B M I R C Monograph Series

Scientific Perspectives of Jainism

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Publisher:
Jain Vishva Bharati Institute
Ladnun - 341306 (Rajasthan, India)

ISBN: 978-93-83634-25-5
First Edition: 2017
Price: Rs. 2000/- ($100)

Cover page: Suryaprajnaptisutra, a classic of Shwetāmbara Āgama text in Prakrit, depicting Bhagawan Mahavira preaching astronomy, specifically motion of Sun, Moon and Planets (documented 1500 CE, Schoyen collection), compared with the configuration of the solar system.

Printed by: Payorite Print Media Pvt. Ltd., Udaipur

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1. Jainistic Approach to the Laws of Nature

Samani Chaitanya Prajna

Abstract

According to Jainism, the Universe and all its constituents, living and non-living, are governed by certain causative laws. The laws of nature as enunciated in the Jain canon Bhagavatī (Prākrit: Bhagavaī) are enumerated in this article. Some basic questions related to origin of the Universe and why we exist, are discussed in the light of these laws. According to Jain philosophy, occurrence of any event in living and non-living system requires appropriate conditions of *Kāla* (time), *Svabhāva* (nature of the substance), *Karma* (result of action, cause), *Puruṣārtha* (self-effort), and *Niyati* (determinism). All the five conditions apply directly or indirectly to all the systems living and non-living. These are necessary conditions for any occurrence. They apply to all the objects at all the times and everywhere. This is the reason they are known as causative laws of nature. However, the law of *Purushartha* applies only to the living systems. Besides these, certain amount of randomness also plays a role in some occurrences. There are some events which are not governed by any of the five causative laws. Looking at the five laws mentioned above it is clear that all the laws of nature are not determinate as is generally understood by the term 'Laws of Nature' in modern science.

Key words: Natural Laws, *Paramāṇu, Fusion, Fission, Pañca Samavāya*

Scriptures quoted: Bhagavaī, Ṭhāṇam, Tattvārtha Sūtra, Uvāsagadasāo

1. Introduction

In the ancient times, philosophy, science and religion were all studied as one discipline. They were so finely interwoven with each other that it was difficult to understand one without the other. In order to understand spirituality or nonviolence one was bound to know entire biological world, various forms of life

and their fundamental nature. In determining rebirth or role of karmas leading to different realms of existence, one needs to know the evolution of life and process of death. Similarly, to live a good life one must know the way the nature works. Thus the ethical principles and practices prescribed in Jainism are not mere preaching but are directly or indirectly concerned with the laws of nature.

The laws of nature (Latin: lex naturalis) are the laws which are followed by nature, and therefore, the laws are considered universal; universal in the sense that they are applicable to everything, everywhere, in every condition and at all times. Thus they are invariant in space and time. This article deals with the laws of nature, which are followed by all kinds of existences—living and non-living—in the Universeand these have been described as metaphysical, ethical and logical truths, principles and rules respectively by the Jain seers, sages and philosophers.

The doctrine of the five causative laws is technically known as the principle of Pañca Samavāya i.e. the set of five factors. These factors together determine when and how an event would occur at individual as well as cosmic level. The thing worthy to note here is: sometime among the five factors one becomes dominant and other becomes secondary. Suppose there is a plant. The plant grows when it is properly sown and taken care of by the farmer. In spite of proper care if the seed of the plant is non-fertilized then it will not grow. The seed is fertilized yet the plant grows according to its potency. If the seed is of orange, the fruits of orange will grow and not of any other type. Furthermore, however one can put his best efforts to get fruits before the time but the plant takes time to produce oranges, so time also plays a crucial role in the growth of a plant. Lastly, how long the tree will survive depends on its life-span which is pre-fixed by the Life-span Determining Karma (*Āyusya Karma*). Thus, a phenomenon occurs with the support of all the five afore-said factors and not with the support of one or two of them.

2. Historical Survey

In the west, the formulation of laws of nature dates back to an Ionian named Pythagoras (ca. 580 BCE - 490 BCE). The western concept of laws of nature, assumed to comprise of matter, space and time, emerged in the seventeenth century. The German astronomer Johannes Kepler (1571-1630) seems to have been the first to understand the term "law" in the sense of modern science, though he retained his animistic view of physical objects. Galileo (1564-1642) did not use the term "law" in his scientific works, it appeared later in the translation of his books. The person,

who first explicitly and rigorously formulated the concept of laws of nature, as we understand them today, was Rene Descartes (1596-1650).

Before the modern era the laws of nature were discussed by seers, sages and philosophers as metaphysical, ethical and logical rules. In the east, the discovery of laws of nature dates back to the 24th Tīrthaṅkara, Bhagawān Mahāvīra (599 BCE-527 BCE). Jainism, which propounds that natural laws govern all events in the universe, is based on five fundamental doctrines: Doctrine of Soul (*Ātmavāda*), Doctrine of Karma (*Karmavāda*), Doctrine of Action causing karmic bondage (*Kriyāvāda*), Doctrine of multiple natures of the constituents of the universe, i.e. jīva and ajīva (*Anekāntavāda*), and Cosmology (*Lokavāda*).

Bhagawān Mahāvīra was the first to explain the laws governing the universe, the living and non-living, and behaviour of a wide variety of objects, the smallest and the largest entities. For example, he propounded the four-parametric principle, involving *dravya* (substance), *kṣetra* (space co-ordinates), *kāla* (time co-ordinates) and *bhāva* (mode or *paryāya*), which act together for an event to take place. He also described properties, function, structure, minimum and maximum speed of a Paramānu and laws of their aggregation and disaggregation. Apart from the aforesaid principle, he talked of the intrinsic power of attraction of soul and matter, motion of planets, solar and lunar eclipses, conservation of quantity of matter and souls, cosmology, mass less particles, law of inertia, spherical shells surrounding the earth, black holes in the form of *Tamaskāya* and *Kriṣṇarājī*, etc. The observations and predictions of physical realities are astonishing and remarkable milestones in the history of human understanding of nature.

Mahāvīra's realization that all souls, whether it is the soul of Kunthu, the smallest being, or the soul of the large-sized elephant, are identical in regard to their spiritual potentials, so there is no lower or higher beings among the living beings, implying that the Universeis not human-centered. It was really a milestone in our understanding of the cosmos. Since Mahāvīra did not use the scientific methodology that is popular now, his theories did not need experimental verification but were accepted because he was omniscient. Also, the laws governing living beings and the physical laws governing the material universe, enunciated by him are similar in many respects. In many cases his insight leads to the conclusions which are surprisingly similar to what highly sophisticated scientific methods and techniques have shown recently.

Although the knowledge of Mahāvīra was based on extra-sensory-perceptio (ESP) of the world, his predictions regarding a number of cosmological phenomen are accurate. He talked of the number of planets, stars, solar and lunar eclipse, an longest and shortest days and nights in a year. He defined *Samaya*, the smallest uni of mathematical time, to *Śīrṣaprahelikā*, the biggest unit of mathematical time. I regard to the time, he not only mentioned mathematical time as *Samaya* and *Āvalik* etc. but also symbolic time as Palyopama, Sāgaropama, and Kālacakra (one time cycle) comprising *Utsarpiṇī* (the ascending time) and *Avasarpiṇī* (the descendin time) sectors. By developing metaphysical and ethical principles Mahāvīra not onl focused on why nature behaves as it does, but also explained how it does. In short what he said can be marked as the initiation of the modern scientific thoughts an principles.

In fact, Jain science can be taken as an endeavor marked by a strong interest i uncovering the nature and its laws to explain transcendental and empirical realities Looking at the laws of nature discussed by Mahāvīra it seems that we live in a highl orderly universe.

3. Some Basic Questions Regarding the Universe

There are some questions in regard to the Universe which compel to think o some laws working behind the cosmic process. Now we look into thre fundamental questions from Jain perspective:

Why the Universe has something rather than nothing?

Why do we exist?

Why the Universe follows a particular set of laws and not some different laws?

The answer to the first question is that there must be something pre-existen otherwise the world would have nothing. Nothing comes out of nothing as said i the famous saying *ex nihilo nihil fit*. If the Universe exists, it must have come out o something which was prior to it. In this regard the statement of Mahāvīra is worth noting. He says, "If something is not prior and after, how it can exist in between?" It propounds the law of conservation. There is nothing new, only the restatement o what already exists. If there was nothing in the beginning then how the Universe came into existence, since nothing can come out of nothing. If something can come out of nothing then anything can come out of anything and there will be no need to look for any causal relation between two particular things.

Thus, the Jain model of Universe considers theological speculations in regard to the origin and fate of the Universe as full of contradictions and irrelevant to salvation, and such speculations must, therefore, be avoided. To say that God made the world is to face the fallacy regress *ad infinitum*. Like Nyāya-Vaiśeṣikas or later Sānkhyas, to say that the material arose naturally is to fall into another fallacy. Then the whole Universe might have arisen naturally and there would be no need of intervention of God in such a naturally arising universe? If God is ever perfect and complete, how could the will to create, which is a sign of incompleteness, arose in him? If, on the other hand, he is not perfect, he would create the world in no better way than a potter could. "If out of love for living beings and their needs he made the world, why did he not make the creation wholly blissful, free from miseries and sorrows? These and other such questions arise which are difficult to resolve satisfactorily. According to Jainism, the world is uncreated. It existed before and will exist hereafter, forever. It is without beginning and is eternal.

According to Jain philosophy, the Universe comprises of five fundamental homogeneous entities technically called *Astikāyas: Dharmāstikāya* (the medium of motion), *Adharmāstikāya* (the medium of rest), *Ākāśāstikāya* (space), *Jīvāstikāya* (soul) and *Pudgalāstikāya* (matter and energy), besides *Kāla*. According to Jain philosophy and modern science, the quantity of matter and souls remain the same all the times and therefore, there is no question of emergence of any new paramānu or living being who has no prior existence. The substance remains unchanged, only its form or mode changes with time. Thus, in Jain view, the world is eternal, perennial, indestructible, and permanent and has no end. There was no point of time when the world was not, is not and will not be there. It was, is and will always exist. Hence, Jains do not see any role or intervention of God, the Creator, in creation or regulating the universe.

The five fundamental entities mentioned above neither originate nor get destroyed. They are eternal and ever existent. The scripture *Sthānāṅga* (Prākrit: *Ṭhāṇam*) clearly states: *Paramāṇu* and soul, mobile and immobile living beings, animals and humans – all were, are and will always be there in the world. It happens that some species become extinct and some new ones emerge in the course of time in a particular region of space but there has never been a time when animals and humans have no existence in the universe. In this regard, the Jain concept of evolution is different from the Darwinian Theory of Evolution. Jains regard that a human may evolve to the higher or lower species depending on one's action, good

or bad. Life at various places in the Universe may evolve or devolve, depending on the local conditions. This becomes evident from the concept of 'ārās' discussed under concept of time in Jain philosophy. If the initial conditions are bad, there is decline in quality of life and if the initial conditions are favorable, there is improvement in the quality of life with time.

Rene Descartes also accepted the importance of what we call "initial conditions". According to him, "The conditions describe the state of a system at the beginning of whatever interval of time over which one seeks to make predictions". In his view, "with a given set of initial conditions, the laws of nature determine how a system will evolve over time, but without a specific set of initial conditions, the evolution cannot be specified".

3.1 Why do we exist?

So far as the question of the purpose of humans on earth is concerned, science has no definite answer. But the Indian philosophy in general and the Jain philosophy in particular is very much clear about the purpose of human existence on the earth; the purpose of human life on the earth is to evolve spiritually and ultimately to elevate oneself to the state of purity or perfection.

3.2 How does the Universe work?

Several myths prevail in different cultures in regard to the creation of the universe. It is, in fact, the ignorance of the laws which led people in ancient times to invent gods to lord over every aspect of their life. "Since the connection of cause and effect in nature is invisible and not instantaneous, such gods apparently are attributed the role. In the east, the belief in super-natural powers or the trend of associating natural phenomena with various deities started to weaken with Mahāvīra. In the west, it was Thales of Miletus (ca. 624 BCE-ca. 546 BCE) about 2,600 years ago, with whom the idea of gods began to change. Instead, the idea arose that nature followed consistent principles that could be deciphered and understood. "And thus began the long process of replacing the notion of the reign of gods with the concept of a Universe that is governed by laws of nature, and was created according to a blueprint we could someday learn to read.

Jainism is very firm in its assumption that the Universe is regulated by certain laws. After analyzing the nature of the micro and macro world, the Jain seers have identified some determinate and indeterminate laws governing the cosmic processes. In their view, since nature works according to certain laws, there is no

need to invoke any creator God who sets things of the Universein motion and controls its destiny.

As far as the multiverse theory is concerned, the Jain view differs from modern science in its understanding of the universe. According to the Jain cosmology, the Universeis one and very vast. It is divided into three parts Upper (*ūrdhva*), Middle (*madhya*) and Lower (*adho*) Universe (*loka*). We, humans and animals, dwell in the middle part. Most of the lands of the middle part are unsuitable for habitation by humans. Only the central part of it which comprises of two and half islands: Jambūdvīpa, Dhātakīkhaṇḍa and half of the Puśkaravaradvīpa, technically known as Samaya-kṣetra or Mānuṣya-kṣetra or Dhāidvīpa is suitable for human form of life. Thus, the human region is a tiny part of the grand cosmos (for detailed maps of these lands, see the articles on Jain Geology and Jain Cosmology in this volume).

Stephen Hawking and Leonard Mlodinov, in their book *The Grand Design*, have discussed the ways in which the quantum theory predicts "multiverse"- the idea that ours is just one of the many universes that appeared spontaneously out of nothing, each with different laws of nature. Concluding with a riveting assessment of M-Theory, an explanation of the laws governing our universe, they write that creation of multiverse does not require intervention of some Supernatural Being or God. Rather, these multiple universes arose naturally according to physical laws.

Thus, the atheist approach, the vastness of the Universeand different laws of nature discussed long ago by the Jain seers, are now being increasingly accepted by scientists. So far we have briefly presented the Jain view of the Universeand a few aspects of agreement with modern cosmology. More details, agreements and disagreements can be found in the articles by Rangarajan and others in this monograph.

4. Laws of Nature

Just as science leads to technology so does philosophical inquiry leads to ethical applications. Deeper is the metaphysical understanding, stronger is the ethical application. Ācārya Mahāprajña said, "As one goes deep into reality, one loses one's own interest in the external world and as one loses one's own interest in the external world, one goes deep into the reality". Due to its deeper analysis of metaphysical realities, Jainism could evolve strong ethical principles and practices. Being emphatic on ethical issues, Jainism is recognized as an Ethical Realism. The ethical principles of Jainism are closely connected with the laws of nature. In the

search of laws of nature, thinkers have identified five causative factors, appropriate combinations of which control every process or event in the universe:

- *Kāla* (Time)
- *Svabhāva* (Nature of things)
- *Karma* (Principle of action and its consequences)
- *Puruṣārtha* (Self-exertion or effort)
- *Niyati* (Determinism/Destiny)

4.1 Time

In the four-parametric theory given by Mahāvīra, four factors: the nature of substance, space, time and modes are considered important in explaining any phenomena. Like other factors time is not passive, it also affects cosmic processes. If the time is favourable, everything goes on smoothly. If the time is against then things would go wrong.

Metaphysically speaking, time is nothing but the change which takes place every moment in every object. The change of a single moment is subtle, inexplicable and invisible to common man. It can be experienced only by the extra-ordinary perception.

Samaya is the smallest indivisible unit of time. It is 'absolute' in the sense that the samaya is the same all the time and everywhere. Considering *samaya* as the smallest unit, other units of time have been fixed. The absolute, mathematical time starts with *Samaya* and ends with *Śīrṣaprahelikā*, while the symbolic time units' starts with Palyopama and ends up with a time-cycle called one *Kāla cakra* or one set of *Utsarpiṇī-Avasarpiṇī*. Duration of one time-cycle (*Kāla cakra*) is 20 trillion Sāgaras.

In the Indian tradition, whether it is Jain, Vedic or Buddhist, concept of time is regarded cyclic. But when time is analyzed in depth, it appears that time is both cyclic as well as linear. From the historical point of view time is cyclic, since the same era and events repeat after an interval. From metaphysical point of view time is linear. It is for two reasons: one, time has no expanse (dimension) in space, vertically or horizontally, and therefore, is called *Anastikāya* i.e. non-extended reality. It is a single unitary moment. The past moment is gone; the future moment is yet to come; only the present moment exists at all the times and therefore the past, present and future moments have no connection with each other. Each moment is separate and independent of the other. Secondly, time is infinite. It flows continuously from the

infinite past to infinite future. It means the moment which is passed is passed forever and will never return. Each moment is new. Hence, time is linear. Thus, Jain concept of time is cyclic as well as linear. Jains also believe in the eternity of time. As mentioned earlier, according to Jain philosophy, time did not begin with the creation of Big Bang as scientists postulate.

4.2 Nature of Things

The innate nature or natural qualities of an object also play an important role in occurrence of an event. Things work in a particular way because of innate nature of substance. It is the natural qualities of a seed due to which the plant produces particular type of fruits. Logic and effort made against the nature either fail or bring adverse results. A philosopher has rightly remarked, "*svabhāve tārkikāh bhagnāh*" i.e. "The logicians fail before the nature".

4.3 Karma

The doctrine of karma deals with why and how every action affects the doer. The effect of any action depends on two things: 1. Intention or intensity of passions (*rāga* and dveṣa: attachment and aversion) and the mode of the action. In what way and how long karmas affect a soul depends on the intention of the doer, while the type and quantity of karmas affect the soul, depending on the mode of the action. For example, one kills the other with extreme cruelty or bad intention. The karmas earned by the act of killing would affect the killer adversely for a longer time and with more intensity. Contrary to it, if a living being is killed by mistake or unintentionally, the effect of karmas will be mild and also for a short time. The theory of karma has been extensively dealt with in the vast literature known as Karmagrantha developed over the centuries in Jain tradition and is summarized in some accompanying articles which discuss the doctrine in context of modern biology and neuroscience (see accompanying papers by N.L. Kachhara, S. Tater, S. Jain, R. Jansma and others). To understand the core of spirituality in Jainism one need to know the theory of Karma.

4.4 Self-exertion

Without self-effort nothing is accomplished. To indicate the importance of self-exertion Mahāvīra used five words: *utthāna* (enthusiasm to do something), *bala* (force to execute the task), *vīrya* (inner energy to achieve something), *puraskāra* (efforts to materialize the goal) and *parākrama* (action to accomplish something). To achieve something one needs to make one or all five types of effort. Other factors

may be dominant in some situations, but it does not mean that they become effective without putting any effort. For example, it is true that one who is born certainly dies. Death is inevitable with birth and therefore, is governed by the factor niyati, but how one dies depends on many other factors.

Being mainly a spiritual tradition, Jainism gives paramount importance to the law of self-exertion: free will, choice and action. According to it, the world consists of two realities: Living and non-living. In spite of being governed by the laws of nature, the living beings are different from non-living in many respects. The living beings have free will and choice of action which the non-livings do not have. By using the power of free will, choice etc. the living being can change the effect and duration of Karmas. The strong desires and rigorous practices to accomplish something special are the results of the free will of the living beings. Firm determination, commitment and resolution are also outcome of the free will, choice and action of the living beings. The fate of a living being is mainly governed by the law of self-exertion. In fact, karma is the result or reaction of the past action. The fate of living beings is governed mainly by the two factors: self-exertion and karma. Other factors are subordinates.

Without action karmic particles neither attach to the soul nor come into effect. The behavior of physical object is mainly governed by the laws of nature, while the behavior of a living being is mainly governed by his free will. In practical world even the non-living entities, especially matter, is affected by the will. For example, the bricks assembled by effort take the shape of house etc. Similarly, the oil is in seed but it comes out when the seed is crushed. Even the nature is directly or indirectly gets affected by human behavior. The world today is facing problems of global warming, ecological imbalance and environmental pollution mainly because of the consumerism and over-exploitation of the natural resources by humans.

Among the various causative factors the self-exertion or free will has its own importance. There are certain things, especially those which are amenable to change, can be changed or controlled by effort. Sometimes one can call it miracle or God's intervention. Jain view is that something appears as miracle till one does not know the concerning laws working behind it. There is no other way to achieve the goal than putting in efforts.

4.5 Determinism

Determinism is also an important factor in an occurrence. There are certain things that are sure to happen and will necessarily follow. For example, one who

takes birth necessarily dies. Everything that originates necessarily decays. There is no power which can hold or stop things decaying even for a single moment. Even cosmetic surgery cannot stop aging process of a human body. Similarly there are certain things which occur in a fixed pattern. For example, fertilization or non-fertilization of a seed is pre-fixed. To be eligible (*bhavya*) or not-eligible (*abhavya*) for liberation of a person is pre-fixed. There is no other law then destiny, which determines who will be liberated and who will not.

Sometimes in spite of putting all efforts, things do not occur in the way it is expected. Failure of efforts compels sometimes to believe in determinism as it is seen in the case of Maṅkhalī Gośālaka, a disciple of Mahāvīra. Once Gośālaka was with Mahāvīra and they were passing through a village named Siddhārtha. On his way, he saw a mustard plant and asked Mahāvīra, whether the plant will grow or not? "The plant will grow and the souls of its seven flowers will be reborn as a plod with seven seeds", said Mahāvīra. To falsify Mahāvīra's prediction, Gośālaka uprooted the plant and threw it away. After an interval when he was returning with Mahāvīra by the same route, Gośālaka found that the plants had grown. From that time, Gośālaka became a great exponent of determinism.

Mahāvīra was not in favour of any absolutist approach to any of the laws of nature. His non-absolutist approach to the law of determinism becomes clear when he had dialogue with Śakaḍāla, a strict follower of determinism. He was of the firm belief that everything which occurs in the Universeis predestined. Once Mahāvīra asked him, "suppose all the pitchers, prepared by you, are destroyed by someone then what would you do with him? Śakaḍāla replied that he would beat up the person. "What is the fault of the person if the destruction of the pitchers is predestined? Śakaḍāla realized the limitation of the law of determinism and became a true follower of Mahāvīra. Thus, the law of determinism has also its limit. It does not work anywhere and everywhere. There are other laws too which are simultaneously working in the universe.

5. Limitations of the Laws

If Universeis governed by the laws of nature, three questions arise:

1. What is the origin of the laws?
2. Are there any exceptions to the laws, i.e. miracles or supernatural phenomena?
3. Is there only one set of laws applicable everywhere?

These questions have been addressed differently by different scientists philosophers and theologians. The answer to the first question in Jain perspective is that the laws are eternal since the Universe is eternal. If the Universe with all its complicated processes exists, it must be governed by some laws and the laws must be eternal. Hence, there is no question of the origin of laws; the laws are always there as part of the nature.

So far as the second question is concerned, apart from the aforesaid five factors, the principle of uncertainty also works. There are certain things which cannot be predicted with accuracy beforehand. For example, the time between minimum and maximum time limit of a *paramāṇu* for coming from non-vibration to vibration state is uncertain and therefore, unpredictable. Mahāvīra was asked about the minimum and maximum time a *paramāṇu* takes to come into motion. He said, "A *paramāṇu* takes minimum one moment (*samaya*) and maximum innumerable moments (*asaṅkhya samayas*) to come into motion". But he did not quantify the time it takes since it is unpredictable. A *paramāṇu* may get into motion even after two or three moments or more.

What follows from the above discussion is that Jainism posits two types of laws: Determinate/certain and Indeterminate/Uncertain. So, to say that all the laws of nature are fixed and determinate is not absolutely true. There are certain events which occur in a particular way are certain, but there are some events which are subject to indeterminacy or uncertainty. Even the omniscient cannot predict precisely about them.

The opinions of the western philosophers and scientists in regard to the second question have been sharply divided. Plato and Aristotle, the most influential ancient Greek philosophers, think that there can be no exception to the laws. As far as the biblical view is concerned, the Christians firmly believe that God has not only created the laws but can be appealed by prayers to make exceptions to heal terminally ill, to bring premature end to droughts etc. In opposition to Descartes' view, almost all Christian thinkers maintain that God must be able to suspend the laws to accomplish miracles. Even a rational scientist like Newton believed in miracles of sorts.

In Newton's view, the orbit of the planets would be unstable because the gravitational attraction of one planet towards another would disturb the orbits which would grow with time and result in the planets either falling into the sun or

being flung out of the solar system. God must keep on resetting the orbits or "wind the celestial watch, lest it runs down.". However, like the Jains denying the intervention of divine power and accepting the laws, Pierre-Simon marquis de Laplace (1749-1827) argued, "The perturbations would be periodic, that is, marked by repeated cycles, rather than being cumulative. The solar system would thus reset itself and there would be no need for divine intervention to explain why it had survived to the present day". Scientific determinism, formulated by Laplace, is now the accepted position. Given the state of the Universe at one time, a complete set of laws fully determines both the future and the past, excludes the possibility of miracles or an active role for God.

Recent studies apparently seem to suggest that it is our physical brain, which acts according to the laws, that determines our actions and not some agency like' soul' which is not governed by these laws. Yet the outcome is determined in such a complicated way and with large number of variables so as to make it impossible to predict human behaviour. It is impractical to formulate the underlying physical laws of human behavior. In such a situation, the psychologists adopt an 'effective theory' to explain human behavior.

In physics, an effective theory is a framework created to model certain observed phenomena without describing in detail the underlying processes. In the case of humans, since we cannot solve the equations that determine our behavior, we use the effective theory that people have free will. This effective theory is only moderately successful in predicting human behavior because decisions of a human being are often not rational. Sometimes they are emotional or are based on a defective analysis of the consequences of the choice.

6. Why this set of laws and not some other? why are the laws of nature so constant?

In answer to the question, why this set of laws and not others, it can be said that in Jain view, Time, Nature of Things etc. are only the laws which apply to all the systems and operate all the times. Their application can vary depending on the individual, geographical, temporal and situational conditions and, quality. To understand the application one needs to understand the Jain geographical concepts. In Jain view, the Universe (*Loka*) is very vast. It is divided into three parts: upper, middle and lower. The human beings live in the middle part. The application of the laws in human sphere is not the same. For example, the application of the law

of time differs in Bharata and in Airavata, in comparison to Mahāvideha of Jambūdvīpa which is in the middle of the middle universe. In Mahāvideha the time always remains equivalent to fourth *ārā* (era). There is no ascending and descending order of time. Contrary to it, in Bharata and Airavata there are both ascending and descending orders of time having six types of *ārās*.

7. Exceptions to the Laws

The laws of nature under discussion are universal. They are the principles which govern all the phenomena. Hence, in normal conditions there is no exception to these laws. Apart from these laws some randomness takes place and for that Jain philosophers have no answers. They call it wonder (*acherā/āścarya*). Such wonders happen once in hundreds or thousands of years. In the long history of Jainism we find ten such wonders. They are, for example, a woman named Malli Kumari, becoming the 19th Tīrthaṅkara or the birth of Rishabha in the third *ārā* to liberate and become Tīrthaṅkara . Thus, in understanding and explaining any phenomena, whether it is a real object or laws, the Jain approach has always been non-absolutist.

All the natural laws can be broadly divided into two categories: 1) Metaphysical and 2) Rational. The metaphysical laws can again be divided into two categories: Determinate and indeterminate. The determinate metaphysical laws work all the times and everywhere. They are universal and eternal. The indeterminate laws vary from person to person since they are governed by the karmic laws, freedom of will, choice and action along with specific innate potentials of an object. The rational laws work mainly in the past and present times. If the initial conditions change, the consequences will automatically change. Many theories or laws based on scientific observations and experiments become outdated with new research, as more observations are made. With the invention of new theories the limitation of the existing theories becomes clear.

Many scientists presume that a law of nature is based on an observed regularity and can be used for predictions that go beyond the immediate situation upon which it is based. But, according to philosophers, all generalizations cannot be thought of as laws of nature. Some generalizations may be falsified in future and therefore, cannot be considered as laws. Ācārya Mahāprajña endorses this opinion when he writes that all generalizations, especially rational ones, are not universal, since they may change in future. Philosophers are unanimous that most of the laws of nature exist as part of a larger, interconnected system of laws. The Jain canons

Ācārāṅga and *Daśavaikālika* support it. Scientific laws of nature are usually formulated in mathematical terms. They can be either exact or approximate, but they have been observed to hold without exception if not universally, at least under a stipulated set of conditions. For example, Einstein felt an urgent need to modify Newton's laws when the objects were moving close to the speed of light. Yet Newton's laws are considered to be valid laws, for conditions encountered in everyday world, in which the speeds are far below the speed of light. We conclude by stating that the laws, discovered by omniscient or the universal observer are eternal while the laws, discovered by the logicians or philosophers, may be subject to change in future.

8. Conclusions

In concluding remarks, it can be said that to know the reality, whether it is law of nature or any phenomena, one needs to observe the reality as such without any pre-supposition or bias. The truth itself reflects in unbound pure consciousness. The omniscient, yogis, seers, sages, and saint-philosophers use this technique to observe the realities: empirical and transcendental. As a result, they could discover some laws applicable under all conditions and everywhere. They have not only created this new knowledge but on the basis of this knowledge they have also evolved such ethical principles and practices which are equally universal and are necessary to create a harmonious and peaceful world-order. Clearly, one presupposition of this article is that the Universe is not of our making. It is self-made, ever existent and regulated by its own laws. The Universe is eternal and not a construct of mind or consciousness or any Supreme Being. It works in a particular way as explained in this paper. *Given the sheer size of the universe, the human effect on it is infinitesimal.*

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3. *Bhagavaī (Viāhapaṇṇatti)*, ed. Ācārya Mahāprajña, Tr. Muni Mahendra Kumar and Nathmal Tatia, Jain Vishva Bharati, Ladnun, 1st edn. 2005, 2.45 pp 346-7 – Cauvvihe loe paṇṇatte, tam jahā - davvao, khettao, kālao, bhāvao.
4. Ibid 5.150 p. 275
5. Ibid 5.16 p. 282–paramāṇūpoggale....aṇaḍḍhe amajjhe apaese no saaḍḍhe no samajjhe no sapaese.
   (ii) Ācārya Tulsi (1995), Illuminator of Jain Tenets, Tr. Satkari Mookerjee, Ladnun: Jain Vishva Bharati, p. 1.14-19, pp 6-11.
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   Jīvā ya poggalā ya aṇṇamaṇṇabaddhā, aṇṇamaṇṇapuṭṭhā,
   aṇṇamaṇṇamogāḍhā, aṇṇamaṇṇasiṇehapaḍibaddhā,
   aṇṇamaṇṇaghaḍattāeciṭṭhanti? Hantā atthi.
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10. *Bhagavaī* 3.253 p.98– candovarāgā i vā sūrovarāgā i vā....
11. Ibid 1.191-99 pp 99-100 – esa ṇam poggale tītamaṇantam sā, sayam....esa ṇam jīve tītam aṇantam sāsayam samayam bhuvīti vattavvam siyā; 208-jīvā no vaḍḍhanti, no hāyanti, avaṭṭhiyā, p.35.
12. Ibid ...loe ya aloe ya puvvim pete, pacchā pete do vete sāsayā bhāvā, aṇāṇupuvvī esā Rohā! Puvvim bhante! aṇḍae, pacchā kukkuḍī? Puvvim kukkuḍī, pacchā aṇḍae?
    ...evāmeva Rohā! se ya aṇḍae, sā ya kukkuḍī puvvim pete, pacchā pete do vete sāsayā bhāvā, aṇāṇupuvv esā Rohā!; (ii) Ibid, 2.45-47; 11.90-110; 20.62-63.
13. Ibid 1.404-410, pp 67-68–...poggalatthikāe...garuyalahue vi agaruyalahue vi.
14. Ibid 25.92-paramāṇupaggalāṇam....aṇuseḍhim gati pavattati, no viseḍhim gati pavattati.\
15. Ibid 1.298 –Evam loyante ya sattame ya taṇuvāe. Evam ghaṇavāe, ghaṇodahī....
16. Ibid 6.70-88 pp 246-249 – (i) no puḍhavī tamukkāe tti pavvucca, āutamukkāe tti pavvuccati. (ii) Ibid 6.89-110, pp 249-250-...aṭṭha kaṇharātio paṇṇattāo.
17. Ibid 7.158– hantā Goyamā! hatthissa ya kunthussa ya same ceva jīve.
18. Ibid 6.132 pp 157-158 –(i) asaṇkhejjānam samayāṇam.....Sīsapaheyāṇge, sīsapaheliyā...; (ii) Ibid, 6.133-134, pp 258-260, ovamie duvihe paṇṇatte, tam jahā paliovamya, sāgarovame ya.
19. *Bhagavaī* 2.124-129 p.114, paṇca atthikāyā paṇṇattā, tam jahā dhammatthikāe, adhammatthikāe, āgāsatthikāe, jīvatthikāe, poggalatthikāe.
20. Ibid 1.191-199, p 35– ...esa ṇam poggale tītam aṇantam sāsayam.
    ...esa ṇam jīve tītam aṇantam sāsayam samayam bhuvīti vattavvam siyā.
21. Ibid 1.133-138 pp 27-28–...atthittam atthitte pari□amai natthittam natthitte pariṇamai....
22. Ibid 2.45 p.87– na kayāi na bhavissai bhavinsu ya, bhavati ya, bhavissai ya dhuve niyae sāsae akkhae avvae ava□□hie, nice, natthi pu□a se ante.
23. *Ṭhāṇam* (VS 2033), ed. Ācārya Mahāprajña, Jain Vishva Bharati, Ladnun, 2.1, p.35.
    Jadatthi □am loge tam savvam dupaoāram,tam jahā jīvacceve ajīvacceva. Tasaccevāthāvaracceva....
24. Ācārya Mahāprajña, *Jaina Darśana Manana Aur Mīmāmsā* (1995), Adarsh Sahitya Sangh Prakashan, Churu, pp 233-250.
25. The Grand Design, p.26
26. *Bhagavaī* 1.20, pp 36– Savve te uppaṇṇanāṇa-dansaṇadharā, arahā jiṇā kevalībhavittāt ao pacchā sijjhanti, bujjhanti, muccanti parinivvayanti savvadukkhāṇamantam karensu vā, karenti, karssantivā.
27. *The Grand Design,* p.17
28. *Bhagavaī* 11.110; 20.62-63
29. Ibid 2.122, 123 p.113–Goyamā! Addhāijjadivā, do ya samuddā, esa ṇam evaie samayakhetteti pavuccati.
30. *The Grand Design,* pp 8-9
31. *Ācārāṅgabhāṣyam,* ed. Ācārya Mahāprajña, Jain Vishva Bharati, Ladnun, 1st edn. 1994, p.169.
    Yathā yathā samāyāti samvittau tattvamuttamam,
    Tathā tathā na rocante viṣayāḥ sulabhāḥ api
    Yathā yathā na rocante viṣayāḥ sulabhāḥ api,

Tathā tathā samāyāti samvittau tattvamuttamam

32. *Sanmati Prakaraṇa* of Siddhasena Divakar (1st edn. 2008), Tr. Dhirajalala Dahyalala Mehata, Surat: Jaina Dharma Prasarana Trust, 3.53–
kālo sahāvaniyai, puvvakayam purisakāra neganta/
Micchattam te ceva uvvam, samāsao hoti sammattam//

33. Ibid 11. 128–se ṇam samayatthayāe āvaliyatthayāe jāva ussappiṇitthayāe....
chijjamānijāhevibhāgam no havvamāgacchai, settamsamaesamayatthayāe....; (ii) 6.132-134 pp 257-260-
...visam sāgarovamakodākodio kālo osappini ussapini ya.

34. Ācārya Tulsī, *Illuminator of Jain Tenets,* 2.1, p.1– ....opacārikam dravyamasau.

35. *That Which Is (Tattvārtha Sūtra)* (1994), tr. Nathmal Tatia, London: Harper Collins Publishers, 5.39, p.14– so'ṇantasamayaḥ.

36. Stephen Hawking and Mlodinow Leonard (2010), *The Grand Design*, New York: Bantam Books, p. 51.

37. *Bhagavaī* 1.174-Goyamā! aṭṭha kammapagaḍio paṇṇattāo....

38. Ibid 1.146 p 28–evam sati atthi utthānei vā, kammei vā, balei vā,
Vīriyeī vā, purisakkāra-parakkamei vā.

39. *Sanmati Prakaraṇa* of Siddhasena Divakar (1st edn. 2008) 3. 43.
duviho dhammavāo, aheuvāo ya heuvāo ya/
tattha ya aheuvāo, bhaviyābhaviyādao bhāvā//

40. *Bhagavaī* 15.75 p.669–
taeṇam tassa Gosalassa Maṇkhaliputtassa te satta tile
ganamaṇassa ayameyaruve ajjhatthie cintae patthie manogae saṇ
kappe samuppajjithā- evam khalu savva jīvā vi
pauṭṭaparihāram pariharanti-'esaṇam Goyamā!
Gosālassa Maṇkhaliputtassa pautte',
esa ṇam Goyamā! Gosālassa Maṅkhaliputtassa mama, antyaoāyaeavakkamane paṇṇatte.

41. *Uvāsagadasāo* 7.25-27

42. Ibid 5.169–paramāṇupoggale ...jahaṇṇeṇam egam samayam,
ukkoseṇam asnkhejjamkālam evamjāvaanantapadesio.

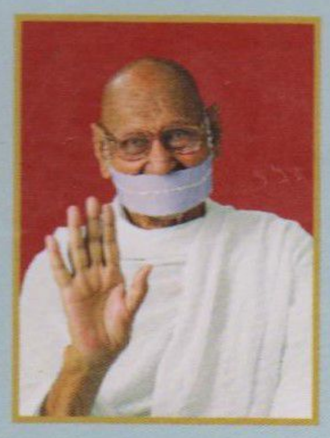
43. *The Grand Design,* p. 30

44. Ibid, p. 30

45. *Bhagavaī* 2.125–se samāsao pañcavihe paṇṇatte, tam jahā - davvao, khettao, kālao, bhāvao, guṇao.

46. *Thānam* 10.160, p. 947–dasa accherāya paṇṇattā...itthitittham... kaṇhassa....

47. *Acārāṅgabhāṣyam* 1.39 p. 47– ṇeva sayam logam abbhāikkhejjā, ṇeva attāṇam abbhāikkhejjā, je loyam abbhāikkhāi, se attāṇam abbhāikkhai, je attāṇam abbhāikkhai, se loyam abbhāikkhai. (ii) Tattvārthasūtra 5.21 p.131–Parasparopagraho jīvānām.....



Jain Philosophy and Scientific Quest

Since time immemorial, the philosophers and scientists of different schools and streams have asked the question, "Who created this world? Why? When? And How?" Jain philosophy maintains that the world is not a Creation of anybody like God. It just exists out there since beginning less time and would remain so for ever.

The world is made of two basic ingredients *Jiva* (living being) and *Ajiva* (nonliving entity). When these two intermingle they take a certain form, which is the world. Both *Jiva* and *Ajiva* are basic elements, the world is their expanse. There are three factors characterizing every *Jiva* and *Ajiva* – *dhrauvya* (continuity), which works alongside the other two viz., *utpada* (creation) and *vyaya* (destruction). Everything is prone to change; there is one element, *dhrauvya,* that is not amenable to change.

Any substance has two attributes persisting and successive. The former is called *guna* (property) and it implies that the *dravya* (substance) is eternal. The latter is called *paryaya* (mode), which denotes movement or capacity to change. What we perceive through our senses is only the *paryaya* and not the basic element of anything, *jiva* or *ajiva.*

The soul is *amurta* (non-corporeal) and cannot be perceived or known by senses, mind and intellect. Its attribute is consciousness which is known only through its function, it cannot be directly comprehended through sensory perception. The soul illuminates itself as well as others. It is capable of knowing itself as well as the objective world. Souls and the material bodies exist bound with each other, in contact with each other, pervading each other, stuck with each other through mutual attraction and unified with each other through mutual identification. *Jiva* has both the capabilities – consciousness and capacity to acquire, whereas the *pudgala* (matter) is non-conscious but has the property to get attracted.

In the present age of science one feels exalted by calling one's religion as a "scientific" one. It is easier to consider Jainism as a scientific religion but I feel that Jainism qualifies itself to be placed in the category of a science due to its spirit of scientific inquiry. It explores the truth through scientific mode and does not stop till that truth is fully realized. Since our world is constantly changing, the truth also has two aspects viz., (1) eternal and (2) ever changing. Both are inevitable. Jain philosophy has accepted both change and non-change as the two aspects of truth. Jain philosophy concedes to both, the soul as well as matter, since both of them have independent existence.

Why Jainism does not believe in God as the Creator? Jainism says that any fundamental existence can have no creator. Modes have creator. All the modes of soul are created by the soul itself and the modes of *pudgala* are created by *pudgala.* Soul can create its modes through volition; *pudgala* has no volition so the modes of *pudgala* are created by laws of nature. There are two kinds of laws – (1) Universal Laws and (2) Man- made Laws. The search for truth means the search for Universal Laws. Modern science has developed itself on the basis of such research. It finds out the Laws and a new secret is revealed. The philosophical search for truth is nothing else than the realization of the Eternal Laws. Same is the objective of science, which explores these Laws through experiments and observations.

- Acharya Mahaprajna

(From *Philosophical Foundations of Jainism)*

ISBN: 978-93-83634-25-5

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