survival of the fittest."

Let us compare the two in some detail.

• Darwin's principle is based on an emphasis on differences among species. Jainism, on the other hand, looks at the underlying identity among all the species and claims that the soul is the underlying identity among all the biological species.

• Darwin's principle is based on the concept of natural selection, that is, species which are superior survives, whereas those which are inferior with respect to adjustment with the environment, poor selectivity, and/or availability of resources die out or are eliminated.

• Jainism also talks of evolution, but is spiritual, which is accompanied by an increase in purity of soul and increase in its knowledge. However, in spiritual evolution also, one has to be very selective as a very strict discipline is demanded for oneself. A strict set of rules have to be

followed to have progress along the spiritual path. But in this process, they consume minimum resources, and hence resources do not have great impact on survival. It is least important which is critical in case of Darwin's principle. As the least resources are consumed by the Jain monks, they produce minimum entropy in the environment, and this can be linked with some kind of higher order.

• Jainism says that all living beings want to evolve, and so highly developed species like human beings should support the evolution of other species through the principle of non-violence (ahimsa). In this process, their own evolution also gets enhanced.

• With the discovery of genes, mutation takes place in such a way that new genes are more robust and are transferred to the next generation. However, in Jainism, it is an individual soul which leaves a body in one's life and goes to another world after leaving the body in one life. As knowledge is major characteristic of the soul, knowledge is carried over to the other birth.

• Darwin's principle does not talk about any goal in the process of evolution; it talks only about natural selection, and the whole evolution could be a set of randomly occurring steps of evolution without following any direction to achieve any goal. Jainism, on the other hand, talks of Moksha, which is the target or one's goal. Hence many uncertainties are reduced. One should note that, since human systems are strictly irreversible, a goal for such systems is perfectly compatible with the General Systems Theory.

• In view of the above principle of Jainism that worshipping of all animal kingdom and plant kingdoms and all natural objects like water, soil, air etc., is heavily emphasized in Jainism, a concept of "live and let live" has evolved, indicating respect for all living beings and aims to have collective evolution of all living beings.

It appears that the various principles and set of rules and regulations developed by ancient Jains are just like control parameters in this huge biosphere which indirectly provides stability of the biosphere on the long time scale and are hence critical conditions required for the continuation of life processes on this planet. They also reflect the interdependence of various activities of human beings on different components of the biosphere through the principle of ahimsa. The whole subject of General Systems Theory and philosophy of Jainism may provide a new perspective to the field of Bioethics.

Appendix 1.

Details of one hundred questions answered in same sequence by Shri Ajit Chandra Sagarji Maharasahab.

---1 to 10

One Line sentences may be in questioners' form	
11-20	Words of Wisdom in a sentence of 5 to 7 words
21	First line of a Sanskrit Shloka
22 to 30	Synonym or Antonym in Gujarati
31	Second line of the same Sanskrit Shloka
32 to 40	Idioms
41	Third line of Sanskrit Shloka
42 to 50	Any first line of the same Sanskrit Shloka
52 to 60	Names of any priest, religious book or religious place
61	A mathematical puzzle
62 to 70	Name of any philosopher, scientist, or patriotic person
71	First part of 16 Blocks- mathematical miracle
72 to 80	See and Remember (DarshanAvadhan)
81	Second part 16 blocks - mathematical miracle
82 to 90	See and Remember (DarshanAvadhan)
91	9 Blocks - Mathematical miracle
92 to 99	Mathematical calculation with 8 persons
100	Day of the Birthday
101-104	A line from a religious, cultural, or patriotic song
105 to 108	Shloka from Jain Aagams

Surendra Singh Pokharna received his BSc (Physics, Chemistry and Mathematics) in 1970, MSc (Physics) in 1972, and PhD (Theoretical Physics) in 1978, from Udaipur University (Rajasthan, India). He did his Post-Doctoral research in Biophysics in association with the Indian Institute of Science, Bangalore (1979), and his Post-Graduate Diploma in Operations Research from the Operational Research Society of India (1985). During the doctoral program, a he carried out a theoretical study of superfluid helium. In the Post-Doctoral program, he studied problems in biophysics.

Surendra worked as a Senior Scientist at the Space Applications Center (Indian Space Research Organziation), in Ahmadabad (India) for 19 years on applications of remote sensing in agriculture and management of land resources using satellite data, mathematical modeling, systems analysis. He is currently working in the IT industry, which he has been doing for the last 7 years. Surendra has done research in different interdisciplinary fields concerned with Science, Society, Religion, Culture, Jainism and the General Systems Theory. He taught Physics for about 7 years. He has about 150 reports and publications, and has also published some 60 letters in various newspapers. Surendra was born on May 24, 1950 in Udaipur (Rajasthan), India. His father is Shriman Balwant Singhji and his mother is Shrimati Lahar Kunwarji. He is married to Sunanda and they have three daughters.

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