PROCEEDINGS OF JAIN ACADEMY OF SCHOLARS

Devoted to Synthesis of Jain Darshan and Science

Samosaran, 15th Century, Patan

PROCEEDINGS
OF
JAIN ACADEMY OF SCHOLARS

Devoted to Synthesis of Jain Darshan and Science

Jain Academy of Scholars,
804, Yash Aqua, Vijay Cross roads,
Navrangpura, Ahmedabad 380009, India

Editorial Board

Price: 425/-

002

Cover Page: Samosaran at Patan, 15th century, Patan

~~March 2020~~
October 2020

Published by Dr. Narendra Bhandari,
on behalf of Jain Academy of Scholars, Ahmedabad, India

Web: https://www.jainscholars.com
Email : scienceandspirituality7@gmail.com, nnbhandari@yahoo.com
You tube: https://youtube.com/channel/UCLiCWWAf00GEJ2eNsIyarZA;
Contact : +91-9824077890, +91-48977890

Contents

Editorial: Road Ahead for Jain Philosophy
Narendra Bhandari 1
General Articles 4
A Modern View of Jain Philosophy
Narendra Bhandari 4
सम्यक् जीवन शैली
श्रुतरत्नाकर, अहमदाबाद 9
Research Articles 12
Scientific Basis of Violence and Nonviolence
Pratap Sanchetee and Prashant Sanchetee 12
The Subtle and Elementary Physical Structures in Jainism Perspective
Narayan Lal Kachhara 18
Meditation (Dhyan): A Path From Aggressiveness to Non Aggressiveness – Empirical Studies on School Children
Viney Jain 25
News and Views 34
Science and Jainism 34
Book Reviews 35
Articles and Webinars of Interest 39
Forthcoming Events 40
Academy News 42
Nomination Forms 44
Template For Preparing Papers 48
Instructions for Authors 50

Editorial

The Road Ahead for Jain Philosophy

Narendra Bhandari

Every person believes that his religion is the best and most persons think that his/her religion is superior to other religions. That is how people are told from their childhood, taught, brainwashed and convinced. Jains also think that Jainism is the best, but because of their basic concept of *Anekāntāvad*, a Jain does not think that it is superior to other's; other religions may also be equally as good in concepts and practices, another path to attain enlightenment. For this reason and because of their belief in coexistence and non-violence, Jainism has come to a very dire state in the world today and this is the motivation of this editorial.

In spite of being rich in philosophic concepts derived directly from the eternal laws of nature, the academic appeal of Jain darshan also waned fast as its followers gave more importance to conduct (*chāritra*) rather than study of their scriptures. So much so that they sat as silent spectators when some of the concepts dealing with physics, biology and mathematics were rediscovered during the last millennium or stolen from Jain texts and credited to European thinkers. To illustrate the point, we may mention the wave particle duality, properties of 'bosons', climatic cycles of the earth, life in plants, microscopic-life in air and water, arithmetical series, logarithms, permutations and combinations, number theory, concept of various types of infinities such as infinitely-infinite (*anantānant*) etc. The list is long and this aspect has been dealt with separately in Proceedings of the conference held at IIT, Bombay in 2016. We reproduce in the Appendix at the end of this editorial, some of the prominent concepts mentioned by Tirthankar Mahavir 2600 years ago, compiled in *Āgama*s during the first millennia of this era and were rediscovered by western scientists in the last 6 centuries. The Nobel prizes of 2016 and 2017, mentioned in the News columns in this Proceedings further strengthen this point.

One of the oldest and most friendly religions and once having the largest following in the world, how could it wane so quickly? Over the ages, the number of Jains has reduced drastically as Hinduism and Buddhism showed a different and easier way of attaining salvation and the newer, younger religions like Christianity, Islam and sikhism lured people, by fulfilling their political, social and personal necessities, some by force, some by proposing an easy life style and some by assuring prosperous, respectful life style. The records show that during the period of Tirthankar Mahavir, about 2600 years ago, there were crores of people, who adopted Jainism because of its time tested path to enlightenment, superior ethics and personal peace and social harmony it offered. The worst thing which happened since Mahavir is that an individual was assigned his religion from the family of his birth rather than by exercising his mature choice. Most other religious groups multiplied faster than the Jains who adopted a disciplined life style in which celibacy was given primacy. Thus their number dwindled quickly.

The fertility rate of Jain women today is among the lowest, much below the replacement level and if extrapolation offers any clue, with this rate in 5 decades the number of Jains may reduce from about 50 million today to just a lakh or two.

As a consequence of such considerations, discussion and debate has started in Jain community in recent times about the future of Jainism and the road which lies ahead, if nothing is done to rectify the situation. Questions have been raised whether a nonviolent, peaceful, tolerant, and forgiving society can even continue its meagre existence in the pandemic terror which has engulfed the whole world today and whether self defense is essential to save our spiritual and ethical heritage and physical survival. Some solutions have been proposed, most not at all practical. We propose an academic solution to the problem, believing that people at large, without the coercion of their selfish controllers, prefer what is best for their betterment, if they are convinced logically, scientifically and without any ulterior motive or hidden agenda.

If indeed Jain life style and values are better suited for common good of humanity, and Jain darshan has any merit, which can be established with scientific logic, it should become acceptable to the world. The World today in fact, we believe , is looking for something which is intellectually satisfying, logically rational, morally appealing and gives equal opportunity to all for their physical, mental and spiritual betterment.

This indeed has been the motivation for formation of this Jain Academy of Scholars, to bring out the salient features of Jain philosophy in modern language, by scientific methodology and contemporary logic.

Much effort that it may take, we feel convinced that it will succeed and make the world a better place to live, with its insistence on living by laws of nature, karma theory, non-violence, coexistence of all living beings, frugal life style and minimal disturbance to the environment, biosphere, and geosphere and emphasis on development of individual and collective consciousness. The Jain Academy of scholars and the Proceedings should strive to attain these objectives.

Appendix 1: Some scientific concepts documented in *Āgamas*, rediscovered by scientific studies during the past 6 centuries. *(Based on "Enigma of The Truth, by Narendra Bhandari", in Jain Philosophy: A Scientific Approach to Reality).*

1. **Life in plants** : The western civilization and scientists did not believe that plants have life. Influenced by thinkers like Descartes, the western thought did not even consider that the lower animals, below humans, have soul or are living.*Āgamas* clearly emphasize that plants are living entities, have feelings and emotions and this forms a core component of Jain ethos and life style. The fact that plants have life and emotions was demonstrated by a set of experiments by J.C. Bose and published in his book 'Mechanism of plants' only in 1926, after which it became scientifically accepted all over the world.
2. **Micro-organisms in Water, air and soil:** Jainism postulated existence of microorganism, invisible to the eye, in earth, water, fire, air and soil, more than 2600 years ago. Scientific proof of such microorganisms came only after Zachharia Janssen and his father in 1590 CE invented a microscope with which microorganisms could be seen.
3. **Concept of unit Space and unit Time:** According to Jainism, space and time are quantised. Jainism mentions a *pradeśa* which is the smallest unit of space. This concept of quantum of space can be compared with Planck's length ($\sqrt{(h\mathrm{G}/2\pi c^3)}$) where G is the Gravitational constant, h is the Planck constant and c is the velocity of light).It is calculated to be 10^{-35} meters wherein, due to the Heisenberg's Uncertainty Principle, laws of physics are not valid. Similarly there is a mention of *samaya*, smallest unit of time in Jain philosophy, which can be compared with Planck time ($\sqrt{(h\mathrm{G}/2\pi c^5)}$) which is calculated to be 10^{-43} seconds.
4. **Dimensionless paramāṇu and its motion:** Jainism propounds that *paramāṇu* is the smallest material entity. It is dimensionless and indivisible, and although it undergoes several types of transformations, motions and vibrations, its behaviour is uncertain, depending on some conditions.

   The *Bhagavatī Sūtra*, compiled during the early part of the current era, vividly describes types of motions of a *paramāṇu*. "Under certain conditions a *paramāṇu* undergoes simple vibrations, complex vibrations, motion, oscillations, collisions, penetration and excitation, that is, it undergoes varied transformations; under other conditions, it does not undergo simple vibrations, complex vibrations, motions, oscillations, collisions, penetration and excitation, that is, it does not undergo varied transformations."

   Although particles equivalent to *paramāṇu* described in Jain *Āgamas* have not yet been discovered, scientific understanding of such motions of elementary particles came only during the past century. Experimentally, after the high powered electron microscopes were invented, and theoretically, after quantum mechanics was developed during the last century, atoms and molecules have been found to have various types of vibrations, motions, oscillations, penetrations, collisions and excitation etc.

   Furthermore, it has been mentioned in the *Bhagavatī Sūtra* that one to infinite *paramāṇus* can coexist in a unit space. This is similar to the Bose statistics, discovered by Satyendra Nath Bose, in 1924, who developed statistics dealing with particles, which are indistinguishable, but can coexist in the same space. These particles are called bosons with spin 1 (e.g. photons) and follow Bose-Einstein statistics.
5. **Wave–particle duality:** The soul moves like a wave and also like a particle. This concept of Wave-Particle duality is clearly stated by Acharya Abhayadevsuri (ca.1015 CE), while quoting Bhgavatisutra (6/122) in connection with samudghāt (expansion) of the soul at the time of death. There are two types of samudghāt: *desh Maranantik* and *sarvata Maranantik*. In *desh maranantik samudghat* the soul, without taking all its units (*atmapradeshas*) with it, expands to its destination of rebirth in the new realm elsewhere in the universe. The soul then returns to the dying body; not all the *atma pradeshas* of the soul had gone to the destination and some had remained within the dying body. This is called *Deshata samudghat* (spatial expansion) and the motion of the soul is described as *Illika* (wave-like) gati. Then, upon death, the soul collects all its *atmapradeshas* in a ball like form and again goes to the destination like a *genduka* (ball), when the new jiva is reborn. This is called *Sarvatmana-utpad-kshetra samudghat*. This example is given for Atman, although in physics, the wave-particle duality is described for matter. None the less as a concept, the duality is mentioned in the *Āgamas* and it may apply to 'everything' at quantum level.
6. **Shells around celestial bodies:** Mention of *Valaya* or shells around planetary bodies is mentioned in *Bhagavatī Sūtra*. In contrast, scientific discoveries of shells (e.g. Magnetosphere, Ionosphere, Atmosphere around the Earth) and other planets were made in 1950's after the advent of space age when satellites were sent in space around Earth and other planets.
7. **Climatic cycles with periods of 21000 years and 41000 years:** *Kāla chakra* or Cosmic wheel of time, described in Jain *Āgamas* clearly mentions six *Ārās* (eras) in *Avasarpiṇī* and *Utsarpiṇī* half cycles, the last two of which (V & VI *Ārā*) have a period of 21000 years. Dr R.M. Jain (2011), N. Bhandari (2011) and Jain, Bhandari and Surana (2017) have argued that these are actually climatic cycles of Earth due to changes in tilt angle, ellipticity and eccentricity of Earth's orbit, as proposed by Milankovitch, known as Milankovitch cycles, and confirmed experimentally as temperature or climatic cycles preserved as oxygen isotopic ratios in the deep sea sediment and Antarctic ice cores. The quantitative agreement of the 21000 year cycle, mentioned in *Āgamas* and determined by measuring oxygen isotopic composition is amazing.
8. **Black holes or *Kṛṣṇarājī* and *Tamaskāya***
   Sthanang Sūtra mentions *Kṛṣṇarājī* (Black Giants) and *Tamaskāya* (Dark bodies), which some scholars have translated as Black holes, which are massive invisible stars, discovered astronomically during the past century. They are so massive that space curves around them and even light cannot escape and hence they cannot be seen. Several *Āgamas* give details of their numbers, shapes and sizes. Āchārya Vijay Nandighosh Suriji has summarised their description given in the *Āgamas* and have argued that these concepts were existing in Jain philosophy although

their description i.e. shapes and locations do not match with the properties of Black holes. These, at least the *Tamaskayas* may possibly be dark clouds, the star forming regions such as Bok globules, or clumps made of dark matter, warranting further study to identify them.

9. **Law of conservation:** The law of conservation implies that all the six basic constituents (*Dravyas*) of the universe are conserved in all the processes and nothing can be created from nothing or lost. This has been a basic concept of Jainism which led to the concept of eternal existence. According to Jainism, the six *Dravyas* constituting the Universe are living beings (*jīva*), Space (*ākāśa*), Matter (*pudgala*), Time (*kāla*), *dharmāstikāya* (traditionally considered to be the medium of motion and *adharmāstikaya* (medium of rest).This *shatdravya* model, what we call as HexaD model, is based on the laws of conservation. None of these *dravyas* and hence the Universe, can be created or destroyed and hence they have to be eternal, exist for ever, uncreated and without beginning and end.

   Law of conservation is the underlying law of all physical and chemical phenomena, as formulated by modern science during the past few centuries. Energy, mass, velocity, angular momentum, linear momentum etc. cannot be produced from nothing; they are always conserved even as mass and energy are converted into each other. Similarly particle properties and attributes are conserved in all transformations.

10. **Causality:** According to Jainism cause and effect are related; one has no existence without the other, i.e. every cause has an effect and there is no effect without a cause. This is applicable to living as well as non-living-physical processes. This has led to the theory of *Karmavāda*. In scientific theories, dealing with the physical universe it is termed as Causality.

11. **Concept of Indescribability:** One Jain concept which has found common ground with quantum mechanics is indescribability. Saptabhaṅgī or seven modes of predication enunciated in Jain logic has some modes which exist but are indescribable in any language or mathematically (i.e. avyaktavya). The wave particle duality also predicts that some of their modes cannot be described (Bhandari and Pokharna, 2017).

12. **Entanglement:** Entanglement is relatively new concept in physics. It states that two particles produced in the same reactions are entangled i.e. behaviour of one totally depends on the other, irrespective of separation between them. Their properties depend on each other. This is enshrined in Jain sutra '*Parasparopagraho Jīvānām*' which is the core principle of Jainism. It states that all life forms are entangled, i.e. dependent on each other; none can exist as an independent entity. Jain principle emphasizes this principle for living beings and physics extends this principle to particles. May be this is applicable to both and can be extended to matter as well, besides living beings.

13. **Determinism:** Determinism is the basic law dealing with the gross physical universe. If one knows the conditions or values of all parameters at any instant of time, involving any process and the laws governing the process, one can predict its state at any time in the future or the past. This is the basis of all scientific calculations. This is the basis of Niyati vada (Destiny): whatever is to happen, will happen. In Jainism, this principle is called *Krambadhha Paryāya* implying that everything in the physical world happens according to predetermined sequence.

14. **Newton's First law of motion:** The law of inertia or Newton's first law of motion states that a body continues to move in a straight line (or remain in a state of rest), unless acted upon by a force. This is implied in many statements given in the *Āgamas*, motion of soul through Loka etc. Soul has intrinsic power to move or remain at rest and so it moves or stays at rest, but still follows Newton's Law. paramāṇus move by its nature but the gross matter requires an external force to move or come to rest.

    The laws, concepts and observations listed above are only illustrative and many more doctrines like *Syādvāda* (uncertainty), *Anekāntavāda* (complementarity) etc. can be added which emphasize similarity between Jain philosophy and modern science. The reader is referred to Bhandari, (2017) and Bhandari and Pokharna, (2017) since these have been discussed in detail there.

    Apart from concepts and laws of physics, many a discoveries were made by Jain saint-mathematicians during the first millennia of the Current Era and they discovered many rules of calculations, conceived series and subseries and large numbers, as summarized by R.S. Shah (2017), Samani Vinay Prajna (2017) and Anupam Jain et al., (2017). The work of Sridhar (~799 C.E.) and Mahavirāchārya (814-877 CE) related to the Number theory, Fundamental Operations, Set theory, Fractions, Simple Quadratic, cubic and higher order equations, permutations and combinations deserve special mention. Nemichandra Siddhantachakravarti (10^{th} Century CE) deals with 14 sequences, concept of infinity of various types, decimal system etc. in his work *Trilokasār*. Some of these concepts and numbers are credited to European mathematicians who discovered them much later, during the past 5 centuries. Possibility of many such concepts and laws described in the *Āgamas* remains unexplored.

    Although due credit must be given to Jain thinkers for the above discoveries, there are several aspects of geography, planetary sciences, cosmology etc. where glaring disagreements with scientific concepts are found.

A Modern View of Jain Philosophy

Narendra Bhandari

Abstract: Jainism is very simple, logical and easy to understand philosophy and it is based on just four sutras, six laws, four doctrines and a few concepts, a foundation on which the huge edifice of its four pillars has been constructed. We describe these aspects here in an easy to understand logic so that people get a correct view of Jain philosophy and some myths which have crept in over the ages can be corrected.

This article describes fundamentals of Jainism but also mentions what Jainism is not and gives some practical aspects for imbibing Jain principles in life.

All the Jain principles have been formulated from observation of nature, micro and macro processes occurring in the universe and by visualising them in all their aspects through meditation by pure souls, The Tirthankaras. Therefore there is no subjectiveness in them and in that sense they are Laws of Nature and are eternal and universal. Of course a huge pyramid of theories has been constructed and calculations have been performed from these few fundamental concepts but that is only done to apply them to every gross and subtle constituents of nature, both living and non-living, their processes of mutual interactions and in order to understand them with precision. For this purpose a very cumbersome terminology, their definitions, classifications and technical details had to be developed, which did not exist till then and large volumes of scriptures were compiled, making it appear a very complicated religion, which it is not, if one braodly wants to understand only the basics. Overemphasis on conduct (*chāritra*) rather than on *Darshan* and *Gyān* made it even more difficult to follow.

Basic Jainism: Jainism can be summed up in:

1. **Four sutras**
   (a) There is only misery in the world. Anything appearing as soure of happiness eventually turns into misery.
   (b) The cause of misery is karma.
   (c) The remedy for Karma is *gyān*.
   (d) The method for acquiring true *gyān* is *Dhyan*.
2. **Four Pillars of Jainism:**
   (a) **Ātmāvad**, that the soul exists,
   (b) **Karmavād**, that every action and thought affects one's consciousness and defiles the soul, because consciousness is the integral part of the soul. Karma is like the memory of the soul.
   (c) **Kriyāvād**, that is, there are procedures for purifying the soul and
   (d) **Lokavād**, One can realise the truth by observing the universe because the truth is interwoven with the universe.
3. **Six Laws Governing the universe:** The laws on which the Jain philosophy is based are the following: The universe consists of an infinite number and variety of things and processes but they can all be constructed from interaction between a minimum of six distinct Reals (entities or *dravya*). Every Real in the universe is eternal and one Real cannot be converted into another. Non-intra convertibility of one Real to another and law of conservation (described below) requires six independent Reals in the universe.

   Constituents of the Universe : The universe contains six Reals or Entities. These are (i) space (ākāsh), a veritable vacuum, in which (ii) living beings and (iii) matter exist; the living beings and matter move which requires (iv) A medium or agent of motion (called *Dharmāstikāya*) because of Law of conservation of momentum. To bring the living beings and matter to rest, they are required to have the property of inertia and thus require (v) an agent or medium of rest, called *adharmāstikāya*. Matter and living beings continuously undergo transformation and this is accomplished by (vi) Kaal (Time), which is an agent of transformation of all living and non living. Acting on living (jiva), Kaal gives rise to the phenomena of birth and death, acting on matter (*pudgal*), it transforms one form into another by association and dissociation; acting on *dharmāstikāya* it gives rise to the phenomena of motion, acting on *adharmāstikāya* it gives rise to the state of rest, acting on space (*ākāsh*) it gives rise to the phenomena of simultaneity or sequence of events.

   (a) The law of conservation and immortality applies equally to all the living and the non living things. An important consequence of this law is that the soul is immortal and so is matter (called pudgal because *pud*=created and *gal*=destroyed), which is conserved in all physical and chemical processes. They always existed, exist now and will continue to exist forever. Conservation of momentum of moving bodies and bodies at rest requires the medium of motion (Newton's first Law of motion) and medium of rest. *Kaal* is like an important force, acting on everything (Real) which drives the universe; Thus we have six Reals or Entities in all in the universe : space, living beings (jiva), matter, agent of motion, agent of rest and kaal. This is called **HEXĀD** (Hexa=six, and D for Dravya) model.

   The living beings and matter occur in different forms

and sizes. They are active constituents and interact with each other as well as their different forms. Space, agent of motion, agent of rest are passive. They are only facilitators (not even a catalyst) of different processes, do not partake in any process, but some processes can not occur without them. Four entities consist of infinitesimally small basic, smallest parts or quanta, which can not be further subdivided: living, constituting soul (*Ātma*) can be taken to occupy innumerable *ātmapradeshas*, matter made of *paramāṇus*, space of *pradeshas* and *kaal* of *kalanus*. *Dharmāstikāya* and *Adharmāstikāya* each are one single entity throughout the universe (*Loka*), passive, uniform and isotropic.

The law of conservation has given rise to the concept of eternity for reals. The universe has no beginning and no end, because no real can be created or destroyed.

Ātmavād (the science of soul) is based on the fact that the soul interacts with material particles of karma, when emotions are present, which then bind with the soul and there are procedures for purifying the soul of these karma particles. Emotions or *kashayas* are like interfaces between *Ātma* and *karma*. Every action or thought has some consequences, good or bad, and should be avoided. There is yet a third way, other than good and bad, that is emotionless, pure (*shuddha*) reaction, in which *jiva* acts as knower (and knower only) and not as doer or thinker, leading to no binding with karma.

(b) **The law of oneness :**

Phenomena occurring in the universe: The material universe constitutes of smallest (invisible) to the biggest (unfathomable) structures that exist and everything is undergoing transformation all the time. Consider the smallest living and functional entity like a cell. There are of the order of 10^{15} cells in a human body, of about 320 different types (Fig.1) and there may be 200 trillion molecules in a single cell. The body requires 10^{27} atoms to construct all the cells. Each DNA of a chromosome contains about 3 billion genetic codes. Each gene contains 6 million orders in it. Each cell makes 2000 proteins every second. To accomplish the copious production and to keep body alive and functional requires them to execute thousands of coordinated reactions with precise timing and function.

The same is true of the universe containing hundreds of billions of galaxies. For large inanimate structures like our solar system or even a larger structure like our galaxy, which consists of billions of stars moving in spiral arm structure, each star, containing innumerables small particles, pebbles, rocks etc. scaling up to thousands of small and big planet-like bodies. They all move in harmony and a close observation of a living cell as also a galaxy reveals the types of phenomena, some of which can be listed as follows.

- **Deep coherence:** coherence means working in steps and we use deep coherence here to imply anticipating and working in steps.
- **Order:** means in orderly fashion, not chaotic or random.
- **Coordination:** means as if they are moving cooperatively towards a common goal.
- **Synchronicity:** functioning with perfect timing.
- **Harmony:** functioning without disturbing or interfering with the other components or coming in their way.
- **Entanglement:** working as if they anticipate what the other component is doing or going to do, i.e. all components are having instant connectivity.
- **Dynamic equilibrium:** Undergoing changes, taking over and leaving activity without disturbing the overall equilibrium or stability of the whole, larger system. There is a hierarchy of self sustaining systems, smallest to the biggest.
- **Spontaneity:** Every process, subtle and gross, small and big, occurs spontaneously, by itself. There is no external agent or help necessary.
- **Self corrective faculty:** this is a very important phenomena: If anything is done with the smallest error (in synthesis of the structure of a protein in a cell, for example) or wrongly, it corrects itself. This self correcting facility ensures long term continuation.

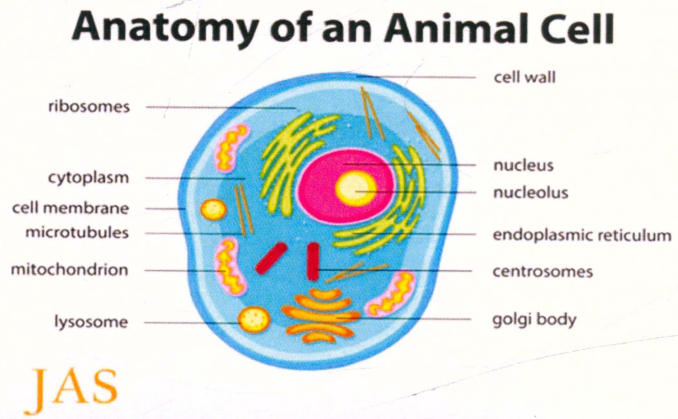


Figure 1. A Small Living cell and the Milky Way galaxy

- Their size ranges between less than a millimeter to thousands of light years but the phenomena occurring in them follow the same principles described in the text.

- All these processes taken together undeniably imply one-ness of the individual with the whole (and vice versa) and is true for living as well as non-living.

(c) **Law of coexistence:** Nothing in the universe can exist by itself or in isolation, be it a living being or material thing, small or big. Everything depends on everything else. In physics this is known as Mach's principle, after Ernst Mach, who proposed it in context of mass of matter, that mass of a body arises due to the interaction of the rest of the matter in the universe. This is a fundamental principle applicable to everything in the universe. This can be easily illustrated by a plant in your garden and in a forest. The one in isolation in your garden can not survive for a week if you dont water it, so it has no existence of its own, whereas the one in the forest will be there for thousands of years because each component of the forest (land, water, trees, animals etc.) help each other. This phenomena is called entanglement in physics. Each component is not only dependent on the other but can not become independent how so ever much it may try. In Jainism it is described in a sutra by Acharya Umaswati as ***"Parasparopagraho jivanam"*** in Tattvartha sutra. In Buddhism it has been called *Pratityasamutpada*. Although here it refers to living entities, this should be extended to non living (matter) also. The practical consequences of the Law of coexistence is immense. One who believes in coexistence, interdependence, and mutual entanglement CAN NOT harm any body (living or non-living), because eventually it will hurt him and he will have to have compassion towards every body and everything for his own survival. Ahimsa, compassion, tolerance, forgiveness etc. emerge from this fundamental law of coexistence and are its practical corollaries.

(d) **Law of Determinism (*krambaddhaparyāya*):** Everything is predetermined in the universe, depending on its past, the future can be predicted precisely. Just like one ~~can~~ predict the position of a car, if its speed is known, at any time in future, so is the fate of every one. This is the law of gross world, of the classical mechanics in contrast to micro world which follows quantum mechanics, discussed below.

(e) **Law of causality (karmavād):** Causality implies that every action has an effect; there is no action, howsoever trivial, which has no effect and every effect has an underlying cause. The cause and its effect are automatic, precise and this relationship and its consequences is inviolable. This is similar to the Newton's third law of motion that action and reaction are equal and opposite. One is free to do anything (Free will, see below) but must be ready for its consequences in the same measure. Jainism, as applicable to living beings, calls it karmavād. The advantages of karma theory in life is immense. One who believes in Karma Theory can do no wrong because he knows very well that he will have to undergo its consequences in full measure and If something wrong happens to him, he will not blame any body else because it is a consequence of his own past Karma.

(f) **Laws of Quantum mechanics:** Quantum mechanics is applicable to subtle constituents or micro world, material particles about the size of an atom and smaller. In contrast to classical mechanics which is applicable to gross matter, which has laws which are deterministic as discussed above, in the quantum domain, the laws are probabilistic. There is a choice; there is a free will.

Three more points of the quantum phenomena are relevant here.

(i) One is the concept of indescribability, that some things may exist which can not be described or expressed. We will discuss the equivalent Jain concept below.

(ii) The second consequence in the quantum domain is that the observer and observed (*Gyata* and *Gyeya*) exist together. A particle does not exist till it is observed by an observer or it may exist in an indescribable form (not as a particle or anything else). Weird as it might look, it is an established fact in quantum physics. The third point is Law of complementarity. Even opposite behaviours of a thing are complementary and helps us understand the 'thing' better and more completely. This will be discussed further below in the context of *Anekāntāvad*.

4. **Four Doctrines**

(a) **Anekāntāvad :** Anekāntāvad is a term, generally used to describe the three doctrines Anekāntāvad, Nayavād and syādvād together. These three doctrines are unique to Jain philosophy, and the three refer to object, subject and its knowledge i.e. respectively called *gyeya*, *gyātā* and *gyān* in Jainism.

According to Jain philosophy, every object Y can be expressed as made of two parts, essence (E) and mode, m (t) which is a function of time, t.

Y= E+m(t),

E= essence, m=mode, t=time

Anekāntāvad is applicable to the object one wants to know, i.e. gyeya. Actually, everything living and nonliving changes its mode (paryāya) every moment; the living by changing his perception by acquiring knowledge and the material bodies by their transformation under the various laws of nature, and therefore it is impossible to know an object completely at any particular moment and one has to know its modes in the infinite, beginning-less past and infinite, endless future to know it completely. Therefore this doctrine of Anekāntāvad implies multiplicity of modes of the object.

Nayavād, in contrast, refers to the perspective or view point of the knower. It is subjective, depends on the mental frame of reference of the knower. The story of the six blind men and an elephant is very apt in this context. Every blind man describes the elephant differently depending on the part of the body of the elephant he touches; legs as pillars, tail as rope, ears as a hand held fan, side as a wall, trunk as branch of a tree and tusk as pipe.

Syādvād is a fundamental aspect of nature of knowledge. It states that there is NOT ONE TRUTH and any knowledge is not unique; there may be more than one description or prescription of the ultimate reality. There is limitation of knowledge acquired by sensory organs and training of the imperfect brain which is called *apratyaksha gyān* or indirect knowlege. The complete knowledge is directly acquired by consciousness without the medium of brain and sensory organs, called *pratyaksha gyān*.

(b) **Indescribability:** Things may exist in forms which can not be described within the framework of thought, language or speech or mathematics; some things can only be experienced and experiences or feelings, are not only subjective, they can not be expressed precisely. Thus any knowledge is not binary, yes and no or right or wrong but it can be expressed in seven ways, termed as *saptabhangi*. yes, no, both, neither, indescribable, both and indescribable, neither and indescribable.

The Laws of coexistence and causality mentioned above have several practical aspects and can be applied in life style. Five of them, as described in scriptures, are *satya, ahimsa, aparigraha, achorya and brahmacharya*. We have added three more mahāvratas which are central to Jainism, making them eight in all. These three additional mahāvratas are *samarpan*, forgiveness (*kshama*) and negation (*nishedha*). Too much emphasis is laid on the various *mahavrats* but they are most misunderstood aspects of Jain life style and we explain them below.

i. **Satya:** This actually means 'The search for Truth' but has been limited to speaking the truth which according to syādvād is impossible.

ii. **Ahimsa:** Every living being lives on other lives, (Life feeds on life) consuming them as food, except for trees, which make their food naturally from sunlight without killing other lives. So emphasis must be on minimising violence and causing hurt to others or killing of other jivas, but too much emphasis has been laid on saving *ekindriya jivas*.

iii. **Aparigrah:** implies non-attachment to possessions, both living and non-living and non-accumulation of material things but this is always misinterpreted. Jains are generally a very rich community and they believe in riches, although at the same time they make good contributions to the society. *Aparigrah* (accumulation) does not mean *Agrah*, to accept riches but means that riches should be given to others, who are in need and not accumulated.

iv. **Achorya:** It actually means exploitation of other's rights, of earth's resources, of society's resources etc. or taking more than ones share, but it is generally taken to mean that one should not steal.

v. **Brahmacharya:** This is the main principle of life style in which one must devote all the time with Brahma (self) i.e. in meditation, but it is generally taken to imply sexual constraints and behaviour, which is but one minor aspect of Brahmacharya.

vi. **Samarpan:** Total surrender to enlightened souls. This is the theme of *Navkar mantra*, the prime Jain prayer.

Why should we surrender to Arihants, siddhas, acharyas and other teachers and sadhus? They cannot do anything to us; can not grant any boon or do any good or bad. The reason is that they can show us the path to enlightenment, although one has to tread on this path himself. We do not have enough strength or wisdom to know the path and for this reason we should be grateful to Acharyas because they have brought to us the Gyān given by Arihants, which we are incapable of realising ourselves. Actually, we should not only begin by surrendering ourselves to Enlightened souls but to their Agna (instructions, path) they have shown. That is the real meaning of Navakar mantra beginning with Namo Arihantanam (Namo (Bow) to Arihant anam (agna)).

Unless one surrenders totally and unequivocally to the path of the Enlightened souls (*Siddhas, Arihants, Kevalis*), *Gurus* and *Sadhus*, one can not get the deep knowledge required to purify his soul. For this reason *vinay* (humility) is considered as the highest conduct. And *samarpan* provides us with the highest receptivity to acquire this gyān.

vii. **Kshamā:** *Kshamā* or forgiveness is the main corollary of ahimsa and the importance of Universal forgiveness in purifying one's soul can not be over-emphasised. Therefore, together with tolerance and compassion (*karunā*) we have included it as a *mahāvrata*.

viii. **Negation and minimisation:** The underlying principle of all the above *mahāvratas* is total negation of every unnecessary requirement and minimisation of every requirement.

Waste of food, energy, water, and material possessions, earth resources etc., and damage to biosphere, ecosphere etc. is absolutely forbidden. Consumption of essential items, required for one's survival must be minimsed.

Some excellent Jain concepts : Jain philosophy has some excellent concepts , which are unique in many respects. We list them here.

1. **Classification of living beings:** Jains classify living beings on the functional basis of sensory organs (mind included) in contrast to modern biology which classifies them according to structure of the basic cells. Thus the following categories exist in jain classification
   (a) *Nigodh:* organised molecular entities
   (b) one sensed beings : water, air, energy, can be further grouped as *sachitta* and *achitta* depending on their structure (organised or random, respectively).
   (c) Plants: more advanced than humans in many aspects, because they prepare their own food by themselves in non violent manner whereas all other jivas use other living beings as their food.
   (d) Jivas with *Prana*: 2 to 5 sensed (without mind):
   (e) Humans with mind (*sangnāni jiva*)
2. **Jain classification of Gyān:** Gyān in Jain philosophy, is of five types:
   (a) *Mati gyān*: innate knowledge, one is born with

(b) *shrut gyān*, knowledge learnt by scriptures and personal interaction.

(c) *Avadhi gyān*: knowledge transcending 'limited' space and time directly through consciousness without the help of sensory organs.

(d) *Manah paryav gyān*; reading of thoughts of others.

(e) *Keval gyān* (omniscient), Know all; transcending space, time, modes throughout the universe.

In contrast, the modern education system depends only on shrut gyān which is indirect, through sensory organs, other than mati gyān which is innate. The modern educationists have no idea about the higher three gyāns which is direct and can be acquired by purifying the soul.

3. **Loka and Aloka:** Loka contains six constituents as mentioned above. The extent of the universe is defined by the existence of these constituents. *Loka* (cosmos) moves in *Alokakash* (transcosmic space), which is infinite in extent and where only space exists, devoid of the other five constituents of *Loka*.

4. **Bhed vigyan (science of distinction):** Bhedvigyan is the crux of Jain philosophy. If one is to attain his/her goal of purification of consciousness and soul and attain the state of moksha (absolute freedom from all attachments), one must use the criteria defined in *Bhed vigyan*. Bhed vigyan distinguishes what is useful for your soul and what is not. One should adopt what is useful and avoid what is not. For this purpose one should distinguish between his 'self' and others. Others include other souls as well as other material things. In this context one should be absolutely SELFISH, in the real sense of SELF (ĀTMĀ).

We close this discussion by stating that Jainism and science are both pursuits of understanding laws of nature and there are many similarities between them. A comparison below shows points of similarities and differences, for sake of clarity.

Science and Jain Darshan

Science

- No God
- The physical universe is governed by Laws
- Laws are derived by observation of Nature
- Laws proved by experiments and Theoretical models
- No miracles, no exceptions
- TOE (THEORY OF EVERYTHING)
- Materialism : No consciousness
- Does not go beyond logic
- Based Only on observations
- Objective

Jain darshan

- No God
- Living and non-living are governed by Laws
- Laws derived by Meditation
- Laws verified by experience
- No miracles, no coincidences, no favours, Only purushartha
- Moksha
- Both jiva and Ajiva
- Goes beyond logic
- Based on Observations & Experience
- Subjective

What Jainism is NOT

Jain philosophy is not a religion but a path to attain enlightenment. It prescribes recipes to attain absolute freedom (moksha) from all worldly bindings (bandha), which ultimately results in misery. The bindings are due to ones own karma. *Gyān* is necessary to rid oneself of the karmas and true *gyān* can only be attained by meditation. When one is immersed in deep meditation, penances occur automatically. Rituals are not necessary. So Jainism must start with *Darshan*, correct perspective, attaining gyān and then imbibe it in conduct. But it is observed that just the opposite sequence is being followed, starting with penances, where much importance is given to fasting, rituals, and type of food. Jainism is just not this or this only. It has more to do with correct perception of the world rather than food practices, more to do with Bhāv (thoughts), than activity (physical acts), more to do with meditation than with temple rituals and more to understand and follow the laws of nature than to be dogmatic about what is written in the scriptures. So Practical aspects of Jainism must involve Non-violent life style, self discipline, meditation and penances.

About the Author:

Dr. Narendra Bhandari, Ph.D. (Physics), Space scientist. Currently at the Science and Spirituality Research Institute, Ahmedabad. Carried out research in Planetary and Earth Sciences at T.I.F.R, Mumbai, and Physical Research Laboratory (ISRO); Founding Fellow of Jain Academy of Scholars.
Web: www.nbhandari.com
Email: nnbhandari@yahoo.com
Mobile:9824077890

सम्यक् जीवन शैली

नवसर्जन

विज्ञान और आध्यात्म शोध संस्थान, अहमदाबाद

श्रुतरत्नाकर, अहमदाबाद

प्रकृति के नियम

हम सब प्रकृति से उत्पन्न हुए हैं । जब ब्रह्माण्ड भी नहीं था तब प्रकृति थी- जब कुछ भी नहीं रहेगा तब प्रकृति रहेगी। प्रकृति, जिसने एक क्षुद्र अमीबा से मानव को विकसित किया, उससे अधिक बलवान कोई भी नहीं है। प्रकृति सब ऊर्जा का स्रोत है। सितारे, सूर्य, पृथ्वी और चन्द्रादि ग्रह और उपग्रह ही हमारे जीवन का आधार हैं। पेड़ पौधों से न केवल भोजन मिलता है बल्कि वे जैविक ऊर्जा भी देते हैं. ब्रह्माण्ड में ऐसा कोई भी पदार्थ नहीं है जो हमारे जीवन में उपयोगी न हो। हम प्रकृति के साथ सहयोग करके जी सकते हैं और उसके विरुद्ध भी। यदि हम उसके विरुद्ध काम करेंगे तो अंततः प्रकृति हमें नष्ट कर देगी और यदि हम उसके अनुसार जियेंगे तो प्रकृति हमारी सहायता करेगी। अतः हमें अपने स्वास्थ्य, मानसिक शांति और आध्यात्मिक विकास के लिए प्रकृति के नियमों का अनुसरण करना और उनके अनुसार ही जीवन यापन करना श्रेयस्कर है ।

पिछली कुछ सदियों में वैज्ञानिकों ने अध्ययन करके प्रकृति के नियमों को परिभाषित किया है। तो हम पहले यह ध्यान में ले लें कि विज्ञान के अनुसार प्रकृति के नियम क्या हैं। प्रकृति के नियम बड़े सरल हैं। कुछ मुख्य नियम इस प्रकार हैं।

- **संरक्षण का नियम:** कोई भी वस्तु नष्ट नहीं होती है; केवल उसका रूप बदल जाता है। इसलिए ब्रह्माण्ड में प्रत्येक वस्तु अनादि और अनंत है। इसे वैज्ञानिक कंज़र्वेशन का नियम कहते हैं।
- **नियतिवाद :** सब क्रियाएं पूर्ण तरह से पूर्व निश्चित हैं -प्रत्येक वस्तु की किस क्रिया के सन्दर्भ में भूत काल में क्या स्थिति थी और भविष्य में क्या होगा इसकी गणना की जा सकती है।
- **कार्य-कारण सम्बन्ध :** प्रत्येक कार्य के पीछे कोई न कोई कारण होता है-बिना कारण के कोई भी कार्य नहीं होता और ऐसा कोई कारण नहीं है जिसका कोई प्रभाव न हो। इसे वैज्ञानिक क्राज़ेलिटी का नियम कहते हैं और धार्मिक संदर्भ में इसे कर्मवाद कहते हैं।
- **सहअस्तित्व का नियम :** ब्रह्माण्ड में प्रत्येक वस्तु एक दूसरे पर निर्भर करती हैं; सब वस्तुएं, जीव और अजीव एक दूसरे को प्रभावित करते हैं- प्रभावित ही नहीं करते - एक दूसरे के कारण ही उनका अस्तित्व है।

जीवन शैली की दृष्टि से अंतिम दो नियम, कर्मवाद और सहअस्तित्व अत्यंत महत्वपूर्ण हैं। यहां जो नियमावली प्रस्तुत की गई है वह उपरोक्त नियमों के अनुसार ही बनाई गई है। आज का युग विज्ञान का युग है। विगत सदियों के वैज्ञानिक आविष्कारों और तकनीकी विकास ने मानव का जीवन स्वस्थ, दीर्घायु, समृद्ध और बहुत आरामदायक बना दिया है पर मनुष्य का मस्तिष्क संतुलित जीवन की गूढ़ता और उसके लाभों को नहीं समझ पाया है और उसकी इच्छाएं निरंतर बढ़ती जा रही हैं । इस प्रवृत्ति ने दुनिया में चारों ओर अशांति पैदा कर दी है। व्यक्तियों और राष्ट्रों में स्वार्थ. प्रतियोगिता, वैमनस्यता और आर्थिक विकास की होड़ इस हद तक बढ़ गई है और मतभेद बढ़ते चले जा रहे हैं कि जीवन आज विरोधाभासों से भर गया है। बौद्धिक विकास के कारण हमारे प्राकृतिक संसाधनों का दुरुपयोग और अतिशोषण हुआ है जिसके कारण वातावरण में प्रदूषण की मात्रा बढ़ गई है कि सांस लेना भी दूभर हो गया है । अति विशाल ओजोन होल बन गया है जिससे पृथ्वी पर जीवन को क्षति पहुंचाने वाली अल्ट्रावॉयलेट किरणें आ रही हैं। ग्रीन हाउस गैसों की वजह से पृथ्वी पर तापक्रम बढ़ गया है : उत्तरी और दक्षिणी ध्रुवों पर और हिमालय पर बर्फ पिघल गई है । कॉन्टिनेंट्स के कोस्टल क्षेत्र डूब रहे हैं। जलवायु और मौसम बदलने से अनावृष्टि, अतिवृष्टि की घटनाएं बढ़ती जा रही हैं । ऊर्जा और जल की मांग निरंतर बढ़ती जा रही है, लोग स्मार्ट शहर की बात करते हैं पर गांधीजी के आत्मनिर्भर लोकल संसाधनों पर आधारित ग्राम विकास की बात कोई नहीं करता। गौर से देखें तो मानव सभ्यता और पृथ्वी विनाश के कगार पर खड़े दिखाई देते हैं। मानव जीवन और पृथ्वी को विनाश से बचाने के लिए अब यह आवश्यक हो गया है कि हमें एक ऐसी जीवन शैली का निर्माण करना है और अपनाना है जिसमें हम आत्मा, मन और शरीर तीनों के संतुलित विकास की बात करें और यह भी ध्यान में रखें कि हम वातावरण के एक भाग हैं और यदि वातावरण अच्छा रहेगा तभी हम ठीक से रह सकेंगे। ऐसी ही जीवन शैली से हम विश्व को आने वाली आपदाओं से, महामारी और विनाश से बचा पाएंगे। एक छोटे से वायरस - कोरोना से फैली महामारी 2019 ने मानव जीवन को ही खतरे में डाल दिया है और मानव सभ्यता के भविष्य के बारे में भी संदेह उत्पन्न हो गया है। क्या हम इस घटना से सबक लेने को तैयार हैं? क्या हम अपनी जीवन शैली को भौतिक प्रगति के अतिरिक्त मानसिक विकास और आध्यात्मिक शांति से जोड़कर आगे बढ़ने को तैयार हैं? क्या हम व्यक्तिगत प्रगति के साथ साथ पूरे समाज, पूरे देश और पूरी मानव सभ्यता, पृथ्वी पर रहने वाले अन्य जीवों, बायोस्फीयर या जीवमंडल के सामूहिक कल्याण को ध्यान में रखकर रहने को तैयार हैं? प्रश्न यह भी उठता है कि क्या कोविड-19 पृथ्वी का मानव जाति से बदला है क्योंकि हमने पृथ्वी का अत्यधिक शोषण करके उसे भयंकर रूप से प्रदूषित कर उसके संतुलित तंत्र को नष्ट कर दिया है या यह हमारे पृथ्वी पर निवास करने वाली अन्य प्रजातियों का हमसे बदला है जिनका भी पृथ्वी पर साझा अधिकार है पर जिन्हें हमारे हाथ अपने भोजन और मनोरंजन के लिए मार दिया जाता है । भौतिक विकास के कारण हमने प्राकृतिक संसाधनों का बुरी तरह दुरुपयोग और विनाश किया है जिनके कारण प्राकृतिक आपदाएं अधिक तीव्रता और अधिक आवृत्ति से होने लगी है और वातावरण में प्रदूषण की मात्रा इतनी बढ़ गई है कि सांस लेना भी दूभर हो गया है और पृथ्वी तीव्र गति से विनाश की ओर बढ़ रही है। हमें यह आभास तो हो गया है कि यदि हमें मानव सभ्यता बचानी है तो एक ऐसी जीवन शैली का निर्माण करना होगा जिसमें आत्मा और शरीर दोनों के विकास के साथ साथ पर्यावरण को भी सुरक्षित रखें। आखिरकार हम पर्यावरण के एक छोटे से भाग ही हैं। पर्यावरण बचेगा तो हम बचेंगे अन्यथा नहीं- ऐसी ही जीवन शैली हमें और विश्व को आने वाली आपदाओं, महामारीओं आदि से बचा सकती है।

एक अनुमान के अनुसार, पृथ्वी पर हर वर्ष १५,००० करोड़ जीवों की हत्या होती है, हर वर्ष २५००० जीवों की प्रजातियां लुप्त हो रही हैं और १९७० से लेकर २०१० के अंतराल में पृथ्वी के आधे जीव नष्ट हो चुके हैं। दुख की बात यह है कि अधिकतम जीवों की हत्या भोजन के लिए या मनोरंजन के लिए होती है अगर हमने अपनी जीवनशैली को नहीं बदला तो शीघ्र ही मानवप्रेरित क्रियाओं से सारे जीवों का महाविनाश हो जाएगा और पृथ्वी पर प्रलय आ जाएगा ।

इसकी गंभीरता को देखते हुए ऐसा लगता है कि यह महामारी मानवता को भौतिक विकास से आध्यात्मिक विकास की ओर ले जाएगी। सरल शब्दों में आध्यात्मिकता का अर्थ है प्राकृतिक नियमों का पालन करना और प्रकृति को बिना ठेस पहुँचाए अपना कार्य करना। इसके लिए लोगों को एक संतुलित और संयमित जीवन-शैली अपनानी होगी जो सब जीवों के प्रति न्याय संगत हो। कोरोना महामारी और उसके कारण उत्पन्न होने वाली परिस्थितियों में शांति और सुख से जीने के लिए हमें भारतीय दर्शन द्वारा प्रतिपादित सिद्धांतों और सरल और सात्विक जीवन शैली का पालन करने पर विचार करना होगा।

ऐसी जीवन पद्धति जो सनातन या शाश्वत है क्योंकि वह प्रकृति के नियमों पर आधारित है जो न्यूनतम ऊर्जा, जल संसाधनों आदि पर आधारित है और जिसका पर्यावरण पर कम से कम प्रभाव पड़ता है और जो सब जीवों के साथ सह अस्तित्व के सिद्धांत पर निर्भर है। हिंदू बौद्ध और जैन धर्म हजारों वर्षों से ऐसी जीवन शैली के प्रतिपादन करते रहे हैं और भारत के निवासी प्राचीन काल से उसका पालन भी करते हैं आ रहे हैं कम वस्तुओं का उपयोग करके भी सरल सुखी शांतिपूर्ण आरामदायक और बिना कष्ट के बेहतर जीवन जिया जा सकता है। प्राकृतिक नियमों पर आधारित इस जीवन शैली से सब जीवों को बहुत भौतिक मानसिक और आध्यात्मिक विकास के समान अवसर उपलब्ध हो सकते हैं। इन बातों को ध्यान में रखते हुए हमने एक आदर्श दैनिक चर्चा की नियमावली बनाई है उसके वैज्ञानिक और आध्यात्मिक आधारभूत सिद्धांतों का इस पुस्तिका में विवेचन करेंगे ताकि जो इस नियमावली का पालन करना चाहते हैं उनको उसके पीछे के वैज्ञानिक तर्क का पता रहे और वह उसका पूरा लाभ ले सकें संक्षिप्त में यह नियमावली प्रकृति जिसने हमें बनाया है उसके प्रति धन्यवाद ज्ञापित करने का, परिवार जिनके सहयोग से हम जीते हैं उनके साथ अच्छे संबंध स्थापित करने का, पृथ्वी जिस पर हम रहते हैं उसके संरक्षण करने का, अन्य जीव जिनके साथ हम पृथ्वी पर रहते हैं उनके साथ सह-अस्तित्व, सद्भाव की भावना रखने का और उनके अधिकार के शोषण का दुरुपयोग ना करने का कर्म का फल अवश्यंभावी होता है उस को ध्यान में रखकर प्रत्येक कार्य करने का शरीर और मन को किस प्रकार स्वस्थ रखें, प्रत्येक मानव को उसका अध्यात्मिक लक्ष्य प्राप्त हो, प्रत्येक जीव को उसका भाग मिले इन बातों को ध्यान में रखते हुए यह नियमावली बनाई है।

हम इस नियमावली की चर्चा 4 भागों में करेंगे।

- प्रकृति के मूल नियम: सामान्य जनों को इनके बारे में शिक्षित करना,
- इन नियमों के अनुरूप व्यक्तिगत जीवन शैली का निर्माण,
- सह-अस्तित्व पर आधारित, पारिवारिक और सामाजिक व्यवहार के सुझाव
- व्यक्तिगत गतिविधियों का स्व-परीक्षण,

नई जीवन शैली निम्नलिखित सात सिद्धांतों पर आधारित है:

1. आवश्यकताओं को कम करना यानि ऊर्जा, जल, भोजन और बिजली जैसे संसाधन जिससे पर्यावरण को न्यूनतम नुकसान पहुंचे,
2. दूसरों पर निर्भरता कम करना,
3. व्यक्तिगत, परिवारिक और सामाजिक दायरे में सद्भाव और सहिष्णुता,
4. अच्छे स्वास्थ्य के लिए आहार विज्ञान,
5. पृथ्वी पर रहने वाले सभी जीवों पर करुणा,
6. स्व-परीक्षण और आत्म विकास,
7. धर्म और विज्ञान के सिद्धांतो का उचित समन्वय।

कोरोना महामारी 2019 ने मानव जीवन की धारणाओँ और वर्तमान युग की संभावित समस्याओं व चुनौतियों में एक बड़ा बदलाव कर दिया है। यहाँ तक कि मानव सभ्यता के भविष्य के बारे में ही संदेह उत्पन्न हो गया है। इसी कारण से संपूर्ण विश्व का ध्यान भौतिक-वाद से हट कर पृथ्वी के अन्य जीवों और मानवता, दोनों के सामुहिक कल्याण की ओर जा रहा है।

दुनिया के अधिकतम धर्म - विशेष कर जैन, हिंदू, बौद्ध धर्म और उनके अनुयायी हजारों वर्षों से ऐसी जीवन शैली का प्रतिपादन करते आ रहे हैं और भारत के निवासी प्राचीन काल से उसका पालन भी करते आ रहे हैं। कम वस्तुओं का उपयोग करके भी सरल, सुखी, शांतिपूर्ण, आरामदायक और बिना कष्ट का, बेहतर जीवन जिया जा सकता है। प्राकृतिक नियमों पर आधारित इस जीवन शैली से सब जीवों को भौतिक, मानसिक और आध्यात्मिक विकास के समान अवसर उपलब्ध हो सकते हैं। हम इस सरल और आसानी से अनुसरण की जा सकने वाली आदर्श जीवन शैली की नियमावली में ऐसी जीवन चर्या की मुख्य बातें प्रस्तुत करेंगे।

आध्यात्मिक और मानसिक संतुलन:

1. सूर्योदय से पूर्व उठना।
2. उठते ही इस नये दिन के लिये प्रकृति को धन्यवाद देना।
3. अपने ईष्ट देव का स्मरण करना।

मेरा स्वास्थ्य सबसे महत्वपूर्ण:

1. प्रातः सूर्य के दर्शन करना और उससे ऊर्जा प्राप्त करना।
2. नित्य क्रिया करने के पश्चात् अनुकूलता अनुसार टहलना, योग या प्राणायाम करना।
3. प्रतिदिन सुबह लगभग 30 मिनिट ध्यान करना। तथा पूरे दिवस में कार्यों के बीच बीच दो मिनिट विराम लेकर दीर्घ श्वासोच्छवास लेना।
4. सोने से पूर्व सभी जीवों के साथ मैत्री भाव अनुभव करना। दिन भर की चर्या में यदि आपने किसी को कष्ट दिया हो तो उससे क्षमा याचना करना और किसी ने आपको कष्ट दिया हो तो क्षमा भाव धारण कर उसे क्षमा कर देना। अपने प्रति शुभ भाव भाते हुए प्रसन्न चित्त होकर निद्राधीन होना।
5. हो सके तो आकाश, चन्द्रमां और तारों को देख कर इस विशाल ब्रह्मांड से अपनी तुलनात्मक स्थिति पर चिंतन कर के सोना।

आहार विज्ञान

1. प्रतिदिन नियमित समय पर शुद्ध, ताजा बना हुआ सात्विक, निर्दोष आहार ग्रहण करना। बासी खाने से बचना।
2. शुद्ध शाकाहारी भोजन ही लेना। मांसाहार अर्थात् मांस, मच्छी, अंडे का सर्वथा त्याग करना। शहद, मक्खन, जीलेटिन, शराब का भी सर्वथा त्याग करें।
3. उबाल कर ठंडे किये हुए जल अथवा शुद्ध फ़िल्टर किया हुआ जल पीना। कम से कम स्रोतों का जल पीना।
4. यथासंभव सूर्यास्त के पश्चात् भोजन न करना अर्थात् सूर्यास्त से सूर्योदय तक आहार ग्रहण न करना।
5. सप्ताह में एक बार भोजन का त्याग और महीने में एक दिन उपवास करना।
6. दूध, घी, तेल, दही, तले हुए पदार्थ, गुड़ या शक्कर को विगइ अर्थात् विकार-प्रमाद आदि उत्पन्न करने वाले माने गए है अतः इन पदार्थों का परिमित मात्रा में ही उपयोग करें और हो सके तो प्रतिदिन इन में से किसी एक पदार्थ का त्याग करें।
7. परिमित और पूर्व-निश्चित मात्रा में आहार ग्रहण करना। किसी भी भोजन में परिमित संख्या में (नौ प्रकार से कम) व्यंजन ही ग्रहण करना।
8. ध्यान पूर्वक भोजन करना और भोजन के साथ दूसरी क्रियाएँ न करना। भोजन के साथ मोबाइल और टेलीविज़न जैसे उपकरणों का उपयोग तो बिलकुल न करें।

सामाजिक, राष्ट्रीय और वैश्विक कर्त्तव्य

1. नम्रता धारण करना। सभी जीवों के प्रति मैत्री-भाव, दुःखी जीवों के प्रति करुणा-भाव एवं हमेशा संतोष-भाव धारण करना।
2. जगत के सभी पदार्थ अनन्त धर्मात्मक है। अतः अन्य लोगों के विचारों को समझनें का प्रयत्न करें और अपने विचारों का आग्रह न रखें। अपनी दृष्टि की तरह ही अन्य लोगों की दृष्टि में भी सत्यांश है इसे स्वीकार करें।
3. देश तथा समाज द्वारा निर्धारित नीति-नियमों का पालन करना। न्याय पूर्ण व्यवहार रखना।
4. घर, कार्यालय, एवं सार्वजनिक स्थानों में स्वच्छता बनाए रखना।
5. कोई भी क्रिया विश्व कल्याण का भाव रख कर करना।

6. जगत के सभी जीव कर्मवश हैं, कर्म के कारण ही सुख या दुख प्राप्त होता है। संयोग या वियोग भी कर्म के कारण होता है। जो जैसा कार्य जिस भाव से करता है वैसा ही फल प्राप्त होता है। यह कर्म का सिद्धान्त है । क्रोध, अहंकार, कपट, लोभ आदि से कर्म का बंध होता है उसी तरह मैत्री, करुणा, प्रमोद आदि कर्म के क्षय का कारण है उसका अभ्यास करना ।

जीवदया और पर्यावरण मन-वचन-काया से किसी भी जीव की हिंसा न करना और दुःख नहीं पहुँचाना । यदि हिंसा का आचरण हो जाय तो क्षमा याचना करना ।

संसाधनों का सदुपयोग आवश्यकता से अधिक वस्तुओं, वस्त्र, पात्र आदि का संग्रह न करना। आवश्यकता से अधिक हो तो अन्य को दे देना।

सर्वोदय और आर्थिक विकास

जब हम आर्थिक विकास की बात करें तो सब के आर्थिक विकास की बात करनी चाहिये न कि केवल अपने या अपने परिवार के ही विकास की बात सोचना।

परिवार प्रेम की कुंजी

1. परिवार में सबके साथ प्रेम का भाव रखना।
2. जहाँ तक हो सके साथ में भोजन करना। सप्ताह में एक बार पूरे परिवार का सहभोज करना।
3. सप्ताह या एक माह में एक बार एक छोटा धार्मिक कार्यक्रम रखना।
4. किसी के साथ कुछ गलत फहमी हो तो जितना शीघ्र हो, उसे दूर कर देना।
5. शाम को सोने से पहले परिवार के सभी सदस्यों को क्षमा कर देना।
6. यदि संभव हो तो किसी नियत समय पर परिवार के सभी सदस्यों का कुछ समय के लिये मिलना।

खेल और मनोरंजन

1. घर पर खेलने लायक कम से कम एक खेल में रूचि विकसित करना।
2. घर के बाहर खेलने लायक कम से कम एक खेल में रूचि विकसित करना।
3. मनोरंजन के लिए टेलीविज़न और अन्य साधनों का भी नियंत्रित उपयोग करना।

प्यार भरा वार्तालाप

1. कम से कम बोलना।
2. एक दूसरे से वार्तालाप करते हुए प्रेम पूर्ण व्यवहार करना।

पद्मश्री डो. सुधीर शाह, प्रो. नरेन्द्र भंडारी, प्रो. सुरेन्द्र पोखरणा, प्रो. राजमल जैन, श्री दुष्यन्तभाई शाह, श्री कुशलभाई भंसाली, डो. हीना बहन शाह, डो. जितेन्द्र शाह। Ahimsa World vol. 4-5 (2020) से उधृत ।

Scientific Basis of Violence and Nonviolence

हिंसा और अहिंसा का वैज्ञानिक आधार

Pratap Sanchetee and Prashant Sanchetee

Abstract: Virtually all animals including humans engage in aggressive behavior. Brain mechanisms for aggression are very similar across species. Aggression, initially developed in nature for self defense and preservation of species, has taken an extreme form, resulting in violence at individual, societal and nation level. It is influenced by genetic code, upbringing in childhood, environmental and cultural factors and incorrect interpretation of philosophies and religions. To foster peace, we need to suppress violence and to promote nonviolence in our mind. In this presentation, we will discuss changes in brain and mind responsible for aggression and the way to modulate them for a peaceful behaviour. Changes in brain will be explained with structural changes with functional MRI (fMRI), hormonal changes and epigenetic studies.

Introduction :

Like all emotions, aggression and violence are conceived in mind, generated in brain and executed by the body : Authors

Nature has created this planet with a specific purpose (though not well understood) and has created a balance amongst all living beings. Every one of us, including plants and animals, has a right to live on this Earth. However, we as human beings are insensitive to injuries we are inflicting on the very nature, which supports us.

Violence and aggression have existed as long as mankind. Both aggression and cooperation are genetically coded but are greatly influenced by environmental and cultural factors, upbringing in childhood, and incorrect interpretation of philosophies or religions. Thus understanding neurobiological processes are of great importance in preventing violence and promoting nonviolence.

Impulsiveness, anger, aggression and violence can be considered as a spectrum of behavior with identical mechanism controlled by the brain. These emotions operate at multiple levels in brain e.g. anatomical, biochemical and physiological (Sanchetee et al., 2017). While current literature is abundant in social science, a little attention has been paid to systematic neurobiological studies on violence. Though all animals engage in aggressive behavior, humans are unique in the complexity of their social relationships and their highly developed social intelligence. In this paper, we shall discuss scientific explanation of violence and how it can be controlled to develop an attitude of nonviolence, peace and co-existence.

Definition and Scope

Nonviolence (अहिंसा): Dictionary meaning of nonviolence or *Ahimsa* is 'abstention from violence as a matter of principle'. It is one of the cardinal features of most of the religions such as Jainism, Hinduism and Buddhism and many philosophies. The first tirthankara in Jain religion, Rishabhdev, perpetuated the idea of nonviolence. It has also been related to the notion that any violence has karmic consequences.

Anger (क्रोध): The emotion of anger is defined as a negative emotional response to goal-blockage and unfair behavior by others.

Aggression (आक्रामकता): Aggression refers to intentional act or behavior that is carried out with a purpose to cause physical or psychological harm to others or to self. It is a primitive behavior which aims at damaging or destroying a living being (plant or animal), normally for food, or dominance among males. Uncontrolled aggression has several components such as impaired recognition of social cues and enhanced impulsivity.

Violence (हिंसा): As per World Health Organization (WHO), it is defined as "the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, which either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation". All spiritual philosophies including Jain religion has recognized violence not only at physical level but at verbal and mental level also.

Cruelty (क्रूरता): It is perhaps an extreme form of destructive behavior where an individual inflicts harm to other people with sense of feeling good or deriving pleasure (sadism) out of it. It is expression of a violent personality exposed to repetitive mental trauma or abuse.

Scope : In all species, both aggression and cooperation (peaceful coexistence and nonviolence) are genetically encoded behaviors that are essential for survival. Unfortunately the term nonviolence has a negative connotation and does not indicate any positive quality of mind.

Aggression and violence can be broadly classified into two i.e. reactive/impulsive and proactive/instrumental. Reactive/impulsive aggression is essentially a defense mechanism to counter threat (real or perceived), frustrating

event, and/or provocation. Its primary goal is to remove the provoking stimulus. It is always associated with anger, increase in sympathetic activation, a failure of brain control, and an easy switching among targets. In contrast, proactive aggression (also known as '*appetitive aggression*') is a lust (purposeful planned attack) driven by instrumental motivations to achieve personal goals, material goods or social status. It is characterized by consistent attention to a target, and often by a lack of emotional arousal. There is mutual reinforcement between reactive and proactive aggressions.

Aggression can also be categorized as *state aggression* and *trait aggression*. While *State reactive or proactive aggression* is an aggressive response triggered by a specific provocation or incentive, *trait reactive or proactive aggression* refers to disposition that individuals tend to conduct reactive or proactive aggressive behavior in daily life across times and situations.

WHO has divided violence into three broad categories:

1. self-directed violence
2. interpersonal violence
3. collective violence

Homo sapiens are the only species on the earth that oppresses, maims and kills systematically and in large scale members of its own species. The average percentage of deaths caused by members of the same species in animal kingdom is about 0.3 per cent (Gomez et al., 2016). The same figure for humans is estimated to be about 2 per cent, about six times higher than for animals. For all their ferocious reputation, tigers are much less likely to fight each other to death – with a rate of 0.88 percent. In general, humans have a higher propensity for proactive aggression and lower propensity for reactive aggression. Humans are moral animals and we cannot escape from that.

Scientific view on aggression and violence

(a) Causes of violence;
(b) Neuro-hormonal basis of violence;
(c) Role of environmental and cultural factors in violence;

Causes of Violence

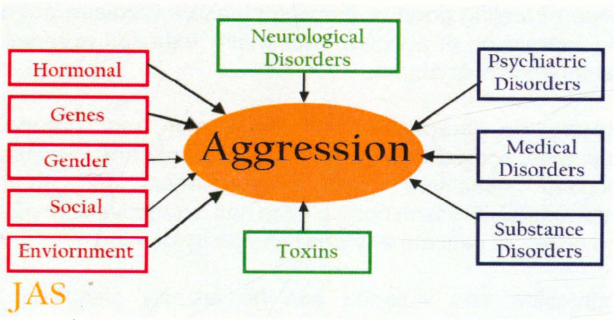


Fig. 1: Causes of aggression and violence

An animal, to be successful in an evolutionary sense, must get food, avoid becoming someone else's food (prey), and reproduce. Violent behavior is associated with a combination of environmental and heritable factors against a genetic background (Fig. 1).

Genetic basis

Development of the brain starts with the most basic systems (brainstem, sensory motor regions) and progresses to the most complex (prefrontal cortex). Whereas no single gene responsible for human violence has been discovered, data from molecular genetics suggest that multiple genes may interact to predispose individuals to this behavior (Filley et al., 2001). Emerging evidence indicates that telomeres shorten with exposure to psychosocial stress, particularly early-life stress (Ridout et al 2015). Aggression in animals and humans is likely to be related to genes regulating central serotonin metabolism. Gene–environment (e.g. maternal stress hormones, teratogens, nutritional deficiencies, or illness) interactions have important effects on aggressive behaviors.

Neuro-hormonal basis of violence

Many neurotransmitters and hormones such as serotonin, catecholamines, acetylcholine, dopamine, gamma aminobutyric acid, vasopressin, steroids, opioids, and other substances (Fig. 2) are involved in the modulation of aggressive behavior (Filley et al., 2001).

While serotonin and gamma amino butyric acid (GABA) are inhibitory, norepinephrine, acetylcholine and dopamine are excitatory for violent behavior. Aggressive behaviors are known to be regulated by serotonin neurotransmission including regulation of serotonin release, reuptake and sensitivity (via serotonin receptors). Reactive aggression is suppressed by high concentrations of brain serotonin. Disruption of serotonergic projections to the prefrontal or anterior cingulate cortex enhances reactive aggression. Dopaminergic function appears to be necessary for aggressive behavior, possibly by regulating arousal, learning and memory. Neuronal nitric oxide synthase (nNOS) exerts inhibitory effects on male aggression.

Fig 2: Hormones and neurotransmitters in aggression and violence

Gender and Aggression

Male dominance in aggression is more due to biological than social reasons. Males are naturally stronger, have a physical advantage, and often employed for security and war (Sanday et al., 2001). Perhaps genetic and hormonal (testosterone) factors can explain this discrepancy (Strenziok et al., 2011). Environmental and socioeconomic factors such as unemployment, lower education level, alcohol use and access to firearms need to be considered for higher violence amongst males (Filley et al., 2001; Sanday et al., 2001).

Both genders use direct verbal aggression equally. While male gender uses more physical aggression, female gender uses more indirect (e.g. spreading rumors) aggression. It appears that there is a genetic component with complex relationship among androgens, oxytocin, estrogens and progesterone and none of them work in isolation. There is some evidence that high levels of female hormones (e.g. estradiol and progesterone) are associated with low levels of aggression (Albert et al., 1992). It has also been postulated that brain monoamine oxidase A (MAO A) suppresses the aggressive behavior and this enzyme may be genetically deficient in males (Alia-Klein et al., 2008).

Circadian rhythm

Circadian rhythm is a roughly 24 hour cycle in the physiological processes of living beings, including plants and animals. Anger and reactive aggression interact in multiple ways with circadian clocks (Sanchetee and Sanchetee, 2018). There is a predictable rhythm in the expression of aggression and anger and disruptions of the normal circadian system increase the likelihood of aggressive behaviors (Hood and Amir, 2018). Conversely, chronic expression of anger can disrupt normal circadian rhythm which in itself is a risk for many non-communicable diseases such as cardiovascular diseases, tension, irritable bowel disorders etc. Increased exposure to artificial environment and exposure to unnatural sources of light for extended durations also result in aggressive behavior. Aggression is apparent in most animals during breeding season.

Role of environmental and cultural factors in violence

Aggression and violence do not present in isolation. Other destructive emotions such as greed, lust, ambition, egotism and revenge also co-exist. Aggressive behavior is associated with negative effect, arousal, cognitive-behavioral control, mentalizing and reward. Feelings of superiority, dominance, and satisfaction gained by performing violent and terroristic attacks are a big reward. In contrast, social rejection is a painful event that often increases aggression.

Societal and cultural factors play an important role in the development of violent behavior. The role of cultural forces in either promoting or discouraging interpersonal violence is so obvious that it has obscured the part played by biologic disorders in determining responses to endogenous and environmental challenges.

Brain Structures

There is not a single area or centre in the brain which can be identified as "violence center". The development of brain in the animal kingdom has been considered in three successive stages as below (Wikipedia):

(i) The reptilian brain or complex, in most primitive animals, is concerned with instinctual behaviors, aggression and dominance.

(ii) Paleomammalian brain or complex is next order of brain development and collectively it has been labeled as 'Limbic System or Lobe'. These are group of structures around upper brainstem and consist of amygdala, hippocampal formation, parahippocampal gyrus, cingulate gyrus, septal region and hypothalamus concerned with a variety of emotions.

(iii) Neomammalian complex is the most developed part of the brain and is labeled as neocortex. Anatomically it is divided into 4 lobes i.e. frontal, temporal, parietal and occipital lobes. All advance cognitive, emotion, and social attributes are related to neocortex. The frontal lobe, especially the prefrontal regions, is responsible for the most advanced and civilized functions of humans.

The abnormal electrical activity in the amygdala is mostly implicated in violent behavior (Filley et al., 2001). Activity of orbitofrontal cortices results in inhibition or regulation of aggression. There is a balance between the impulsive aggression generated in the temporolimbic structures and its control by the orbitofrontal cortices.

Aggressive responses to a frustrating or threatening event are mediated by limbic systems; more controlled and goal-oriented aggression, instead, is regulated by higher order cortical systems. Neural circuitry in reactive aggression includes attention control (e.g. prefrontal cortex), conflict resolution (e.g. dorsal anterior cingulate cortex), emotional processing (e.g. medial/orbitofrontal cortices) and social reward (Nelson and Trainor, 2007).

Proactive and reactive aggressions are innervated, hormonally influenced, and genetically supported in different ways. There are evidences that proactive and reactive aggressions have preference for the differential brain area. While proactive aggression engages the bilateral dorsolateral prefrontal cortex (DLPFC), posterior cingulate cortex (PCC), lateral hypothalamus, ventrolateral periaqueductal gray and the central and basolateral amygdale, reactive aggression involves amygdale, hypothalamus, insula, periaqueductal gray, orbitofrontal cortex (OFC), ventromedial prefrontal cortex (VMPFC), anterior cingulate cortex (ACC), DLPFC, and superior temporal gyrus (Strenziok, 2011, Pardinia et al., 2014, Tang et al., 2015).

Scientific Basis of Peace and Reversal of Violence

It has been established beyond doubt that aggression and violence are associated with many structural, functional and biochemical changes in brain (Nelson and Trainor, 2007). It has also been observed that human brain adapts to environmental pressure, physiologic changes, and experiences. These changes refer to as brain plasticity and occur at the level of behavior, anatomy, physiology, and biochemical levels and can also be demonstrated at cellular

and molecular levels. Thus capitalizing on neuronal plasticity, we can achieve not only peace but also reverse tendencies for violence.

Violence in many forms can be preventable. There is a strong relationship between levels of violence and intensity of modifiable factors. Some of the measures to be taken at various levels to mitigate aggression and violence are given below:

Individual level

- Development of personalities which is commensurate with peace and non-violence.
- Avoiding alcohol and smoking.
- Management of drug and substance abuse.
- Promotion of better mental and physical health.
- Skill learning in perceptual, cognitive and motor performance.

Family and group level

- Newborn and young children are vulnerable to insult to mental faculties which can have permanent detrimental effect that may manifest in later age.
- Safe, stable, and nurturing relationships between children and parents.
- Reduction of domestic aggression with spouse and children.
- Prevention of damage to brain development through improvement in prenatal and perinatal care and prevention of head injuries.
- Reduction in interpersonal aggression.
- Commitment to nonviolence by individuals and demonstrations in struggles against violence and oppression.

Societal and National level:

- Peaceful societies and nonviolent social movements and providing insight on core values and norms like humility, respect for others, love and caring, forgiveness, and patience are fundamental in promoting peace.
- Nonviolent attitudes actualized through nonviolent models and non-punitive child rearing practices can help socialize children to become nonviolent adults.
- Nonviolent social norms and values can play an integral role in reducing aggression.
- A well planned nonviolent resistance can win rights with little or no bloodshed.
- Media coverage can promote nonviolence as a promising alternative to violence.
- Reduction in poverty and gender inequality and increase in income.

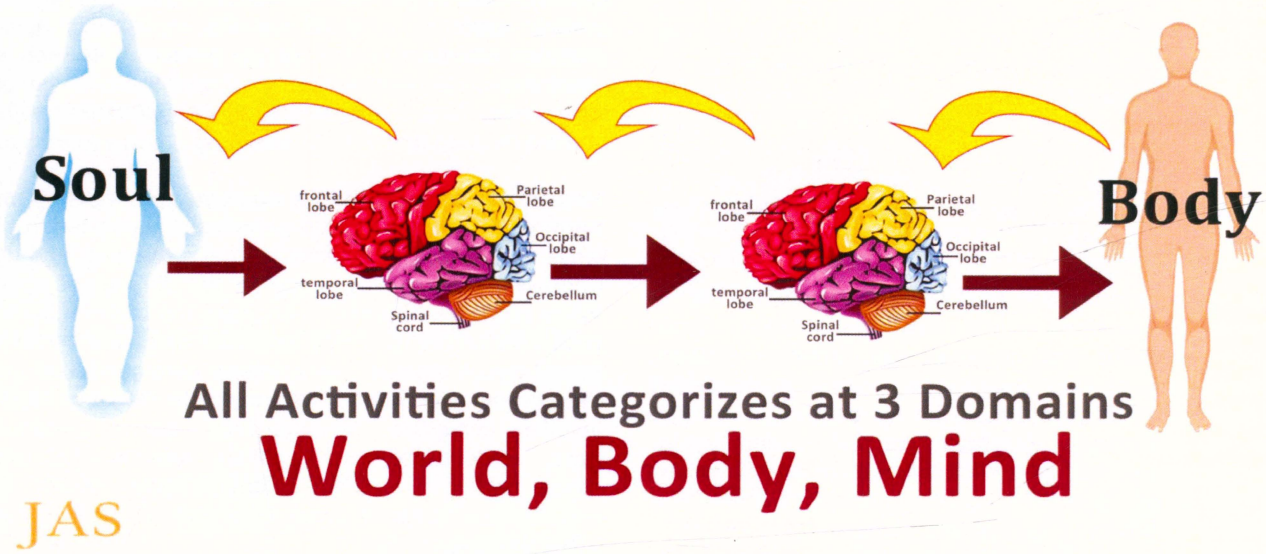


Fig. 3. Various levels of activities in developed animals including humans.

Religion in promoting peace and reduction of aggression

As per Jainism and other major religions across the world, all activities and emotions are carried at three inter-related levels i.e. body, mind (interfaced with brain) and soul (Fig. 3). Three basic tenets in Jain religion are right knowledge, right faith, and right conduct to attain salvation. To achieve these, one must observe the five great vows (*Maha-vratas*) i.e.*Ahimsa* (non-violence), *Satya* (truthfulness), *Achaurya* (non-stealing), *Bhramhacharya*

(celibacy), and *Aparigraha* (non-possession). Thus, philosophy in Jain religion is a wholesome prescription for non-violence and to acquire peace.

Meditation is one of the important practices in different religions to achieve not only supreme peace but also helps in adopting non-violent behavior. It (meditation) is an umbrella term that covers different practices ranging from posture practices to management of breath-based practices and *dhyana*. It has been classified into two broad categories i.e. Focused Attention (FA) and mindfulness or Open Monitoring (OM). FA is based on the concentration of attention on a particular external, corporeal, or mental object while ignoring all irrelevant stimuli. In contrast, during OM one enlarges the attentional focus to all incoming sensations, perceptions, cognition, emotions, and thoughts from moment to moment without focusing on any of them with a non-judgmental attitude or without any prejudice (censorship). Experienced meditators have shown greater grey matter concentration in the hippocampus, ventromedial PFC, anterior and posterior cingulate cortex and temporoparietal junction that subserve emotion regulation, learning, and memory (Tang et al., 2015). A breath-based meditation activates limbic structures (hippocampus, parahippocampus, and amygdala), insula and lateral frontal areas, while mantra repetition is more associated with activation in the precentral gyrus, parietal cortex, and medial frontal gyrus. Thus, value of meditation has been proved with scientific gadgets also (Sanchetee et al., 2017).

How to grow young ones in a violent environment

Attention to violence among young people is particularly critical, because effective preventive steps during early childhood and adolescence can yield extended benefits. Children are exposed to and witness many destructive or impulsive activities such as action movies, video games, news reports, or violent sports such as boxing. Rewards from such activities often lure them to imitate and follow such behavior. We need to study the implications of such exposures on developing brain. Thus we need to develop a new model of social order where children learn from healthy family and society structures. Print and social media should be made more responsible and directed toward balanced development of young in the society. Parents, elders and teachers, all should jointly work for children's development. Childhood experiences have long influences over future behavior.

Future Direction

1. Phenotypic heterogeneity of violent behaviors is a principal problem of this research area. Efforts at subtyping of violence (e.g. impulsive versus premeditated violence) are in progress, but much remains to be done.
2. A fundamental challenge is to translate the recognition of this heterogeneity into research, prevention, and treatment. This requires using the available tools of molecular genetics, neuropharmacology, brain imaging, and psychopharmacology in the same subjects.
3. Neurobiological and environmental (e.g. social) factors continuously interact and influence each other. To understand the neurobiology of violence, we need to study it in the context of such biosocial interactions.

Conclusions

Violence, like all human behavior, is a learned behavior and controlled by the brain and mind. Medical science has much to contribute to human welfare at both the societal and personal level. Violent behavior differs in its origins, mechanisms, and management and its neuroanatomic and chemical basis is being recognised. There is interplay of biologic, genetic, developmental, interpersonal, cultural and other sociologic factors for aggression. Frontal lobe dysfunction, altered serotonin metabolism, and the influence of heredity, promises to lead to a deeper understanding of the causes and solution of this important problem (Filley et al., 2001).

We must be directing research for prevention and management of violent behavior. Factors at societal levels like economic inequality, racial discrimination, alcohol abuse, firearm accessibility, child abuse, and educational deprivation will lead to a better, peaceful society where aggression and violence will have no place.

Suggested readings

1. Albert D.J., Jonik R.H., Walsh M.L. (1992) Interaction of estradiol, testosterone, and progesterone in the modulation of hormone-dependent aggression in the female rat. *Physiology Behavior.* 52(4): 773-779. doi: https://doi.org/10.1016/0031-9384(92)90413-V.
2. Alia-Klein N., Goldstein R.Z., Kriplani A., Logan J., Tomasi D., Williams B.W., et al. (2008) Brain monoamine oxidase: A activity predicts trait aggression. *J. Neurosci.* 7, 28(19), 5099–5104. doi: https://dx.doi.org/10.1523/JNEUROSCI.0925-08.2008
3. Filley C.M., Price B.H, Nell V., Antoinette T., Morgan A.S., Bresnahan J.F., Pincus J.H., Gelbort M.M., Weissberg M. and Kelly J.P. (2001) Toward an understanding of violence: neurobehavioral aspects of unwarranted physical aggression: Aspen

Neurobehavioral Conference Consensus Statement. *Neuropsychiatry, Neuropsychology, and Behavioral Neurology*, 14(1):1–14.

4. Gómez J., Verdú M., González-Megías A., et al. (2016) The phylogenetic roots of human lethal violence, Nature 38:233–237 doi: https://doi.org/10.1038/nature19758.
5. Hood S., Amir S. (2018) Biological clocks and rhythms of anger and aggression. *Front. Behav. Neurosci*, 12:4. doi: https://dx.doi.org/10.3389/fnbeh.2018.00004.
6. Nelson R., Trainor B. (2007) Neural mechanisms of aggression. Nat. Rev. Neurosci. 8:536–546. doi: https://doi.org/10.1038/nrn2174.
7. Pardinia D.A., Raine A., Ericksona K., Loebera R. (2014) Lower amygdala volume in men is associated with childhood aggression, early psychopathic traits, and future violence. *Biological Psychiatry*, 75(1):73-80. doi: https://doi.org/10.1016/j.biopsych.2013.04.003.
8. Sanchetee, P., Mishra, J.P.N., Jansma, R. (2017) 'Mind, Brain and Consciousness' In Scientific Perspectives of Jainism, Eds. Samani Chaitanya Prajna, Bhandari, Narendra, Kachhara, N.L., BMIRC, Jain Vishva Bharti Institute, Ladnun.
9. Sanchetee, P., Jain, A., Agarwal, H. (2017) Preksha meditation and mental health in elderly, *J. Ind. Acad. Geriatr* 13(3): 131-138.
10. Sanchetee, P., Sanchetee, S.C. (2018) Relevance of pineal gland: Science versus religion, *Yog Mimansa* 50:41-48.
11. Sanday, P.R. (2001) Male dominance. *International Encyclopedia Social & Behavioral Sciences*, 9143-9147. doi: https://doi.org/10.1016/B0-08-043076-7/03976-0
12. Strenziok, M, Krueger, F., Heinecke, A., Lenroot, R.K., Knutson, K.M., van der Meer, E., Grafman, J. (2011) Developmental effects of aggressive behavior in male adolescents assessed with structural and functional brain imaging, *Soc. Cogn. Affect. Neurosci.* 6(1): 2–11.
13. Ridout, S.J., Ridout, K.K., Kao, H.T., Carpenter, L.L., Philip, N.S., Tyrka, A.R., and Price, L.H. (2015) Telomeres, early-life stress and mental illness. *Adv. Psychosom. Med.* 34:92-108. doi: 10.1159/000369088.
14. Tang, Y.Y., Hölzel, B.K., Posner, M.I. (2015). The neuroscience of mindfulness meditation. *Nature Reviews Neuroscience*. 16: 213–225.
15. Wikipedia. Violence https://en.wikipedia.org/wiki/Violence. Last accessed on 26 Sep 2020.

About the Authors:

Dr. Pratap Sanchetee, MD (Medicine), DM (Neurology), Professor, Jain Vishva Bharati Institute, Ladnun, and Neurologist, Sanchetee Hospital, 429, Pal Link Road, Jodhpur-342008., Founding Fellow of Jain Academy of Scholars.
Tel. +919414173555
Email: pratap.sanchetee@gmail.com

Er. Prashant Sanchetee, BE, Software Engineer, 41 Highfield Road, Feltham, Middlesex, TW13 4DA, London, United Kingdom
Tel. +447867192732
Email: prashant.sanchetee@gmail.com

The Subtle and Elementary Physical Structures in Jainism Perspective

Narayan Lal Kachhara

Abstract: Properties of matter, *pudgala*, particularly at subtle[1] level, are described in detail in Jainism. The smallest constituent of matter is *paramāṇu* and its aggregation forms bigger structures of *skandhas* and *varganās*. In this article I study the properties of *paramāṇu* in modern context and investigate the properties of groups of *paramāṇus* and *varganās* in the scientific perspective. I present logical arguments on the basis of information available in Jaina texts to describe the characteristics of groups of *paramāṇus* and then go on to study the four touch and eight touch *varganās*. Photon, in modern science, can be assumed to be an eight touch *varganā* composed of infinite *paramāṇus* according to Jainism and it has that many quanta of energy. All the gross matter in the universe is composed of the biggest eight touch *varganā* called *Mahāskandha varganā*. How this *varganā* forms particles like quarks is not mentioned in Jainism. But this can be understood with the help of clairvoyant observations of atoms of hydrogen and other chemical elements made by Annie Besant and Leadbeater.

Scientific knowledge of matter is not sufficient to understand the processes taking place in the bodies of organisms. Jainism provides conceptual knowledge about subtle structures used in the body of organisms as well as other physical structures that has the potential of giving new direction to scientific study.

Keywords: *Paramāṇu*, *varganā*, photon, quark.

Introduction :

Jainism describes the characteristics of *jiva* and *ajiva* substances in detail. The properties of matter, which is the subject of scientific study today, also finds important place in Āgamas. The smallest constituent of matter is *paramāṇu* and the bigger structures are formed by its combinations known as *skandhas*. Jainism describes the properties of *paramāṇu* and rules for formation of *skandhas*. All this knowledge is obtained by *direct* cognition by consciousness, without the aid of sensory organs or mind. Science regards such information as subjective and speculative. Scientific findings are based on experimental observations, and theoretical and statistical analysis. This kind of study is called objective, which is repeatable in space and time. However all scientific knowledge needs subjective observer who uses media of rather imperfect senses and mind. Why then the knowledge obtained by *direct* cognition without the use of imperfect media is regarded as speculation and unreliable is a question. Annie Besant observed the inner structures of chemical elements clairvoyantly, which were found agreeing with the later scientific findings. This lends support to the belief that the knowledge obtained by *direct* cognition is reliable and true.

In modern particle physics ordinary matter is composed of elementary particles such as quarks and leptons (e.g. electrons) and force carriers, like photons. According to Jainism these structures are of gross type having eight touch properties. Jainism states that there are still smaller structures having four touch properties which in turn are made up of *paramāṇus* having only two touch properties. Science has not yet discovered these structures. It has of course discovered great many details of eight touch gross structures that are not available in Jainism. Thus Jainism and science are complementary and together provide us a complete spectrum of information about the physical universe.

Paramāṇu

A *paramāṇu* is the ultimate, indivisible constituent of the physical universe. It is eternal and cannot be split or destroyed by any means whatsoever [1]. *Paramāṇu* is not sense perceptible but its large aggregates are perceptible. The properties of gross forms of aggregates are described in terms of sense perceptible qualities, a method that was followed in ancient times. The sense perceptible qualities are colour, smell, taste and touch. Jain philosophy believes that a substance has the same properties in all its forms i.e. properties do not change with form. So *paramāṇu* also has the same properties as the gross form of matter. Every *paramāṇu* has one of the five primary colours-black, blue, red, yellow and white, one of the two smells-good and bad, one of the five tastes- sweet, bitter, pungent, sour and astringent, and two of the four primary touches i.e. either hot (*usna*) or cold (*sheeta*) , and either smooth (*snigdha*, positive charge) or rough (*ruksa*, negative charge)[2] [2]. It has many kinds of motions like spin, vibration, linear, rotational, oscillation, etc. [3]. The velocity of motion in any mode is uncertain and it changes with time [4]. *Paramāṇus* differ in respect of colour, smell, taste and touch properties. *Paramāṇus* have innate affinity of uniting with other *paramāṇus* to form composite structures. Such structures are liable to disintegrate setting the *paramāṇus* free. The process of association and dissociation of *paramāṇus* is a regular phenomenon. *Paramāṇu* never loses its identity

[1] Subtle matter is sense imperceptible.

[2] The smooth touch is regarded as positive charge and the rough touch is regarded as negative charge. This is based on the commentary Sarvartha-Siddhi on sutra 5/24 of Tattvartha Sutra which says "Snigdha-ruksatva-guna-nimitto udyot", which means that lightening in clouds is produced by the qualities of snigdha and ruksa. According to modern science lightening is produced due to positive and negative charges in the clouds. So snigdha is taken as positive charge and ruksa is taken as negative charge.

even when it is part of a composite. Any number, up to infinite, of *paramāṇus* can occupy a single space point [5]. A *paramāṇu* is capable of being dynamically active. The activity of a *paramāṇu* is not continuous but is rather intermittent. *Paramāṇu* can be cognized by effect of collective action of a group of them or by direct experience of transcendental knowledge (of a perfect soul).

Cold, hot, smooth and rough are primary touch qualities of *pudgala*. The other four touch qualities viz. light (*halka*), heavy (*bhari*), soft (*mridu*) and hard (*karkash*) are secondary touch qualities. These touch qualities are supposed to develop when bonding between infinite *paramāṇus* produces a gross aggregate. If number of negative *paramāṇus* is more in the bonding process, the aggregate contains light touch quality and if positive *paramāṇus* are more, than heavy touch is produced in the aggregate. When positive *paramāṇus* are in majority and they bond in cold condition, soft touch is produced and when a majority of negative *paramāṇus* bond in hot condition, hard touch is produced in the aggregate [6]. The mass of the aggregate is said to relate to the light and heavy touch qualities. The four touch aggregates and *paramāṇus* are mass less. The mass is a property of gross aggregates having eight- touch [7].

What is *paramāṇu* in terms of modern science? All known elementary particles fall in two group's fermions and bosons. Fermions do not share the same space the way bosons share. So a *paramāṇu* is not a fermion. Bosons are force carriers. The electromagnetic attraction between protons and electrons in the orbit is pictured as being caused by exchange of large number of photons. Photons have no charge and therefore do not compare with *paramāṇus* which have charge. It is shown below that photon in fact is composed of infinite number of *paramāṇus*. A *paramāṇu* has kinetic energy of motion and potential energy of charge and therefore can be regarded as an energy particle having charge. Charge is an essential property of *paramāṇu*. And since the *paramāṇu* is indivisible its energy is the quantum of energy.

Paramāṇu Groups and Aggregates

There are billions or trillions of *paramāṇus* in a small space and they are all moving in criss-cross way. The *paramāṇus* have no preferred type of motion and may move randomly in different directions with any combination of motions. But it can be expected that in any particular direction there would be thousands or millions of *paramāṇus* moving with different speeds. The *paramāṇus* moving with similar speeds fall in groups. The *paramāṇus* in a particular group have affinity to unite because of their charges. So the group behaves as a unit and the *paramāṇus* close up together. The group now has a denser structure.

Every group contains *paramāṇus* with positive and negative charge. As *paramāṇus* draw closer, aggregation of *paramāṇus* takes place i.e. the *paramāṇus* are packed in the *pradesa* space and the density of charge in *pradesa* [3] increases. This also reduces the space occupied by the group. So, aggregation results in high energy density and a denser structure. The net charge of the aggregate, or group, shall be decided by the total number of positive and negative *paramāṇus* in the aggregate, or group, and the charge of individual *paramāṇus*. But the total energy of the aggregate, or group, shall be the sum of energy of all *paramāṇus*, positive and negative, in that aggregate, or group. The group so formed has four touch properties: positive, negative, hot and cold and is said to be massless in Jaina terms.

Varganā

Varganā is a group of *paramāṇus* acting as a unit. Although *varganā* is a physical entity it is described in Jaina texts from the point of view of its use to *jiva*. When studying the physical structures we must understand the *varganās* in that form. An attempt has been made by the author to understand *varganās* in physical context [8] and interpret their meaning in scientific perspective. We shall follow that approach here. Eight kinds of *varganās* are described in Bhagwati Sutra [9] and 23 kinds in Gommattsara Jivakanda [10]. In the latter system the *varganās* are classified on the basis of number of *paramāṇus* in the group. The lowest order *varganā* has just one *paramāṇu*. The next higher order *varganā* has countable *paramāṇus*. The next higher *varganā* has innumerable *paramāṇus* and the next higher order has infinite *paramāṇus*. Up to this stage the *varganās* are just collection of *paramāṇus*. It has been mentioned that a *varganā* having less than infinite number of *paramāṇus* has no useful application because its energy is too small to be practically useful.

Following Gommattsara system the following four touch *varganās* are useful to jiva.

1. *Ahara varganā*. This type of *varganā* is useful in making the gross, protean and migratory bodies of organisms.
2. *Taijas* (bio energy) *varganā*. This type constitutes the *Taijas or energy* bodies of organisms.
3. *Bhasha* (Sound) *varganā*. This type is used in producing all kinds of sounds.
4. *Mano* (Mind) *varganā*. This type is used in forming the physical mind of organisms.
5. Karman *varganā*. This type constitutes the karma body of organisms.

Besides these five types, there are other four touch *varganās* but these do not associate with *jiva*. Many types of infinities are defined in Jainism [11] and all the above five types of *varganās*, and also other higher *varganās* to be described later, contain *paramāṇus* in numbers more than the lowest type of infinity. The energy and charge density of *karman varganā* is highest among the above five types of *varganās*. Also this *varganā* is smaller in size than the other four types due to process of aggregation.

On further increase in charge density another kind of phenomenon known as bonding is supposed to take place. It is described in Jaina texts that bonding takes place between positive and negative *paramāṇus*, positive and positive *paramāṇus*, and between negative and negative

[3] *Pradesa* is (point) space occupied by a *paramāṇu*.

paramāṇus [12]. Jainism describes the rules for bonding. Bonding between two *paramāṇus* does not take place if their charges are at minimum level[4]. Bonding between positive and negative *paramāṇus* takes place when their charges exceed the minimum level irrespective of the difference in the charge of the two *paramāṇus*. But bonding between two similarly charged *paramāṇus* takes place only when the difference between charges of the two *paramāṇus* exceeds by two or more units.

The *paramāṇus* in an aggregate may have positive or negative charge. Bonding between these *paramāṇus* shall take place according to above rules. A bonded aggregate shall be called here as b-aggregate. A *varganā* has large number of b-aggregates each having different net charge. Bonding between these b-aggregates shall also take place according to same rules.

Bonding of *paramāṇus* in *varganā* has great significance in determining the characteristics of the physical structures. It is said that higher *varganās* are eight touch type i.e. in addition to the four touch possessed by lower order *varganās* these *varganās* also have other four touch properties called soft and hard, and light and heavy. The aggregates in the group vary in respect of charge and thermal property. There are aggregates which are positive and hot, positive and cold, negative and hot and negative and cold. The term hot may refer to excited state and cold may refer to un-excited state of paramāṇus here. Bonding of *paramāṇus* in positive aggregates would develop heavy touch and bonding of *paramāṇus* in negative aggregates would develop light touch. If bonding in positive aggregate is taking place in cold condition soft touch would be produced and if bonding in negative aggregate is taking place in hot condition hard touch would be produced. The heavy and light touches generate inertia in the system and introduce a new property called mass in the *varganā*. The four touch *varganās* are massless. In modern science mass is acquired by particles due to interaction with Higgs field.

The property of eight touch in *varganā* becomes stable only when there are enough b-aggregates in it . This happens in *varganās* higher than *karman varganā*. In the *Santer-Niranter varganā*, next higher than *karman varganā*, such conditions prevail intermittently i.e. sometime the *varganā* exists in eight touch form and sometime in four touch form. The conditions of bonding stabilize in the next higher *varganā* called *Pratyeka Sarira varganā* (PSV, Individual Body *varganā*). This *varganā* is 17^{th} in order in the Gommattsara system. This *varganā* is supposed to help produce food in autotrophic plants. According to modern biology plants make their food with the help of sunlight. So we infer that sunlight consists of *Pratyeka Sarira varganā* i.e. each photon of sunlight is PSV. According to modern science the photon has zero rest mass, has energy equal to the product of frequency of radiation and Planck's constant, and is regarded as quantum of energy. According to Jain view, photon consists of infinite number of *paramāṇus* and large number of b-aggregates as shown in figure 1. The energy of a *paramāṇu* is the minimum energy in nature and is the real quantum of energy, whereas modern science assumes energy of photon as energy quantum. This impels us to appreciate how Jainism describes nature at infinitely smaller scale than that measured by modern particle physics. As the photon has neutral charge, the charges of positive and negative *paramāṇus* would be equal.

Cluster of b-aggregates

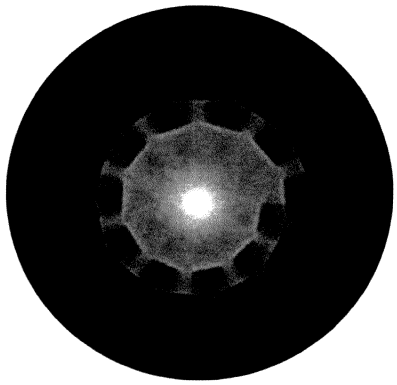


Figure 1. Structure of Photon aaccording to Jainism

Gross (Ordinary) Matter

The last, i.e. 23^{rd} *varganā* in the Gommattsara system is *Mahāskandha varganā* (MV). This *varganā* is supposed to be the source of all gross matter in the universe. How *Mahāskandha varganā* forms the gross matter is not mentioned in Jaina texts. But this can be understood with the help of information obtained by clairvoyant observations of atomic structure by Annie Besant. Clairvoyance is one of the *direct* cognition methods and Jainism gives great importance to knowledge obtained by *direct* cognition.

Annie Besant and C.W. Leadbeater clairvoyantly examined the chemical elements Hydrogen, Oxygen, Nitrogen, etc. [13]. The drawings of the structure of elements were made by two artists on the basis of observations made by them. The observers said that the elements could be raised to etheric[5] conditions by will power. They found that the gaseous state is succeeded by the etheric state, just as the solid is succeeded by the liquid. The etheric state is found to cover four sub states distinct from each other. Thus the matter in the physical world has seven sub states, including the three of solid, liquid and gaseous.

They first examined the chemical element of hydrogen which appeared to have six bodies contained in an egg-like form as shown in figure 2. It rotated with great speed on its own, vibrating at the same time, the internal bodies performing similar gyrations. The whole atom spins and quivers and has to be steadied before exact observation is possible. The six little bodies are arranged in two sets of three forming two triangles that are not interchangeable. The six bodies are not all alike; they each contain three smaller bodies which were called as Anu or Ultimate Physical Atom (UPA). In two of them

[4]The charge of paramāṇu spontaneously varies from a minimum level to some maximum level by a process known as '*sadguna hani vridhi*'.
[5]Etheric condition is subtle state of the element created by will power such that its size can be enlarged, to suit its study.

the three Anu-s are arranged in a line, while in the remaining four they are arranged in triangles. It is, of course, impossible to convey in words the clear conceptions that are gained by direct vision of the objects of study.

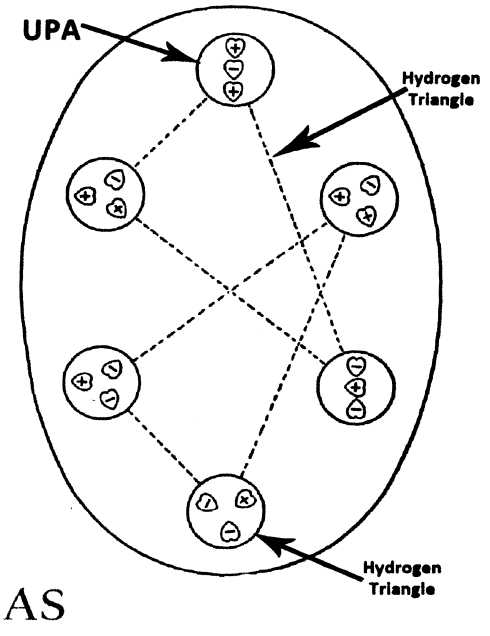


Figure 2. The hydrogen (Reproduced from Occult Chemistry)

Two types of Anu-s were observed by them as shown in figure 3. In one case force pours in from the "outside" and passing through the Anu pours out back into the physical world. In the second case, it pours in from the physical world and out through the Anu into the "outside" again i.e. vanishes from the physical world. The former is like a source and the second is like a sink. They called source Anu positive or male and the sink Anu negative or female. Note that the terms positive and negative do not refer to charge here in Figure 3. All Anu-s observed by them were one or the other of these two forms.

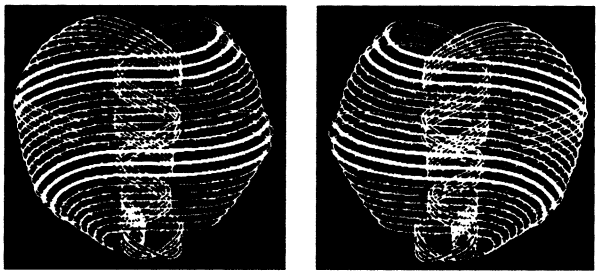


Figure 3. The Anu (Reproduced from Occult Chemistry). Arrows marked on top are by the author.

It was seen that the Anu is a sphere slightly flattened having a depression at the point where the force flows in, and there is a little apex at the diametrical opposite location.

According to Besant and Leadbeater, the Anu can scarcely be said to be a "thing", though it is the material out of which all things physical are composed of. It is formed by the flow of 'life force' and vanishes in its absence. If the flow were checked for an instant, the whole physical world would vanish as a cloud melts away in empyrean. It is only the persistence of that flow which maintains the physical basis of the universe.

Describing the construction of the Anu the authors said that the surrounding force flows in, and three whorls appear with their triple spiral of two and half coils, and returning to their origin by a spiral within the Anu, (see fig3); these are at once followed by seven finer whorls, which, following the spiral of the first three on the outer surface, and returning to their origin by a spiral within that, flowing in the opposite direction forms a caduceus with the first three. Each of the finer whorls is formed of seven yet finer ones, set successfully at right angles to each other, each finer than its predecessor, called spirillae. In the three whorls flow currents of different electricity; the seven whorls vibrate in response to etheric waves of all kinds- the sound, light, heat, etc.; they show the seven colours of the spectrum; give out the seven sounds of the natural scale; respond in a variety of ways to physical vibrations- flashing, singing, pulsing bodies, they move incessantly, inconceivably beautiful and brilliant.

'Force' pours into the heart shaped depression at the top of the Anu, and issues from the point, and is changed in character by its passage. The force rushes through every spiral and every spirilla, and the changing shades of colour that flash out from the rapidly revolving and vibrating Anu depend on the several activities of the spirals, and with the change of activity from one spiral to another, the colour changes.

The Anu has three proper motions independent of any imposed upon it from outside. It turns incessantly upon its own axis spinning like a top; it describes a small circle with its axis, as though the axis of the spinning top moved in a small circle; it has a regular pulsation, a contraction and expansion, like the pulsation of the heart. When a force is brought to bear upon it, it dances up and down, flings itself wildly from side to side, performs the most astonishing and rapid gyrations, but the three fundamental motions incessantly persist.

Two Anu, one positive and the other negative, brought near each other, attract each other, and then commence to revolve around each other, forming a relatively stable duality; such a molecule is neutral.

Besant and Leadbeater observed atoms of many chemical elements of the Periodic Table and studied their structures. These structures fell into seven natural classes with a few exceptions. The reader may refer to the book Occult Chemistry for details.

Scientific Perspectives of Clairvoyant Observations

Stephen Philips studied the work of Besant and Leadbeater in a scientific perspective [14]. In the paper published in 1995 he reports how facts of nuclear and particle physics are consistent with the purported psychic descriptions of subatomic particles by Besant and Leadbeater, made nearly 100 years ago. He

says that most of their descriptions of atoms were published several years before physicists even suspected that atoms had isotopes and therefore their observations must not be rejected as fraudulent.

He interpreted the observations in the context of current scientific knowledge of the atom. In the Standard Model of particle physics, the subatomic particles are composed of fundamental spin -1/2 particles called "quarks". This model requires six varieties of quarks to exist; the up (u), down (d), charm (c), strange (s), top (t), and bottom (b) quarks. The up quark with its partner the down quark makes up the protons and neutrons inside atomic nuclei. A proton consists of two positively charged up quarks and a negatively charged down quark and a neutron consists of one up quark and two down quarks. Philips and some other physicists have proposed that quarks are not fundamental but are composed of still smaller, indivisible particles which may be called subquarks. If quark consists of three subquarks, protons and neutrons would each consist of nine subquarks bound together as three groups of three subquarks. This view compares with the observations made by Besant and Leadbeater as shown in fig. 2 in which each triangular array has three bodies each enclosing a group of three Anu. Then each body compares to a quark, the Anu to a subquark and the upper triangle structure compares with a proton or neutron. The two triangular forms observed by Besant and Leadbeater could be deuteron or arrangement of two similar nuclei of hydrogen according to Philips.

On detailed study, Philips reached the conclusion that Besant and Leadbeater accurately describe by ESP quasi-nuclear, bound systems of subatomic particles created from pairs of atomic nuclei of the element under observation.

One of the questions in science is to answer how the quarks are bound together in proton and neutron. The currently accepted theory assumes a strong force between quarks. Each quark exists in three quantum states called "colour"; red, blue and green. Each colour state is characterized by its "colour charge", which is the source of the strong force binding quarks together. This "colour force" is transmitted by eight spin-1 particles called gluons. In the Besant model, Anu is supposed to have magnetic charge, albeit of a kind similar to that known to be associated with the colour force rather than with ordinary magnetism. Indeed, the positive and negative types of Anu have opposite magnetic polarity. According to Besant and Leadbeater, the positive Anu, acts as a source and "force comes out" whereas the negative Anu acts as a sink and "forces disappear".

It may be mentioned that despite his attempts, Leadbeater did not succeed in examining an electron with his micro-psi powers.

Reliability of Annie Besant data has also been examined by Neppe and Close [15]. They proposed a Theory of Everything known as TDVP (Triadic Dimensional-Distinction Vortical Paradigm) model as a comprehensive attempt to develop a unified model to reconcile physics, biology, psychology, parapsychology, philosophy, consciousness researches and mathematics [15]. A concept of vortices has been introduced in this model. Such vortical motions are assumed to exist at all levels starting from the subatomic and up to larger ones like movement of large masses. Authors argue that the mathematics currently being used in mainstream physics is inadequate, and sometimes inappropriate for application to quantum phenomena. The authors devised new calculus called the Calculus of Dimensional Distinction (CoDD) in which the mass/energy content and space-time volume of elementary particles are multiples of the unitary quantum equivalence units of the smallest finite distinctions possible in quantized reality. This new calculus allows a clearer understanding of electrons and quarks and subatomic, atomic and molecular structures.

The authors also proposed (and proved) the hypothesis that mass is nothing more and nothing less than the combined resistance to acceleration due to the angular momentum related moments of inertia of the rapidly spinning elementary particles that, in combination, make up an object. They proposed that quarks are rapidly spinning energy vortices and protons are spinning vortex created by the combination of three elementary vortices of quarks. To do such calculations the authors used the mathematics of integrals, the Diophantine equations to the integral powers of 3. In this process they found that additional quantum equivalence units were necessary to form a stable proton. So the quarks were provided with additional units to produce an axially rotating symmetric vortex and therefore stable proton. These additional units, they called gimmel, occupy space-time but do not register as mass or energy. Proceeding on these lines they accurately predicted the mass of proton. So the hypothesis that quantum particles like quarks and their combinations may be treated as energy vortices was validated. The authors also correctly predicted the mass of neutron. All these calculations were carried out taking electron mass as a quantum unit.

Recently Neppe, Pokharna and Close [16] made a comparative study of 92 elements of the Periodic Table observed clairvoyantly by Besant et al. and TDVP and Triadic Rotational Units of Equivalence (TRUE) quantum unit scores for nucleons. When they examined the data relative to the (3S-1t) usual physical state, the variation was found to be unidirectional with the spread of data close to -10.94% when including electrons, and 8.80% without electrons (which is more appropriate because Besant was not describing electrons but only nucleons—protons and neutrons). They then adjusted the data to a 9-dimensional perspective, and applied a trial-and-error correction and it turned out to be exactly 9.0% added to the original Besant's Anu scores. After adding the 9% correction to the anu-s, the resulting average difference on 91elements was 0.0080 and the standard deviation 0.016374, analysed as a population score difference, and therefore handled as a single unit of correlation. The Pearson-r correlation coefficient is 0.9996. (Elemental 1, Hydrogen, does not have a neutron and so is excluded). Nevertheless, 6 of the 91 individual elements varied, though only slightly, in their results from the 85 other elements. These variations are small — between 2.5% and 5.2%— and the differences hypothetically could be explained by stable long life common isotopes that might have appeared during several 'clairvoyant' readings of the same element.

The data of Besant et al is not only profoundly statistically

significant, it is truly unmeasurable and with correlation coefficients approaching one. The results also appear to be fraud-proof given that the Besant data has been available in published form for a century.

Interpretation of Clairvoyant Observations in Jain Perspective

According to Jainism, clairvoyance is attained in a wide range of levels, from low to high. In the highest case the *param avadhijnani* is able to see objects as minute as a *paramāṇu*. The smallest part both Besant and Leadbeater could see was the Anu, much bigger than the electron. This indicates that their clairvoyance level was not of very high kind. The observations of such clairvoyant persons may not be hundred percent correct and may require examination before its validity is accepted.

The Anu was seen to be a kind of spiral or vortical structure in spherical form in which a 'force' pours in from cosmos, moves in a web of spiral path and goes out at the opposite location on the sphere. What is this 'force' in Jain view? The *Mahāskandha varganās* (MV) are supposed to be the source of all gross matter; this can happen only when these *varganās* form clusters. This prompts us to believe that the 'force' entering the Anu is a stream of MV. The MVs form clusters in the spherical space. Billions of MV are packed inside the spherical space in a spiral arrangement and a continuous flow of MV is maintained in the spirals. The flow takes place in thousands of spirals before finally exiting the spherical space. This Anu is not a "thing" as rightly said by the authors but it is composed of billions of MVs which themselves are aggregation of infinite number of *paramāṇus*. It is the electrical force between the MVs that keep them bound in a spherical space. If this flow were checked the Anu would not form a stable structure of quark as explained below.

The flow of electically charged MV in a spiral path produces a magnetic field. The MV has positive and negative charge. As the Anu consists of thousands of spirals, the magnetic field produced exerts a magnetic force on another Anu in close vicinity. This magnetic force binds together the three Anu-s to form the quark. If the MVs were not flowing the quark structure would not exist. Similar magnetic force exists between the quarks in a proton.

Besant and Leadbeater observed three types of motions in Anu spin, rotation and pulsation. We know that spin and rotation are natural motions of *paramāṇu*. Pulsation requires further explanation. The MVs in cosmos are supposed to exist with differing charges and so the flow of MV entering the Anu does not have same charge. The variation in charge of MV would change the size of the sphere which appears as pulsation motion of Anu.

Besant and Leadbeater identified two types of Anu-s, positive and negative, the former having source like flow and the latter having sink like flow in the spherical unit. We know that direction of electric flow in the spiral decides the direction of magnetic field produced. Therefore the source and sink types of flow would produce Anu with magnetic forces of opposing nature that would keep the Anu bound together in a quark. The Anus is also seen to arrange itself in triangular and linear fashion. In the former case the Anu forces are at 120 degree to each other and in the latter case the forces align on the same axis. Both of these arrangements would produce magnetically stable structures. Conversely, we can say that the Anu-s arrange themselves in a way so as to produce a stable structure.

Annie Besant's clairvoyant observations have helped us to explain formation of quark, proton and neutron from Jain point of view. We have no such help to explain formation of the smaller particle the electron. But it can be visualized that the electron is also formed by clustering of MVs.

Conclusions

According to Jainism the fundamental constituent of physical reality is *paramāṇu* which is an energy particle having charge. The *paramāṇus* form groups and produce bigger structures. The *paramāṇus* in the group aggregate so that a large number of *paramāṇus*, up to infinity, share the same space increasing the charge and energy density. The premise that the fundamental unit of matter is an energy particle having charge is entirely a new concept and may change the way matter is dealt with in physics.

Lower order *varganās* have four touch properties and higher order *varganās* have eight touch properties. The *Pratyeka Sarira Varganā* in the higher order category compares with photon. The real quantum of energy is *paramāṇu* which is far smaller than the energy of a photon.

All gross matter in the universe is composed of the biggest *Mahāskandha Varganā*. How particles like quarks and protons are formed from *Mahāskandha Varganā* has been explained with the help of structure of hydrogen observed clairvoyantly by Annie Besant and Leadbeater. The subquarks and quarks are bound together by magnetic force produced by electric charge of *varganā*. It is also argued that subquarks and quarks could not exist without *Mahāskandha Varganā*.

The Jaina theory provides knowledge of formation of subtle matter in the form of *varganā* and elementary particles like subquarks and quarks. Modern science has carried out detailed study on formation of gross matter starting from electrons and quarks. Thus Jainism and modern science are complementary and together present a complete picture of the structure of the physical universe.

References

1. Āchārya Tulsi and Āchārya Mahāprajna, Eds. (2009), "*Bhagwai*" , Jain Vishva Bharati, Ladnun, 5.154.1
2. Shāntyācharya, "Uttarādhyayāna Vriti" , Devchand Lalbhai Jain, p.24
3. Āchārya Tulsi and Āchārya Mahāprajna, Eds.(2009), "*Bhagwai*" , Jain Vishva Bharati, Ladnun, 25.350
4. Bhatt Akalaṅka Dev, *Tattvārtha Rājavārtika*, (1944) Tr. Mahendrakumar Jain Shastri, Bharatiya Jnanapith, Delhi.

5. Āchārya Pūjyapāda (1997) "*Sarvārthasiddhi*" Tr., Fulchandra Shastri, Bharatiya Jnanapith, Delhi, 1997, 5.14, 5.16.
6. Āchārya Jai, Ed., "Bhagwati Joda", Jain Vishva Bharati, Ladnun, 18.6.117
7. Āchārya Abhaya Dev, "Bhagwati Vriti", Agamodaya Samiti, 1.393
8. Kachhāra, N.L. (2014), "*Scientific Explorations of Jain Doctrines*", Part 1, Motilal Banarsidass, New Delhi,
9. Āchārya Tulsi, Āchārya Mahāprajna, Eds. (2009), "*Bhagwai*", Jain Vishva Bharati, Ladnun, 2009, 2.4
10. ĀchĀrya Nemichandra Siddhānt Chakravarti (1997) "*Gommatsāra Jīvakānda*", 594-595, Bharatiya Jnanapith, Delhi.
11. Mahendra Kumar, Muni (2010) "*The Enigma of the Universe*", Jain Vishva Bharati University, Ladnun, pp 381-387
12. Āchārya Umāswāti (1976), "*Tattvārtha Sūtra*", Tr., Sukhlal Sanghavi, Parshwanath Vidyashram, Varanasi, 5.33., 5.34-37.
13. Besant, A., Leadbeater C.W. (2005) The Project Gutenberg E-book of Occult Chemistry. A. P. Sinnett (Ed.), http://gutenberg.readingroo.ms/1/6/0/5/16058/16058-h/16058-h.htm
14. Philips, Stephen M. (1995) "*Extrasensory Perception of Subatomic particles, Historical Evidence*", Journal of Scientific Exploration, 9, 4, *1.*
15. Neppe, V.M., Close, E.R., (2014) "*Reality begins with consciousness: a paradigm shift that works (5th Edition)".* Seattle, Brainvoyage.com.
16. Neppe, Vernon, M., Pokharna, Surendra Singh, and Close, Edward, R. (2019) "*The remarkable Besant-Leadbeater studies in Quantal Clairvoyance (quantal remote viewing) correlate profoundly with the Triadic Rotational Units of Equivalence Quantal models in Triadic Dimensional Vortical Paradigm",* IQ Nexus Journal. 2019, 11: 3, 5-72. 19082923 V10.32

About the Author:

Dr. Narayan Lal Kachhara, M.E., Ph.D., Emeritus Professor, Jain Vishva Bharati Institute, Ladnun Dr Kachhara has authored many books on Jainism, such as *Scientific Explorations of Jain Doctrines,* and has written many articles. He was honored by Jain Agam Manishi Samman in 2008 by Jain Vishva Bharati. He was formerly Principal of Motilal Nehru Regional Engineering College (now NIT), Allahabad.
Email: nlkachhara@yahoo.com

Meditation (Dhyan): A Path From Aggressiveness to Non Aggressiveness – Empirical Studies on School Children

Viney Jain

Abstract: Aggressiveness is the disposition to commit the act of aggression. Aggression is an act that harms the self, other living-beings, objects and the environment. Harm includes physical as well as psychological injury. Peace and sustainable development are endangered due to global increase in aggressiveness and violence against fellow living-beings and damage to the eco-system caused by harmful human activities. To prevent this catastrophe, change in human behavior from aggressive to non-aggressive is essential. This is a formidable challenge.

Jain philosophy postulates that aggressiveness originates from impurity of the Soul (*Jiva / Ātman*) caused by bonding of imperceptible subtle material particles of *Karma* with the Soul. The *Karmic*-bondage distorts expressions of pure consciousness resulting in emergence of toxic emotions (*Kashaya*) like anger, arrogance, deceit and greed, which promote aggressive behaviors. Radiations (termed ***Leshya*** in Jain terminology), emitted from the activation of the *Karmic*-bonds are associated with the flow of emotions, feelings and intentions (*bhava-dhara*) provide the link connecting the *karmic*-body with the psycho-somatic activities (behavior) carried out by the gross-physical-body (*sthul-sharir*) of the living-being. In simple words *Leshya* mediates the mind-body interactions.

Leshya also correlates personality traits with the valence and intensity of emotions and the degrees of aggressiveness. Interestingly, it was hypothesized that practice of *Preksha*-Meditation (PM) can transform malign *Leshyas* to benign ones (Tulsi, 1993). Based on ancient Jain Yoga traditions, PM is a comprehensive multi-component and flexible system of meditation that seeks to directly perceive and realize the most subtle aspects of one's own body, mind and consciousness; leading to realization of true nature of Self.

Empirical studies to explore the effects of PM practice on aggressiveness in school children are reviewed in the present paper. A PM practice module especially designed for children was tested in Municipal Corporation schools in New Delhi and private schools in Ladnun, Rajasthan. It was highly acceptable in the school setting. Aggressiveness and its sub-types, proactive- and reactive- aggressiveness, were quantitatively assessed by a validated and reliable self-report questionnaire (16 items on a 4-point scale) in Hindi. Highly aggressive children were identified for training in PM practice under supervision of trained Yoga teachers. A cross-sectional single-arm, pre- and post-test experimental study-design was used. The results showed that low socio-economic status, urban environment, male gender and non-vegetarian diet are major risk-enhancing factors for aggressive behaviors. Practice of PM-module (45 minutes/session; 36 sessions) significantly reduced proactive- and reactive- aggressiveness ($p < 0.01$) in majority of children. The calculated effect-sizes varied between -0.30 to -0.70, highest values were observed in boys in single gender schools. Experimental evidence from present studies lends support to the hypothesis that PM practice can transform highly aggressive persons (malign *leshyas*) to non-aggressive (benign *leshyas*) individuals. Since school based PM practice is cost-effective and has the potential of preventing aggressive and anti-social behaviors in adolescents and youth, large-scale longitudinal studies in diverse geographical locations should be undertaken.

Keywords: Aggressiveness, School Children, *Preksha* - Meditation, *Leshya*, Behavior Modification

Introduction:

Meditation (*dhyan*) is a spiritual practice in the holistic system of *Ashtanga Yoga*, aimed at the regulation of emotions and raising consciousness level leading to spiritual development and enlightenment. Many techniques of meditation, based on various religious traditions, developed in ancient India, have now become globally popular. Well known examples include: *mantra* based Transcendental Meditation rooted in Vedic philosophy, Mindful Meditation (MM) derived from Buddhist *Vippassana* and *Preksha* Meditation (PM) developed from Jain Yoga traditions. Aggressiveness in living–beings has been present since time immemorial.

However, large increases in aggressiveness, conduct disorders and violent crimes in all sections of the society have been noted in the last few decades. These trends, if not reversed, pose serious threats for public health, social harmony, and peace. Can the practice of meditation prevent aggressiveness and enhance non-aggressiveness? In this article, we examine this question theoretically as well as empirically. Before presenting the experimental studies, relevant theoretical background will be briefly reviewed. Spiritual perspective according to Jain philosophy and the scientific perspective according to modern psychology will be presented to facilitate understanding the rationale, objectives and methodology of the research study.

Spiritual Perspective on Aggressiveness and Non-Aggressiveness

Aggressiveness is the tendency/disposition to commit the act of aggression. Aggression, defined broadly, is an act (behavior) that threatens or causes harm to the self, other living-beings, objects and environment. Harm includes physical as well as psychological hurt/injury. Violence is the extreme form of aggression which results in severe physical injury and even death of the victim.

According to Jain philosophy, impurity of the Soul (*Jiva / Ātman*) is the cause of aggressiveness. Non-aggressiveness (*Ahinsa*) correlates positively, while aggressiveness (*Hinsa*) correlates negatively with spiritual purity. Spiritual impurity is rooted in the bondages of imperceptible subtle material particles of *Karma* with the Soul. Since consciousness (*Chetanya*) is the major attribute of the Soul, *Karmic*-Bondages restrict and distort expressions of pure consciousness resulting in deficiency in cognitive processes and emergence of toxic emotions like anger, arrogance, deceit and greed, thereby promoting aggressive behaviors.

Doctrine of ***Leshya*** enables to understand the dynamic feedback between the subtle-body (*sukshma-sharir*) the state of consciousness, *karma*, flow of emotions (*bhava dhara*) and the psycho-somatic activities (behavior) carried out by the gross-physical-body (*sthul- sharir*) of the living-being. In simple words *Leshya* mediates the mind-body interactions (Jain, V., 2009).

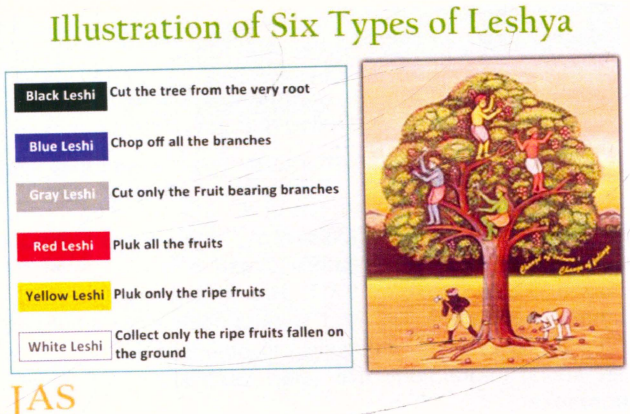


Fig.1: Degrees of Aggressiveness represented by different colors of *Leshya*

Leshya also describes Personality in terms of degrees of aggressiveness and valence and intensity of emotions, feelings and thoughts (*bhava-dhara*). This is beautifully explained by the famous parable of six friends, who feel hunger while roaming in a jungle. On seeing a tree laden with fruits, they act to obtain the fruits in different ways shown by different colors in the wall painting often seen in Jain temples (Fig.1). The man in black is extremely greedy, he wants to cut the tree from the root to make it fall on the ground so that he can get access to all the fruits. The man in white, in contrast, picks up only the ripe fruits which have fallen on the ground to satisfy his nutritional needs without causing any harm to the tree. Different colors of ***leshya*** illustrate the heterogeneity of behaviors arising from various intensities of toxic passions leading to different degrees of aggressiveness.

The relationships between color of *Leshya*, the flux and intensity of emotions, behavioral dispositions, the karma-dynamics and state of consciousness are summarized in Table 1.

Table 1: Correlations of Colors of *Leshya* with Behavioral Dispositions, *Karma*-Dynamics and Spiritual Purity*.

Leshva Color	Kashaya Intensity	Behavioral Traits	Karma Dynamics	Spiritual Purity Gunsathna
Krsna Black	++++++	Violent, Cruel Passionate	B>>>D	1 - 4
Nila Blue	+++++	Greedy, Lazy, Deceitful	B>>D	1 - 4
Kapot Gray	++++	Jealous, Angry Arrogant	B>D	1 - 4
Taijas Red	+++	Upright, Kind Simple	D>B	1 - 7
Padam Yellow	++	Forgiving, Self-scrifice	D>>B	1 - 7
Shukla White	+	Non-Aggressive, Equanimous	D>>>B	1 - 13
Aleshi	--			14

JAS

*B: Bondage (*Bandh*); D: Dissolution (*Nirjara*) of *Karma*. *Guñsthan* is a measure of spiritual purity.

Black, blue and gray *leshies* display high intensities of toxic emotions, aggressive and cruel behaviors, which enhance the *Karmic*-load, bondage (B) of *Karma*, being higher than its dissolution (D). These *leshyas* are, therefore, considered malignant (*ashubh*). The red, yellow and white *leshyas*, in contrast, are considered benign (*shubh*), since they display kind and forgiving behaviors, which reduce the *Karmic*-load, (dissolution of *Karma* being higher than bondage) and thereby enhance spiritual purity.

Transformation of malign *leshya*s to benign ones is expected to facilitate the change of aggressiveness to non-aggressiveness. A number of spiritual practices, such as *Samayik* and *Pratikraman* have been described in Jain scriptures to enable achieving this objective. Meditation (*dhyan*) is an important part of *Samayik*. Acharya Tulsi, in his book (Tulsi, 1993) observed that practice of *Preksha Dhyan* can transform Personality.

***Preksha* Meditation (PM)**

Preksha Meditation (PM), based on ancient Jain practices of *dharma-dhyana* (meditation on the *dharma* i.e. nature of a substance), has been developed after extensive experimentation (Acharya Tulsi, 1993; Mahaprajna, 1994). *Preksha* means to perceive with full awareness and equanimity - without bias, passion, attachment or aversion. PM is a system of meditation to directly perceive and realize the most subtle aspects of one's own body, mind and consciousness; leading to realization of one's true self. Very briefly, the main components of PM are:

Kayotsarga (Body-Transcendence): Conscious relaxation of mind-body to contemplate on the pure nature of the Self detached from the body.

- **Antaryatra (Internal Trip)**: Perception of Sushumna up to Gyana Kendra
- **Shwas-Preksha (Perception of Breathing):** Breathing with awareness.
- **Sharir-Preksha (Perception of Body):** Whole-body awareness.
- **Chaitanya Kendra Preksha (Perception of Psychic-Centers):** Perception of Chakras (neuro-endocrine glands)
- **Leshya-dhyana (Perception of Psychic-Colors):** Visualization of colors associated with benign personality types.
- **Anupreksha (auto-suggestion):** Reciting and contemplating on suggestions concerning achievement of a desirable objective.

This holistic system of PM can be modified to suit the situation, the capacities of the practitioners and the desired objective, Practice of PM is becoming increasingly popular, with training camps being regularly organized nationally and internationally at various locations. Empirical studies have demonstrated many beneficial effects of PM practices on the mental health of children and adult populations (Jain et al., 2014; Gaur and Sharma, 2003; Gaur and Gusain, 2017, Sanchetee et al., 2017; Jain et al., 2018).

Scientific Perspective on Aggressiveness

Aggression is ubiquitous, complex and heterogeneous behavior in the animal world. Closely observing the behaviors of birds and animals, the hypothesis that living beings (animals and humans) are naturally aggressive was proposed (Lorenz, 1966). From the Evolutionary biology point of view, aggression is an adaptive behavior, which serves to enhance the chances of survival in competing for limited resources and to protect against threats. Aggressiveness is thus considered to be essential for survival in a competitive environment and becomes an inherent trait in living beings (Lorenz, 1963), implying that aggressiveness is innate.

Interestingly, studying the behavior of aggressive children and adolescents, psychologist Albert Bandura formulated a Social Learning Theory (SLT) and on the basis of his analysis put forth the alternate view stating that "***Aggression is learned, not innate*** (Bandura, 1973).

The social learning processes may involve several steps such as (a) Observation and Attention (encoding and interpretation of environmental cues), (b) Retention (memory), (c) Reproduction (imitation) and (d), Motivation (selection of goals). Considering aggressive behavior as an outcome of the social learning processes, Bandura's theory made a great impact on future research, since it implied that aggressive behaviors can be modified by social learning. Indeed it has been now demonstrated that family, school and community environments, culture and media can greatly influence the learning and behavior of children in negative as well as positive ways.

Importantly, it has now been realized that persons do not naturally react to environmental triggers (provocation) but also have the capacity to learn to control and modulate the responses suiting the social situation in which it occurs. Emotions, being significant components of human experience, are also important determinants of behavior. Research in neurobiology and cognitive sciences have confirmed that emotional states profoundly influence the cognitive and learning processes. Personality traits and environmental or situational factors interact with the internal state of the individual to determine the enactment of aggressive or non-aggressive behaviors. Living-beings, being interdependent, cooperation may be more advantageous than competition. This is especially relevant for species living in groups such as humans. In social groups, aggressive and violent behaviors to resolve conflicts or to achieve goals become more harmful, since they lead to crimes and encourage the vicious cycle of violence and counter-violence, thereby destroying social cohesion and peace. Therefore, choosing the benign alternative of forgiveness is advantageous for promoting well-being and sustainable development (Jain, V., 2018).

Types of Aggression

Rooted basically in biology, aggression is multifaceted and is displayed in many different ways. Aggressive behaviors have been generally categorized into different sub-types with regard to (i) motivation or function (reactive and proactive) and (ii) form or mode (physical, verbal, relational).

Proactive Aggression

Motivated by passions to achieve goals/gains, for example: domination or obtaining financial benefits (property/territory/privilege). Proactive aggression (PA) is cold-blooded planned, controlled and goal directed.

Reactive Aggression

Reactive aggression (Feshbach et al., 1964) is committed in response to provocations (Miller et al., 2006). It is an impulsive reaction to perceived threat or stress and is derived from anger and fear (Dodge, 1991). Reactive aggression (RA) is defensive and protective and is accompanied by high levels of emotional arousal. Difficulties in attention and adjustment with social interactions are often associated with reactive aggression.

Consequences of Proactive- and Reactive-Aggression

Both PA and RA have been observed to be statistically correlated since most children and adolescents show both types of aggression, suggesting considerable overlap and interactions between both the subtypes of aggression (Kempes et.al., 2005). Despite the overlap, longitudinal empirical studies show that proactive and reactive aggressive actions have distinctive risk profiles on subsequent behaviors. Proactively aggressive children bully other children more often and are bossier than reactive aggressive or non-aggressive children (Raine et.al., 2006). Children who show more proactive aggression feel less guilt when potentially harming other children (Odgers et al., 2008), and this form of aggression is related to externalizing symptoms such as antisocial behavior, psychopathology and delinquency (Seah and Ang, 2008). High, reactive aggressiveness, in contrast,

leads to social rejection by peers and deficient performance.

Modes of Aggression (Physical, Verbal and Relational)

Physical Aggression
Physical aggression often involves acts of violence taken with the intention of causing harm to the recipient, including death, by using weapons or even someone's bare hands. Anger is a frequent source of aggression, but aggressive behavior can also result from intoxication or frustration.

Verbal Aggression
Verbal aggression includes behavior such as bullying, threats or yelling, name-calling and insults. Verbal hostility or cyber bullying can have profound detrimental psychological effects.

Relational Aggression
Relational aggression or alternative aggression is a type of aggression in which harm is caused by damaging someone's relationships or social status. Although it can be used in many contexts and among different age groups, relational aggression among adolescents in particular, has received a lot of attention. Physical and verbal forms of aggression are direct and easier to observe whereas relational forms which tend to harm others by damaging their social relationships, for example by gossiping, telling lies and spreading rumors, are indirect and more difficult to assess.

Development of Aggressiveness in Children
Aggression can be observed from early ages in infants. Developmental biological studies have confirmed that aggressive behavior begins early in life, reaching a peak between 2 – 5 years of age which gradually declines in most children. However, in some children, aggressiveness levels do not decline, become stable or even increase.

Major patterns of development trajectories of aggressiveness have been identified:

(A) decreasing (childhood-limited),

(B) high and persistent (childhood-onset)

(C) low but increasing (adolescent-onset)

Persistent high aggressiveness in childhood is associated with high probabilities of anti-social and criminal behaviors in adolescence and youth. Several studies have demonstrated that persistent childhood aggression gives rise, in later life, to development of conduct disorders, anti-social activities and juvenile delinquency (Campbell et al., 1995; Vitaro et al., 1998). Antisocial behaviors, including aggression, and disruptive behaviors display both continuity and changes over the life course (Pulkkinen and Pitkaenen, 1993; Rutter et al., 2006).

Overt aggression in childhood and adolescence often co-occurs with other problem behaviors such as low academic achievement, risk-taking, multiple sexual partners, and substance abuse (Cairns and Cairns, 1994; Patterson et al., 2000).

Preventive Strategies for Reducing Aggressiveness
Development and evaluation of preventive strategies requires valid, reliable and objective measures of aggressiveness.

Assessment of Aggressiveness
Presently available instruments for assessment of aggressiveness include:

1. behavioral observation by teachers, peers, parents, or trained researchers;
2. self-assessment questionnaires and
3. projective tests, such as responses to drawings and visuals.

Observational methods mainly recognize physical aggression but do not provide any information about the attitudes, intent or psychological state. General trend in recent research is, therefore, shifting towards the use of self-evaluation questionnaires within school settings. Self-report questionnaires, when answered truthfully by the subjects provide quantitative estimates of aggressiveness. Self-reports have been found to be reliable, inexpensive and easy to use.

Furthermore, self-report questionnaires to assess RA and PA can provide information on the personal motivation and thus have an advantage over observational measures. The most frequently used self-report measures for aggression are Proactive-Reactive Aggression scale (Raine et al., 2006) and Buss-Perry Aggression scale (Buss and Perry,1992),

Multimodal Cognitive-Behavioral Therapy (CBT)
During the last few decades, a large number of preventive strategies based on Cognitive-Behavioral Therapy (CBT) approaches to reduce aggressiveness in adolescents have been investigated mainly in America, Europe and Australia. These programs involve multiple distinct intervention elements (e.g. a social skills program for students and parenting skills training) and/or a mix of different intervention formats. They may also involve programs for parents or capacity building for school administrators and teachers in addition to the programming provided to the students. Within the comprehensive service format, programs can be divided into universal and targeted programs. Universal comprehensive programs include multiple treatment modalities, but intervention components are delivered universally to all children in a school or classroom. Targeted comprehensive programs also include multiple modalities, but the children receiving these programs are individually selected for treatment by virtue of behavior problems or risk for such problems. These preventive programs have shown only small to moderate effects, are not cost-effective and difficult to apply on a large-scale (Wilson et al., 2007).

Experimental Studies on Effects of *Preksha* Meditation on Aggressiveness in Primary School Children
Initially, a pilot study was conducted during 2013-2014 to investigate the effects of PM, on aggressiveness in school children. The study was sponsored by Adhyatma Sadhana Kendra, Chhatarpur and carried out at the S.D.M.C. Primary Model School, Sultanpur, after obtaining approval

from the Department of Education, South Delhi Municipal Corporation, New Delhi. Children who displayed high levels of aggressiveness were identified by using a validated and reliable self-report questionnaire in Hindi with 16 items on a 4 point scale. The students with high aggressiveness were administered PM on alternate days under the supervision of trained yoga teachers (3 times/week) according to the PM practice module designed especially for children (Table 2).

Table 2: The multi-component *Preksha*-Meditation practice module for school Children.

Preksha-Meditation Module for Children

1. ***Adarsh Jeevan Geet***
2. ***Asanas & Pranayam***
3. ***Shwas Preksha* (breathing with awareness)**
4. ***Sharir Preksha* (awareness of body sensations)**
5. ***Kayotsarg* (body transcendence – contemplate on true nature of Self)**
6. ***Anupreksha* (auto-suggestion contemplation)**
7. ***Sankalp* (resolutions for disciplined behavior in School)**
8. ***Mahapran Dhwani***
9. ***Anuvrat Geet***

The pilot study showed that PM practice was highly acceptable by children and feasible in the school environment. The results were very promising indicating that aggressiveness improved by the practice of PM after only a few sessions. It was considered worthwhile to extend the studies to more number of schools. Subsequently a more comprehensive research project entitled **"Psycho-Social & Psycho-Biological Studies to Investigate Effects of *Yoga Preksha Dhyan* on Aggressiveness and Academic Performance of School Children"** sponsored by Jain Vishva Bharti Institute, Ladnun, Rajasthan was undertaken in January, 2015 and completed in March, 2017.

The project had the following objectives:

1. To study aggressiveness profiles, identify the associated socio-demographic risk & protective factors.
2. Investigate effects of PM practice on overall aggressiveness and its 2 sub-types, proactive and reactive aggressiveness, in population samples in urban and rural environments.
3. To explore the possibility of identifying responders and non-responders to PM with non-invasive biological markers of aggressiveness.

A comprehensive report on the work done in the project was submitted to JVBI and the Department of Education of SDMC, New Delhi. Some important results have been published (Jain, V. et al., 2017). A summary of results is presented in the following.

Studies in Municipal Corporation Schools in the Urban Environment (New Delhi)

Total numbers of children recruited in the study were 2080 from 5 schools of South Delhi Municipal Corporation, New Delhi. Socio-demographical details of every participant were recorded.

As an instrument to assess aggressiveness quantitatively, a modified Hindi version of a self-report questionnaire (SRQ) for aggressiveness (Raine et al., 2006) was used. The SRQ consisted of 16 items (8 for reactive and 8 for proactive subtype) and assessed overall aggressiveness by a score (OA-Score) on a 4 point scale (1 – 4). The subjects were asked to answer the questionnaire carefully and truthfully. The SRQ was validated and tested for reliability in both urban and rural populations.

Aggressiveness Profile:

On the basis of OA-scores (16-64) estimated from responses to SRQ, children were classified as low (OA-Score: 16-32), moderate (OA-Score: 33-48) and highly (OA-Score: 49-64) aggressive. Analysis of data showed that 47% children had low aggressive tendencies, 48% moderate and only 4.3% displayed high aggressiveness. Proactive-reactive aggressiveness showed significant correlation (r=0.61). Dominantly proactive or reactive subjects were rare; majority of children showed both tendencies.

Risk-Modifying Factors:

Statistical analysis of the data indicated that in the present urban sample population, gender and dietary patterns (vegetarians / omnivores) are observed to be highly significant risk-modifying factors (confidence levels better than 99 percent, estimated by calculated probability, p-value, being < 0.001). Boys displaying significantly higher aggressiveness than girls and omnivores were observed to be more aggressive than vegetarians.

Factors like age (children/adolescents), religion (Hindu/Muslim), type of family (joint/nuclear) and mother's working status (housewife/working outside home) did not appear to significantly (p-value > 0.05, confidence level less than 95 percent) influence aggressive tendencies in the present study sample.

Data analysis further indicates that school environment plays a major role in modifying aggressive tendencies of children. Boys in single-sex only school showed maximum levels of aggressiveness with 12% children being in highly aggressive (OA-Score: 48-64) category. Interestingly, aggressiveness in boys in mixed-sex schools (co-education) showed a decrease. Girls, on the other hand, showed rise in aggressive tendencies in mixed-sex schools as compared to single-sex (girls only) schools. This suggests that the type and quality of peer interactions are important factors in the development of aggressiveness (Jain, K. et al., 2018).

Relationship between Aggressiveness and Academic Performance

Aggressiveness in school children was also observed to significantly influence their academic performance in a negative way. Academic performance as judged from the

marks obtained by the students in the annual examination was observed to correlate negatively with the aggressiveness scores for both boys and girls. The average correlation coefficients were significantly higher for girls as compared to boys, suggesting that aggressive girls are more likely to have lower academic performance (Jain, V. and Jain, K.; 2017).

Modifications of Aggressiveness Profiles by PM Module Practice

Moderate and highly aggressive children with OA-Scores between 35-64 were selected for PM administration. In New Delhi schools, 330 children regularly attended the PM-sessions (45 minutes, 3 times / week).

Comparison of pre- and post- PM, aggressiveness scores documented reductions in the aggressiveness profiles with significant decreases in mean OA-Scores. Majority of children with moderate and high aggressiveness showed significant reductions (p-value:$<$ 0.001) in aggressiveness scores (Fig. 2) measured after 18 and 36 sessions of PM administration (45 min/session, alternate day of week).

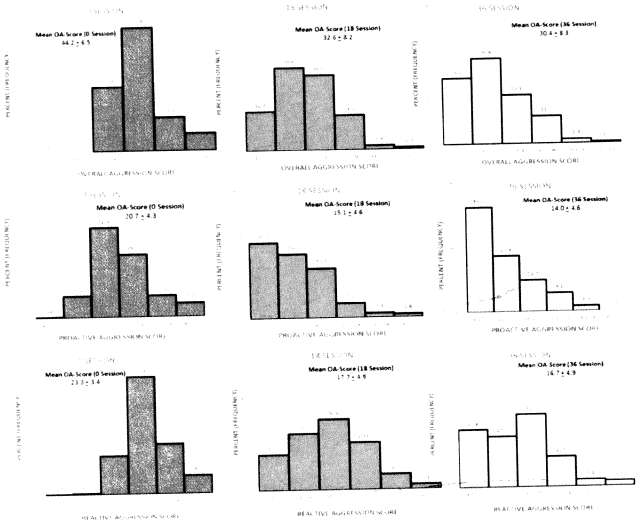


Fig. 2. Changes in the aggressiveness profiles of highly aggressive children after 18 and 36 sessions of *Preksha* Meditation Practice. X-Axis: Overall aggressions score; Proactive-aggression score; Reactive aggression score. Y-Axis shows the frequency.

Notably, the average values of overall aggression scores as well as scores of its subtypes, proactive- and reactive-aggression, showed dose-dependent reductions. Some Children (12%), however, did not display any significant changes. These non-responders may need to be examined further. Children with highly aggressive tendencies responded more to PM as demonstrated by effect sizes. The effect size for boys in single-sex school was 0.72.

Importantly PM-practice affected both types of proactive- and reactive- aggressive tendencies. The relationship between these two subtypes is shown in Fig. 3. Most children display both types of aggression. Children with high reactive- and high proactive- aggressiveness scores are at highest risk of developing violent criminal behaviors later in life. Results (Fig. 3) demonstrate their numbers were considerably reduced (from 16.3 % to 1.8%) PM practice.

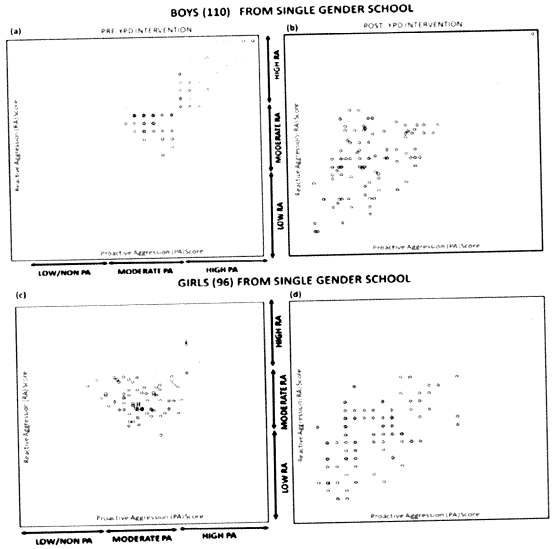


Fig. 3. Distributions of individual PA- vs RA-Scores in single-sex schools: Boys (a) pre-PM (b) post-PM practice.

One year follow-up Post-PM showed various developmental trajectories of aggressiveness. After one year follow-up aggressiveness persisted in some of PM-Non-Responders, but in some PM responsive subjects OA-Scores decreased after 6 months or one year.

Aggressiveness in School Children and Adolescents in Rural Environment

Ladnun is a small town (population $<$ 70,000) in Nagaur District of Rajsathan. In semi-urban environment of Ladnun, students in the primary classes were unable to read and write, indicating poor standards of education. Studies as planned had to be abandoned.

Therefore, VI to VIIIth class students data were collected from 3 schools. However, the test-retest reliability of self-report questionnaire were found to be low in two govt. schools and, reliability was found to be satisfactory in a private school run by a Muslim Trust. This school was, therefore, included in the study. The study sample comprised 113 students attending VI – VIII classes (ages between 9-17 years). According to WHO classification, 4% were children (age group 9-10 years) and the rest 96 % were adolescents (age group 11-17 years). All were meat-eaters (omnivores) and Muslims. Mothers of all students worked at home as home-makers. 33% students were from nuclear families and 67% were from joint families.

From the distribution of the OA-Scores, 3 sub-groups of children were distinguished. Very - low aggressive

children (OA-Score 16-24) comprised 35.4%; low-aggressive (OA-Score: 25-32) were 60.8 % and moderately aggressive (OA- Score: 33 – 36) were 4.4% and none were in high aggressiveness category (OA-Score: 41-64). The average RA-score was 14.6 (2.4) and average PA-score 11.2 (1.9) was a little lower.

Since the aggressiveness profile in this student population was low, PM practice was administered to all the subjects on alternate days. School staff was very cooperative and the acceptability of practice with PM- module among students was very high. The average pre-PM OA score was 25.8 with a standard deviation of 3.7. Post-PM, the average OA-score reduced to 23.1 with standard deviation of 4.3. The differences between pre- and post- intervention OA-scores were statistically highly significant (p value <0.001; Effect-size: - 0.32).

Evaluation of Non-Invasive Biomarkers of Aggressiveness: Research to explore biomarkers of aggressive and conduct disorders is important to elucidate the underlying physiological mechanisms and to move beyond the self-report questionnaires, which may be prone to errors because of possible subjective biases. Basic and clinical research has indicated that imbalances in the activities of the autonomic nervous system (ANS), neuro-endocrine systems and neurotransmitters may be responsible for emotional dysregulation and loss of self-control capacity associated with the expression of aggressiveness. Non-invasive measurements of resting heart rate (HR) and its variability (HRV), ecto-dermal activity (EDA) for assessment of sympathetic nervous system (SNS) activity and levels of cortisol in saliva as a measure of Hypothalamius-Pitutary-Adrenal axis (HPA-axis) activities have been most common markers used to predict and monitor the effects of therapy, although results have not been always consistent because of heterogeneity of samples and inter-individual variability. We evaluated the usefulness of these biomarkers in responders and non-responders to PM in our study sample.

Subjects with low-aggressiveness, PM-responders and non-responders were recruited 6-10 month post completion of PM administration. The subjects were assessed for resting HR, HRV & GSR for assessment of ANS activity and salivary cortisol and alpha amylase (SAA). Morning saliva samples were collected for estimation of basal levels of cortisol (SC) as marker of HPA-Axis activity. The measurements were made using laboratory facilities provided by INMAS, DRDO, Delhi.

It was observed that levels of salivary cortisol showed significant negative correlation with OA-Scores in PM-Non Responders and HRV Frequency domain index HF, which is an indicator of PNS, also showed significant negative correlation in PM-NR compared to Responders (for details, see Jain,V. and Jain, K., 2017).

Discussion

Key findings from the present cross-sectional study are summarized and briefly discussed below:

1. The simplified Hindi version of the self-report questionnaire consisting of 16 items on a 4-point scale, developed to measure levels of reactive- and proactive-aggressiveness has been validated and was found to be reliable, suitable and useful to identify children with high aggressiveness.
2. Urban environment, male gender, non-vegetarian dietary patterns and school environment were identified as significant risk-enhancing factors.

   Results showing lower aggressiveness in girls are in agreement with several earlier published reports. Biological and psycho-social factors may underlie the gender differences.
3. Academic performance was observed to negatively correlate with the levels of aggressiveness.
4. The *Preksha*-Meditation module, developed especially for children, was observed to be highly acceptable to both Hindus and Muslims (followers of other minority religious groups were not represented in the study samples) and is a feasible school based strategy to reduce aggressiveness in children and adolescents.
5. The efficacy of PM in reducing aggressiveness is dose-dependent and higher in boys with high aggressiveness scores.
6. A small percentage of children (about 12%), however, did not respond to PM practice. Non-invasive measurements of biomarkers indicated that PM-non-responders, who continued to display high aggressiveness as compared to responders, are characterized by lower levels of activities of HPA-axis combined with lower PNS and higher SNS activities.

In view of important implications for reducing youth violence and crimes in the society, further research work to examine the reproducibility and generalizability of present results is desirable before large scale applications of PM practice can be undertaken.

For a proper evaluation of the results obtained, it is important that the strengths and limitations of the study are taken into consideration.

Study Limitations and Strengths

The present cross-sectional study has several limitations pertaining to the choice of the study sample, the methodology and proper implementation of the study design. Briefly:

(i) Students from private schools were not included in the study in the urban environment;

(ii) aggressiveness assessment was made by self-report questionnaires only;

(iii) dietary patterns categorized as omnivorous and vegetarian, without any further details about contents;

(iv) academic performance analyzed by annual examination scores only, separate scores of each subject not taken into consideration

(v) quality of PM administration was not uniform;

(vi) effects of family-, school- and community-environments and quality of relationships was not studied.

The main strengths of the present cross-sectional studies despite the above limitations are:

(i) identification and reliable estimates of persistent high aggressive sup-population in primary school children using a simplified, validated and reliable self-report aggression questionnaire;

(ii) a large sample size of more than 2000 children from a relatively similar socio-economic status families have been studied;

(iii) first epidemiological evidence of non-vegetarian diets being a significant risk-factor in the development of aggressive behavior;

(iv) a well-designed, validated PM-practice module, to reduce proactive- as well as reactive-aggressiveness in primary school children has been tested in several schools;

(v) practice of PM module is found to be acceptable, feasible, cost-effective preventive strategy that is easy to implement on large-scale;

(vi) a battery of biomarkers indicative of high aggressiveness has been suggested and needs to be further examined.

Conclusions:

Experimental evidence from present studies lends support to the hypothesis that PM practice can transform highly aggressive persons (malign *leshyas*) to non-aggressive (benign *leshyas*) individuals. Since school based PM practice has the potential to be a cost-effective strategy for preventing aggressive and anti-social behaviors in adolescents and youth, large-scale longitudinal studies in diverse geographical locations are warranted.

Future Research Directions

Several basic and applied aspects, emerging out of the present project, need to be explored in future research for gaining better understanding of the complex psycho-bio-social processes involved in the development of aggressiveness and its prevention by implementing an efficient PM -practice program. These objectives can be achieved by a well-coordinated collaborative research program with the social impact becoming visible, possibly, between 5 – 10 years.

A few steps in this direction are outlined below:

1. Extended systematic cross-sectional and longitudinal studies with PM- module on large samples of school children and adolescents in differing geographical locations and with diverse cultural backgrounds, particularly in the urban areas, should be undertaken.
2. A computerized data management system needs be developed for proper data collection, storage and analysis in future larger studies.
3. Teacher training programs for PM administration should be organized to involve the school teachers for implementation of PM in schools. For proper implementation, coordination between department of education, school staff and research team is necessary.
4. A properly planned PM practice program should be submitted to departments of education of state governments to implement this intervention module in schools as a matter of policy.
5. Systematic studies to understand the biological processes and molecular mechanisms underlying the protective effects of vegetarian diets on the development of aggressiveness are required to further examine the present epidemiological data.
6. Multi-disciplinary genetic, neurobiological and sociological studies to investigate the reasons for gender differences in the development of aggressiveness are needed.
7. Comprehensive basic studies to develop biomarkers of aggressiveness and to understand the biological processes and mechanisms underlying the PM induced behavior modifications should be undertaken.

Acknowledgements:

This article is based on the work done in a research project sponsored by Jain Vishva Bharti Institute, Ladnun. We remain grateful to Samani Charitra Prajna, former Vice Chancellor, JVBI for sanctioning financial support. Many thanks to Samani Chaitanya Prajna, Former Executive Director, BMIRC, JVBI for encouragement and invaluable suggestions. Special thanks to Late Swami Dharmanand Ji for guidance in the development of Preksha-Meditation module for children; Shri Y. P. Pahuja, former Principal of Sultanpur SDMC School rendered advice for permission from the Education Department of SDMC, New Delhi and Dr. N. K. Chaudhary of INMAS, Delhi for providing laboratory facilities. Last but not least, we are grateful to school teachers, students and colleagues, who helped in completing the research project.

References:

1. Acharya Mahaprajna (1993) Preksha Dhyana: Basic Principles. Jain Vishwa Bharti Publication.
2. Acharya Tulsi (1993) Transmutation of Personality through Preksha Meditation. Jain Vishwa Bharti Publication, p-p 282.
3. Bandura, A. (1973) Aggression: A social learning analysis. Englewood Cliffs, NJ, Prentice Hall.
4. Buss, A.H. and Perry, M. (1992) The aggression questionnaire. *J. Pers. Soc. Psychol.* 63:452-459.
5. Cairns, R.B., and Cairns B.D. (1994) Lifelines and risks: Pathways of youth in our time. Cambridge University Press, New York, USA.
6. Campbell, S.B. (1995) Behaviour problems in preschool children: A review of recent research. *J. Child Psychol. Psychiatry*, 36(1):115-119.
7. Dodge, K.A. (1991) The structure and function of reactive and proactive aggression. In D.J. Pepler and K.H. Rubin (Eds.), The development and treatment of childhood aggression, Hillsdale, Erlbaum, NJ, USA.
8. Feshbach, S. (1964) The function of aggression and the regulation of aggressive drive, Psychol. Rev. 71: 257-272.
9. Gaur, B.P. and Sharma, A. (2003): Effect of Preksha meditation on personality variables and psychosomatic health, Psycho-lingua, 33 (1), 87-92.

10. Gaur, B., and Gusain, V. (2017) Impact of preksha meditation on mental health of female executives of metro city. International Journal of Yoga and Allied Science, 6(1),5-12.

11. Huesmann, L.R., Eron, L.D., Lefkowitz, M.M. and Walder, L.O. (1984) Stability of aggression over time and generations. Developmental Psychology, 20,1,120–1134.

12. Jain, Viney (2009) Behavioral, Spiritual and Scientific Correlates of Leshya. Conference: National Seminar on Jain Way of Life, New Delhi. Available on Research Gate. DOI:10.13140/2.1.3986.1442.

13. Jain, S.D., Pahuja Y.P., Joshi, V., Parekh, N.M., Jain, V. (2014): A Pilot Study on the Effects of Yoga Practices on Aggressive Behavior and Academic Performance of School Children. *Technical Report*; DOI: 375 10.13140/2.1.4431.2643 (http.www.researchgate.com)

14. Jain, Viney (2014), *Uttam Kshama* (Supreme Forgiveness): A Jain Concept and Practice for Spiritual Progress, Social Harmony and Peace. In Social Consciousness in Jainism. Eds: Shugan C. Jain and Prakash C. Jain. Published by New Bhartiya Book Publication, New Delhi. pp: 236-247.

15. Jain, Viney (2017), Psycho-Biological and Spiritual Aspects in the Evolution of Supreme Forgiveness. Jain Philosophy: A Scientific Approach to Reality. Proceedings of the International Conference on Science and Jain Philosophy, Indian Institute of Technology, Mumbai, January 8-10, 2016. Eds.Samani Chaitanya Prajna, Narayan Lal Kachhara, Narendra Bhandari, Kaushala Prasad Mishra, Bhagawan Mahāvīr International Research Centre, Jain Vishva Bharati Institute, Ladnun, (Rajasthan, India). pp. 316 – 329.

16. Jain, Viney and Jain, Veer Sagar (2017): Origin and Development of Knowledge According to Jain Philosophy and Cognitive Sciences, Chapter 3, in book: Scientific Perspectives of Jainism. Eds: Samani Chaitanya Prajna, Narendra Bhandari and Narayan Lal Kachhara. Jain Vishva Bharti Institute, Ladnun-341306 (Rajasthan, India). pp. 45–76.

17. Jain K., Sharma, S., Prajna, S.C., and Jain, V. (2018) Influences of gender, religion, dietary patterns, and mixed-sex education on aggressiveness in children: a socio-demographic study in municipal primary schools of South Delhi. Indian Journal of public health, 62(1), 21.

18. Kempes, M., Matthys, W., van de Vries H., and England, H. (2005) Reactive and proactive aggression in children–a review of theory, findings and the relevance for child and adolescent psychiatry. *Eur Child Adolesc Psychiatry*. 14(11) - 1910.

19. Lorenz, K. (1963) Das Sogenannte Böse, ZurNaturgeschichte der Aggression. Verlag Dr. Borotha-Schoeler, Vienna, Austria.

20. Miller, J.D. and Lynam, D.R. (2006) Reactive and proactive aggression: Similarities and differences. Personality and Individual Differences, 41,1469–1480.

21. Odgers, C.L., Moffitt, T.E., Broadbent, J.M., Dickson, N., Hancox, R.J., Harrington, H., Poulton, R., Sears, M.R., Thomson W.M., and Caspi A. (2008): Female and male antisocial trajectories: from childhood origins to adult outcomes. Dev. Psychopathol.; 20(2), 673-716. Springer.

22. Patterson, G.R., De Baryshe B.D. and Ramsey, E. (1989) A developmental perspective on antisocial behavior Am. Psychol, 44(2), 329-35.

23. Pulkkinen, L. and Pitkaenen, T. (1993) Continuities in aggressive behavior from childhood to adulthood. Aggressive Behavior, 19, 249–263.

24. Raine, A., Dodge, K., Loeber, R., Gatzke-Kopp, L., Lynam, D., Reynolds, C., Liu, J. (2006): The Reactive–Proactive Aggression Questionnaire: Differential Correlates of Reactive and Proactive Aggression in Adolescent Boys. *Aggress. Behav.*, 32(2),159-171.

25. Rutter, M., Kim-Cohen J. and Maughan, B. (2006): Continuities and discontinuities in psychopathology between childhood and adult life. J. Child Psychol. Psychiatry, 47(3-4), 276-95.

26. Sanchetee, P., Jain, A., and Agarwal, H. (2017) Preksha Meditation and Mental Health in Elderly, Journal Indian Academy of Geriatrics. 13(3).131-138.

27. Seah, S.L., Ang, R. (2008) Differential correlates of reactive and proactive aggression in Asian adolescents: relations to narcissism, anxiety, schizotypal traits, and peer relations, Aggressive Behavior, 34, 334-562.

28. Vitaro, F., Brendgen, M., and Barker, E.D. (2006) Subtypes of aggressive behaviors, A developmental perspective, International Journal of Behavioral Development, 30,12–19.

29. Wilson, S.J., and Lipsey, M.W. (2007) School-Based Interventions for Aggressive and Disruptive Behavior: Update of a Meta-Analysis Am. J. Prev. Med., 33(2 Suppl), S130–S143.

About the Author:

Dr. Viney Jain, Dr. nat. Phil. is Professor Emeritus, Department of Yoga and Science of Living, Jain Vishva Bharti Institute (Deemed University), Ladnun, Rajasthan
Founding Fellow of the Jain Academy of Scholars.
Email: vineyjain@gmail.com

News and Views

APJ Abdul Kalam Technical University UP is offering an Elective course on Human Values in Jain Darshan to Professional students studying Engineering, Management and Pharmacy. I have prepared a manual of notes for students covering the basic principles of Jainism, and 20 lectures on power point in English. The lectures have been recorded and video shall be available on U-tube shortly.

An orientation workshop for faculty members teaching the course has been conducted for eight days 2.5 hours daily. 130 faculty members from different colleges participated. The course is being offered from the current session 2020-21.

(N. L. Kachhara)

Science and Jainism

Many concepts of Jain Darshan have been recently confirmed by modern scientific research. In this connection we mention the two Nobel prizes related to Jain practices given in Medicine and Physiology for 2016 and 2017. The news is old but needs to be restated because of many misconceptions circulating in the social media.

1. The 2016 Nobel Prize in Physiology/Medicine was given to Japanese scientist Yoshinori Ohsumi for discovering the mechanism of Autophagy.

   Autophagy: Physical body (audarik sharira) contains trillions of cells and most of them die and are replaced by new ones every moment. They are excreted in several ways by the body, such as converting into carbon di oxide in lungs and then exhaled. Even though the efficiency of this process is high, a good fraction of dead cells remains in the body. Autophaging literarily means eating one self. It's a natural process and it's the body's system of cleaning itself: The cells create membranes that hunt out scraps of dead, diseased, or worn-out cells; gobble them up; strip them for parts; and use the resulting molecules for energy or to make new cell parts. This cleaning process of eating away the dead cells becomes more efficient with longer duration of fasting. **Yoshinori Ohsumi** discovered the mechanisms for autophagy. Fasting should therefore be frequently undertaken to cleanse the body. Other physiological effects of fasting on body parameters like blood pressure, diabetes are well documented. Recent work indicates that many diseases like growth of tumors and cancer can also be controlled.

   Periodic fasting for long periods of time is a basic Jain practice of penance related to cleansing of body and mind, besides its spiritual benefits. The physical benefits are clearly borne out by this research by Yoshinori Ohsumi and authenticates scientific basis of Jain practice at physical level.

2. The 2017 Nobel Prize in Physiology/ Medicine was given to Jeffrey C. Hall, Michael Rosbash and Michael W. Young for **Solar control of body metabolism**.

   Life on Earth is adapted to the rotation of our planet. For many years we have known that living organisms, including humans, have an internal, biological clock that helps them anticipate and adapt to the regular rhythm of the day. But how does this clock actually work? Jeffrey C. Hall, Michael Rosbash and Michael W. Young were able to peek inside our biological clock and elucidate its inner workings. Their discoveries explain how plants, animals and humans adapt their biological rhythm so that it is synchronized with the Earth's revolutions. They discovered molecular mechanisms controlling the daily circadian rhythm in body. They showed that a gene encodes a protein that accumulates in the cell during the night, and is then degraded during the day, giving a self-sustaining clockwork inside the cell. With exquisite precision, our inner clock adapts our physiology to the dramatically different phases of the day. The clock regulates critical metabolic functions such as *Our sleep patterns, feeding behavior, hormone release, blood pressure, and body temperature.* Our wellbeing is affected when there is a temporary mismatch between our external activities and this internal biological clock. Jains normally eat before sunset and take their first meal sometime after sun rise. This is advisable in view of the circadian rhythm of metabolic activity in the body.

   Total avoidance of meals during night is a standard practice of all Jains. *Chowihar*, *Naukarsi* and *Paursi* designed for eating about half an hour before sunset and eating about half an hour or a few hours after sunrise are generally followed by all Jain sadhus and sadhvis and most shravaks and shravikas. The above research by Hall, Rosbash and Young authenticates the physiological benefits of these practices.

   The psychological and spiritual benefits of dietary practices, as indicated in Jain scriptures, still remain to be established.

   (Narendra Bhandari)

Book Reviews

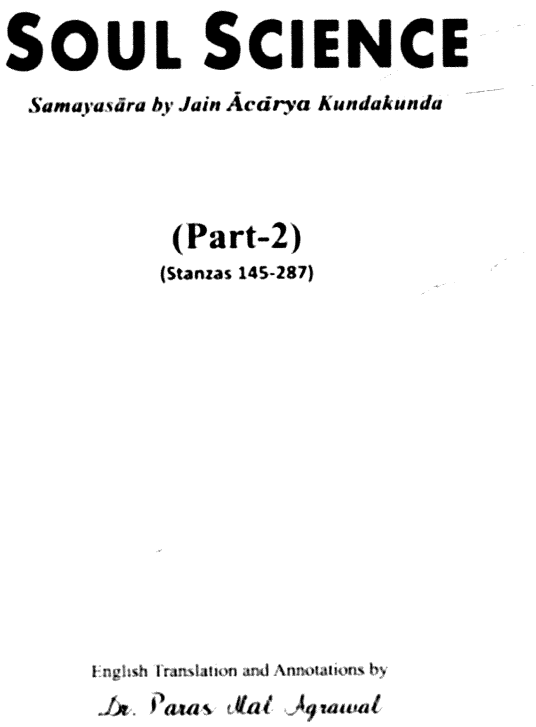
1. SOUL SCIENCE: ***Samayasāra by Jain Ācārya Kundakunda***

Author: Dr. Paras Mal Agrawal

Foreword by Dr. Shugan C. Jain, and **Preface** by Pt. Sachin Shastri

Publisher: **Kundakunda Jñānapīṭha**, 584, M.G. Road, Tukogunj, INDORE - 452001 INDIA

Paper back: Rs. 250/ (India), Rs.600/ (Abroad); Hard bound: Rs. 350/ (India), Rs.800/ (Abroad); Pages: 220, First Edition 2018



This book entitled '**Soul Science**' presents the English translation and explanation of 143 stanzas of ***Samayasāra*** (stanza no. 145 to 287) using modern and scientific examples. The scripture *Samayasāra* is considered as the best work of Ācārya Kundakunda. Digambar Jains recite the name of Ācārya Kundakunda (127-179 A.D.) next only to that of Lord Mahāvīra and his chief disciple Gautama Gaṇadhara. The literal meaning of the word *Samayasāra* is '**soul in its essence**'.

A worldly soul is associated with physical body, pleasure, pain, emotions, etc. All such associates change with time. In the scripture *Samayasāra*, Ācārya Kundakunda very minutely and logically tries to show what the eternal soul is and what it is not. For the bliss, peace, and happiness he suggests to realize I-ness only with the *Samayasāra*.

In view of the significance of *Samayasāra*, many authors in the past have come forward to translate it in English. Ray Bahadur Shri J. L. Jaini initiated this task. His translation of *Samayasāra* has been published in 1930. In 1950, Bharatiya Jnanpith published the book by Professor A. Chakravarti. In 2009, the English translation of *Samayasāra* with annotations by Shri J. S. Javeri assisted by Professor Muni Mahendra Kumarji-II has been published by Jain Vishva Bharati University, Ladnun. In 2012, Shri Vikalpa Printers Deharadun published the English translation of *Samayasāra* written by Shri Vijay K. Jain. All these publications in English by the renowned authors are valuable.

Many readers, however, may be interested in more details. Some readers may be interested in finding the relevance and application of various stanzas of this scripture in their day-to-day life. Some readers may like to have the flavor of the discussion and description provided by Ācārya Jayasena and Ācārya Amṛtacandra. Some readers may like to resolve the apparent contradiction between the facts mentioned by Ācārya Kundakunda in this scripture from the relative point of view (*Vyavahāra Naya*) and the real point of view (*Niścaya Naya*) in question-answer format with modern examples.Professor Paras Mal Agrawal has tried to fulfill such needs of the readers to some extent in his book Soul Science (Part-1) in 2014. It covered first 144 stanzas out of total 415 stanzas of *Samayasāra*. This book is Part-2 of the same that covers stanzas 145 to 287. The final book with stanzas 288 to 415 is under preparation.

Views of some Jain scholars on SOUL SCIENCE

समयसार पर हिन्दी और अंग्रेजी में कई टीकाएं हैं पर आचार्य अमृतचन्द और आचार्य जयसेन की प्राचीन टीकाओं का आधार लेकर जो डॉ. अग्रवाल ने अंग्रेजी में लिखा है वह बेजोड़ और बेतोड़ है। गाथाओं का वैज्ञानिक स्पष्टीकरण गजब का है।

(गुरु आचार्यश्री सुनीलसागरजी के आदेश से, मुनि सम्बुद्धसागर)

This book would be helpful in modifying the views of attachment of common people towards material things. Congratulations to Prof. Agrawal upon this literary achievement in the field of spirituality.

[Prof. Premsuman Jain (Udaipur)]

An excellent blend of science and philosophy, and the best English version of Ācārya Kundakunda's *Samayasāra*. The logical explanation of the deep concepts of Jain philosophy through simple examples makes the subject easy to comprehend.

[Prof. Anupam Jain (Indore)]

Dr. Paras Mal Agrawal has very eminently put before us the clear meaning of the writings of learned Acharya Kundakunda in a scientific way using logical arguments and examples to express the difficult subject in a simple way.

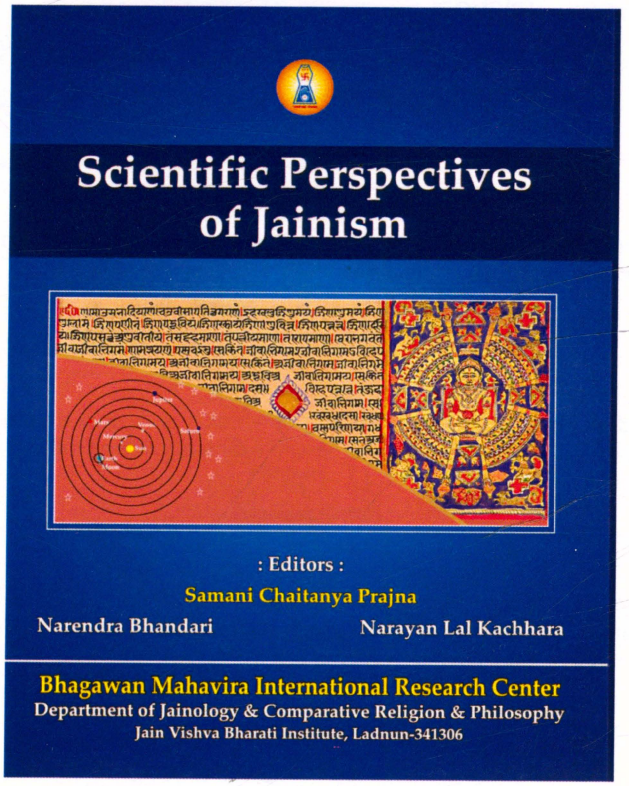
[Dr. N. L. Kachhara (Udaipur)]

By adding heart touching examples related to day-to-day life as well as science, Prof. Agrawal has really added charm in the philosophical description that otherwise appears dry to many. I believe that a reader wishing to understand the hard core concepts of Jain philosophy will surely satiate his hunger here.

[Pandit Sachin Shastri (Mangalayatan)]

2. Scientific Perspectives of Jainism (2016)

Editors: Samani Chaitanya Prajna, Narendra Bhandari and Narayan Lal Kachhara
ebook:https://WWW.amazon.com/dp/B0847SZB69
Prologue: Munishri Mahendra kumar
656 pages, 29 articles by 35 scholars,
Published by Jain Vishva Bharati Institute, Ladnun, Rs 2000,



Jain doctrines, it is generally believed, are based on a sound scientific foundation, but rarely scientists have got together and examined the Jain scriptures from this perspective. Scientific Perspective of Jainism is divided in six sections covering different topics. Since Jainism propounds that all the activities of the universe, including living and non-living dravyas (jiva and Ajiva) are governed by certain laws, it is necessary to begin with summarizing these laws. The first topic to be discussed is theoretical foundation of Jainism. It contains several articles describing scope of various laws of nature describing nature of dravyas, limits of knowledge, theory of cognition etc. karmavad is the basic law governing the living beings and is the second topic consisting of several authoritative articles on the doctrine of Karma, and the way karma affects the body system, its neurological aspects, genes, free will, rebirth etc. One of the major consequences of the Karmavad is development of Jain practices and their anatomical, physiological and psychological effects. Consciousness is the pillar of all Jain thought and therefore some basic aspects of brain and mind are discussed in two part article in context of consciousness. Meditation, breathing and Yoga form the main Jain practices to enhance the level of consciousness. Since Jainism is concerned with development of consciousness in humans, much emphasis is laid on biological aspects and classification of living beings based on number of sensory organs. The main question usually debated is whether Jainism subscribes to evolution or not. This is dealt with in a series of articles bringing out various points of views in an attempt to debate Jain concepts in context of Darwinism and neoDarwinism.

This monograph containing 29 articles is an attempt to describe a few selected aspects of *Āgams* in a simple way, with the aim to find a common ground between Jainism and modern science. Each article has been reviewed to make them as authentic as possible and to avoid repetition, although some speculation has been allowed so that study and research can be undertaken to find evidence in their support or against them.

According to modern science, as in Jainism, only laws of physics are universal and non-violable. It is therefore important to discuss various concepts of physics in relation to Jain philosophy. Laws of physics have been used to understand origin and evolution of the universe, the earth and time cycles. These are discussed very elaborately in a series of articles related to

Lokavad where cosmology, planetary science, time cycles and geography, which have become separate fields in their own right, are all considered together. The modern cosmology, history of its development etc. are treated in separate articles before a comparison is made with jain concepts. Serious disagreements are found in some of these concepts and an attempt has been made to synthesise and reinterpret them correctly. Mathematics is an integral part of Jain philosophy and enormous contributions have been made by Jain scholars in the past. Although it is difficult to cover all the aspects in this volume, its importance has been brought out in a series of articles, despite the fact that much confusion prevails about units of time and space used in Jain calculations. An effort has been made in the right direction to rationalize these units so that the ideas can be compared with modern calculations.

Jainism deals with all aspects of life and its environment and it is very vast in scope. It is impossible to treat all these aspects in one issue. Much thought has been given to ecology and in many ways it is treated as a part of spirituality and therefore we include a few articles dealing with environment and ecology.

We hope that it will serve as a useful collection of status papers which will provide a starting point for serious discussion and research. It is also our hope that more monographs covering different topics related to Jainism will follow in due course.

3. Jainism on Modern Issues

Editors : Samani Chaitanya Pragya, Narayan Lal Kachhara
Publisher: Jain Vishva Bharati, Ladnun-341306 (Rajasthan)
ISBN: 978-81-944033-1-9
First Edition: December 2019
Pages: 480, **Price:** Rs. 500/-
Amazon link: https://www.amazon.com/dp/B0847SZB69

World has never been without problems. There have always been problems at individual, social, political, and national levels. Besides the natural problems, most of the other problems in history were rooted in individual behavior. Individual passions in the form of ego, greed, attachment and hatred give rise to problems in individual life as well as in the society. The solution to such problems also lies at the individual level. If the individual can exercise restraint, *saṃyama*, most of the problems can be solved.

We are living in an age of scientific advancements and technological innovations which are providing us means and facilities hitherto unknown in human history, but at the same time adversely affecting the peace and happiness in our lives in many ways. The adversities created are in fact posing threats to our very survival. Technological developments have turned the planet into a global village so that has given rise to new kinds of problems and new kinds of challenges. Many scholars are of the view that a different kind of approach, other than scientific, is necessary to face these challenges.

The Jain religious values and ethics, especially *ahimsa*, *aparigraha* and the philosophical doctrines of karma, *anekāntavāda* and *syādvāda* are all geared to a better social as well as individual life. To explore these grounds the Department of Jainology and Comparative Religion and Philosophy of Jain Vishva Bharati Institute, Ladnun organised the National Seminar on the theme **"Engaging Jainism with Modern issues"**.

A Total of 65 papers were presented by scholars, and out of these 35 papers have been selected for publication in this Proceeding book. The articles have been arranged in six English sections and one Hindi section.

The first section on Global Peace has six articles, the second section on Social Welfare has seven articles, the third section on Ecology and Environment has three articles, the fourth section on Personal Wellness has eight articles, the fifth section on Jain Ethics has seven articles, the sixth section on Spirituality and Science has three articles and the last section in Hindi has one article.

The Director of the seminar was Prof. Samani Chaitanya Prajna, the Chairman of the Seminar was Prof. Narayan Lal Kachhara, senior Advisor to BMIRC, and the Co-Chairman was Prof. Anand Prakash Tripathi, Head of the Dept. of Distance Education, JVBI.

Articles and Webinars of Interest

1. **Clairvoyant Observations of Atoms and Quarks Support Jainism**, ABLTS and TDVP models that knowledge is Structured in the Consciousness by Surendra Singh Pokharna, Manohar Lal Kalra, Rajmal Jain, Samani Chaitanya Prajna.
2. **Jain Concept and Practice of *Ahimsa*** Narendra Bhandari, In 'NONVIOLENCE AS A WAY OF LIFE, History, Theory and Practice. Edited By Predrag Cicovacki & Kendy Hess
3. **Consciousness: Jain concepts and scientific research** *by Narendra Bhandari*, Jinvani, 27-33, June, 2019.

Speaker: Dr Narendra Bhandari

Date	Title	Lecture Series	link
April 8, 2020	जैनदर्शन और विज्ञान – कोरोना के संदर्भ में	*Corona se karuna ki or* Satya Vigyan Foundation, Mumbai	http://scienceandspiritualityri.org
May 8, 2020	The 5th Revolution	Bangalore Jain Sangh	http://scienceandspiritualityri.org
May 25, 2020	World view through the prism of Nature	Virat talks, Charam Mangal, Pali	https://youtu.be/NxFSPPhfuMw
May 28, 2020	Jain Darshan: Ideal For 21st Century	21st century darshan : Jain darshan Navsarjan Group, Ahmedabad	http://scienceandspiritualityri.org
June 21, 2020	Jain Darshan in Scientific perspectives and the Road Ahead	Florida International University, USA	http://scienceandspiritualityri.org
June 27, 2020	Jain Darshan in the present Era	Science and Spirituality Research Institute and Shrut Ratnakar, Ahmedabad.	https://www.youtube.com/watch?v=4u1aVRCYWY
July 31, 2020	Jambu dvip and Lokakash	Jain Academy of Scholars	http://scienceandspiritualityri.org
October 25, 2020	Jainism as Science and Darshan	Jain Ratna Sangh forum of Professionals	https:/youtu.be/.hVNa1dzVXYD4

Forthcoming Events

7th November 2020,11:30 pm Indian Time

Department of Religious Studies

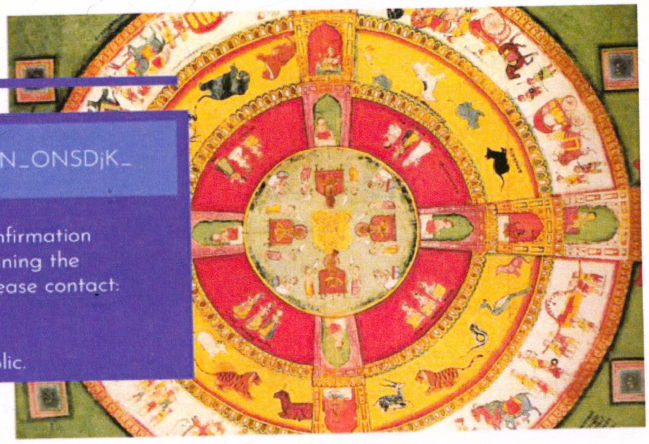
UC RIVERSIDE

First Jain Academic Convention

Jain Studies in North America and Community Sponsorship: Present and Future

This event will feature scholars with Jain-funded academic positions and other Jain studies scholars from North America. Join us to hear them discuss their teaching and research experiences, translation projects, national and international collaborations, and future plans.

WHEN: Saturday, November 7, 2020, 10:00am-3:00pm (PST)



Register at:
https://ucr.zoom.us/webinar/register/WN_ONSDjK_5Sl6gVUF0f26eiQ

After registering, you will receive a confirmation email containing information about joining the meeting. If you have any questions, please contact: abajzelj@ucr.edu.

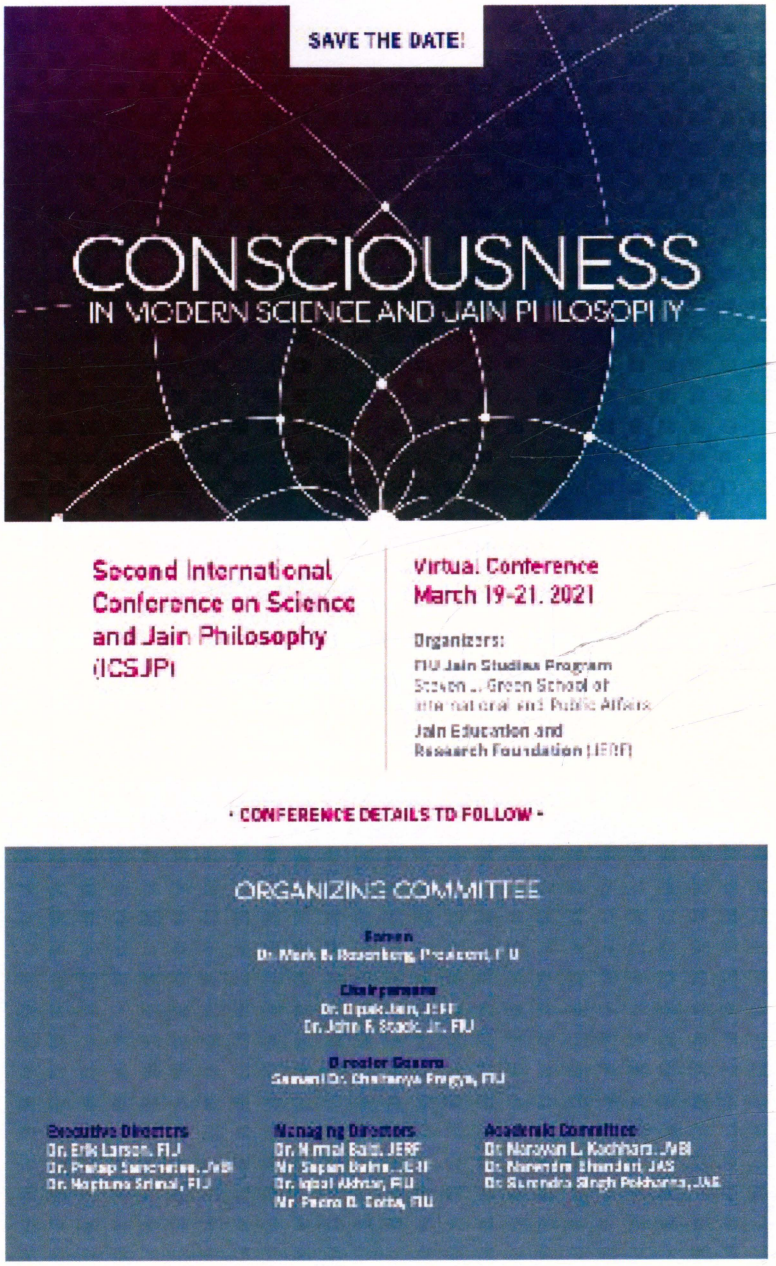
This event is free and open to the public.

Organized in collaboration with the JAINA's Academic Liaison Committee.

Images courtesy of wikimedia commons and CC BY 4.0

2nd International Conference on Science and Jain Philosophy,

Florida, March 19-21, 2021 (on virtual platform)



Academy News

The Jain Academy of Scholars was established on 30^{th} June 2020 with the main objective of carrying out and promoting study and research on Jain Darshan by (1) "supporting concepts of Jain Darshan with scientific methodology and logic" and (2) "enriching scientific theories by introducing Jain concepts".

Motivation: It has been realised for some decades that many scientific concepts given in the Jain Agams are not recognized at the national or international level by world scholars and when the same concepts are given by the western scholars, they are immediately appreciated. There are multiple reasons for this situation:

1. The Jain academic community is small and Jain scholars rarely carry out academic research or studies.
2. The work is not presented in modern, understandable language and remains obscure to most people around the world.
3. Jain scholars do not publish their work in international journals and much of it is confined to local books and magazines which have a limited circulation within close groups and not world wide visibility. Much of the work is carried out in Hindi, Gujarati and various national languages, and remains out of circulation in the world academic community. There may be many other reasons, but to bridge this gap the Jain Academy of scholars has been formed.

At the invitation of Professor Narendra Bhandari and Professor Surendra Singh Pokharna, several like minded scholars (Founding Fellows, listed below), who hold similar views, as expressed above, discussed the need for having such an academic forum to carry out academic studies and research on concepts given in Jain darshan documented in various Agams.

Policy: The academy will be run by the scholars, who may choose to become Fellows or members of the Academy. Every Fellow will have an equal role to play and equal rights as defined by the academy from time to time.

The Academy will support research, study and publication of Jain philosophical concepts and practices. It is proposed to start e-publication of the Proceedings of JAS, with highest academic standards.

Founding Fellows

1. Dr. Anil Kumar Jain
2. Dr. Anupam Jain
3. Dr. Bipin Doshi
4. Dr. Dharm Chand Jain
5. Dr. Jeo raj Jain
6. Dr. Jitendra B. Shah
7. Dr. Kusum Jain
8. Dr. Mahaveer Sisodia
9. Dr. Narayan Lal Kachhara
10. Dr. Narendra Bhandari
11. Dr. Paras Mal Agrawal
12. Dr. Pratap Sanchetee
13. Dr. Rajmal Jain
14. Dr. Samani Chaitanya Prajna
15. Dr. Sudhir V. Shah
16. Dr. Surendra Singh Pokharna
17. Dr. Veer sagar Jain
18. Dr. Viney Jain

Structure: A minimum and efficient system will be put in place to manage the activities of the Academy. To start with in order to carry out the functions of the Academy a Council, Advisory Board and three committees were constituted with members for the interim period as follows:

1. **President :** Dr. Narendra Bhandari
2. **Vice President:** Dr. D.C. Jain
3. **Executive Secretary:** Dr. S.S. Pokharna
4. Dr Paras Mal Agrawal
5. Dr. Anil Kumar Jain
6. Dr. N.L. Kachhara, Chair, Ad. Board

3b. **Advisory Board :**

1. Dr. N.L. Kachhara: Engineering, Chair, Udaipur
2. Dr. M.S. Sisodia: Geology, Secretary, Jodhpur
3. Dr. Anupam Jain: Mathematics, Indore
4. Dr. Bipin Doshi: Medicine/Jainism, Mumbai
5. Dr. Jeoraj Jain: Engineer, Jamshedpur
6. Dr. Jitendra B. Shah: Jainism, Ahmedabad
7. Dr. Kusum Jain : Philosophy, Jaipur
8. Dr. Pratap Sanchetee: Neurology, Jodhpur
9. Dr. Rajmal jain: Physics, Ahmedabad
10. Dr. Sudhir Shah: Neurology, Ahmedabad
11. Dr. Viney Jain: Physics, Delhi

Managing committees:

1. Academic Committee: To look after Academics, Projects and Publications.
2. Fellows and Members Committee: To look after Patrons, Fellows, Foreign Fellows, Members and Student Members.
3. Administration and Finance Committee: Rules and Regulations governing the Academy have been formulated and will be published after the Academy is formally registered.

Eligibility criteria for Fellows, Members and Institutional members of JAS

Fellows
A scholar who has Ph.D. in any academic discipline or a professional degree and has minimum of 20 years of experience in the field of his specialization. He has made significant contributions in the field of Jain philosophy or its principles by way of
(a) Writing books on Jain philosophy and/or related areas of study, **and/or**
(b) Publication of papers/articles in Journals of repute, **and/or**
(c) Inventions/ innovations supporting Jain principles/philosophy.

Honorary Fellows
A scholar who is eligible to be a Fellow; and has made contributions recognized at State/National/ International level; and whose presence shall add prestige to JAS.

Members
A scholar who has Ph.D. in any academic discipline or a professional degree and holds/held a responsible position in the field of his specialization and is interested in Jain philosophy/principles.

Student Members
A student who is enrolled for Post Graduate/Ph.D. programme in any academic branch or a professional degree and has interest in Jain philosophy/principles.

2. Membership fee (INR)
Founding Fellow: 21000/- Lifetime
Fellow: 11000/- Lifetime
Member: 5000/- Lifetime or 1000/- per year.
Student Member: 500/- pa for a maximum of 5 years
Foreign Fellow: USD 300 (or equivalent) Lifetime
Foreign Member: USD 50 per year or USD 200 Lifetime.

3. Procedure
(i). Nomination of Fellow shall be made by the Council on the recommendation of minimum 2 existing Fellows or Academic Committee of JAS

Institutional Members
Institutions, Universities and Organizations pursuing common objectives will be eligible for Institutional Membership. Membership of JAS to Institutions will be offered in two ways:

Reciprocal membership
The Institution and JAS shall become mutual member on reciprocal basis. Both shall be entitled to avail each other's facility for promoting mutual interests.

Membership by application
Any Institution, University or Organization can become life member of JAS on payment of membership fee. JAS shall offer the following facility to the Institution.

Five free Fellowship or Membership subject to eligibility to its employees

Two free delegates in conferences and workshops organized by JAS

Free access to academic resources of JAS

Free copy of JAS publications

JAS can nominate a Fellow member on the appropriate body of the Institution on request for the purpose of advice and guidance.

Institutional membership Fee
Currently the life time Institutional membership by application is fixed at Rs 50000/-.

Nomination Forms

Jain Academy of Scholars

Nomination Form for Fellows

I,..... Fellow of JAS, would like to propose Shri/Dr/Ms/Mrs .... As a Fellow/ Foreign Fellow/ Foreign Member of the Academy.

1. Name of the Nominee:
   (Surname followed by forenames)
2. Date of Birth:
3. Nationality:
4. Field of Professional expertise:
5. Important Past Designations:
6. Address
   (a) Official:
   (b) Residential
   (c) Mobile: Tel E-mail:
7. Academic career

Graduation & higher Degrees	Year	Institution

8. Awards/ Special Attainments
9. Any Other relevant information
   Academic contributions of the Nominee in Jainism (200 words) (May be attached)

10. Top 10 Journal Publications/Books: including (a) name of author(s), (b) year, (c) title of paper, name of journal, (d) volume and pages.

11. Recent Magazine articles (max 5)

Place

Date

Signature of the proposing Fellow

I second the nomination of .....

Place

Date

Signature of the seconding Fellow

Use additional sheets if necessary

I will abide by the rules and regulations of JAS and strive to work towards its objectives.

Signature

Jain Academy of Scholars

Application Form for Members/Student Members

I,..... .wish to become Member/Student Member of JAS, I submit my particulars below

1. Name :
2. *(Surname followed by forenames)*
3. Date of Birth:
4. Nationality:
5. Field of Professional expertise:
6. Designation/Important Past Designations:
7. Address
   (a) Official:
   (b) Residential
   (c) Mobile: Tel: E-mail:
8. Academic career
   (a) Graduation & higher degrees Year Institution
9. Professional attainments
10. Awards/ Special Attainments
11. Publications/Books: (a) name of author(s), (b) year, (c)title of paper (book), name of journal, (d) volume and pages.

12. Any Other relevant information (including contributions to Jainism, if any)

Place

Date

Use additional sheets if necessary

I will abide by the rules and regulations of JAS and strive to work towards its objectives.

Signature

Template For Preparing Papers For

Proceedings of Jain Academy of Scholars (JASP)

Title of paper

First Author[1], Second Author[2], Third Author[3]

An abstract is a brief summary of a research work, review, or any in-depth analysis of a particular subject (Science, philosophy and Jainism) or any related discipline. Abstract should be limited to 200 words.

Key words- Upto five key words or phrases in alphabetical order, separated by commas. Keywords are used to retrieve documents in an information system such as an online journal or a search engine.

1. **Introduction**

   The paper should consist of five major sections. The sections need not be numbered. The number of pages may vary depending upon the topic of research work but generally comprises up to 15 pages.

   Foot notes should be minimized and it is preferred that they are explained in the text itself. All pages must be numbered at the bottom centre of the page.

   Suggested sections constituting the paper are:

   1.1. Abstract
   1.2. Introduction
   1.3. Methodology and Approach
   1.4. Results and Discussion
   1.5. Conclusions

   Each Table must carry a title and should be numbered as 1,2,3... Figures numbered Fig. 1, Fig. 2 etc.. should be sequentially referred in the text. Figures should be properly drawn with legible fonts. In case of graphs. X and Y axes should be labelled and should use CGS units.

   Please use metric (CGS) units through out (centimeters, grams and seconds) .Use of feet, miles or pounds etc. is not advisable.

   In Introduction you can mention work done in the same field by others and introduce your work. Also mention how it improves the current knowledge.

2. Define your objective and summary of the work already done in the field

   2.1. Refer already published work in the same field.
   2.2. Googling on the topic of your research work.
   2.3. Work reported in conferences, workshops and symposiums on the same fields or on related counterparts.
   2.4. Understand and define the terms and jargon related to your research work.

3. **methodology used and Approach**

   Now it is the time to articulate the research work with ideas gathered in above steps by adopting any of the suitable approaches mentioned below:

   3.A. Define the problem

   Pl begin with defining the problem which you are trying to solve by your work. Also briefly describe the work done in this field and give their reference. Drawbacks of other works, and how you are going to improve upon it, if any, may be mentioned here.

3.B. methodology used to solve the problem

The method used, assumptions made, and your approach should be included in this section.

4. **Results and Discussions**

This is the crucial step for your research publication. Results and their analysis must be given in this section. The second part may consist of discussion of results and their implications.

5. **Conclusions**

A conclusion section is required. Although the conclusion may review the main inferences of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

After submission SSRI or JASP will send you reviewer's comment within 2 weeks of submission and you can send us the updated paper within 10 days for publishing.

This completes the process required for preparation of the paper. Generally all Journals are governed by Intellectual property rights and you may refer to the work done by others by giving proper references. Do not try to copy material from other papers.

6. **Glossary/Appendix**

Glossary/Appendixes, if needed, should appear before the acknowledgment. A brief Glossary of terms used and their meaning may be given. Pl use Sanskrit words in *italics as far as possible. Literal English translation does not convey the concept correctly. Use diacritical letters where required.*

7. **Acknowledgements**

Acknowledgment should be brief and mention only those who have contributed to any idea/ reviewed your paper or provided financial support for the work used in the paper.

8. **References Authors should be arranged in alphabetic order. Authors last names, first names, middle names, year of publication within brackets, title of the paper and journal or book should be mentioned in this order. Some examples are given below.**

(a) Agrawal, A.B., Best, C.D., Cort, E.F. (2020) Lokakash revisited, Indian Journal of History of Science, 20 (3) pp. 234-239.

(b) Jain, V.K. (1993) *Linear Networks and Systems* (Book style).Belmont, CA: Wadsworth, pp. 123–135.

(c) Mahaprajna Acharya (1985) Bhagavai vol. 5. (Editor) Jain vishva Bharati Institute, Ladnun, pp. 329-389.

(d) Pokharna S.S. (1964) Synthetic structure of industrial plastics (Book style with paper title and editor), in *Plastics*, 2nd ed. vol. 3, J. Peters, Ed. New York: McGraw-Hill, pp. 15–64.

(e) Smith, B. An approach to graphs of linear formsun, unpublished.

9. **Authors**

First Author – Author name, qualifications, associated institute, mobile and email address and two line introduction

Second Author – Author name, qualifications, associated institute, mobile and email address, and two line introduction.

Third Author – Author name, qualifications, associated institute mobile and email address, and two line introduction.

Correspondence Author – Author name, email address, alternate email address (if any), contact number.

Instructions for Authors for submission of papers

Original research papers and Review articles, not published before, relating to academic aspects of Jain philosophy and Scientific concepts are invited for publication in the Proceedings of the Jain Academy of Scholars.

Articles may be written in Hindi or English. Electronic submission in a word file in word is preferred. The article, typed with 1.5 line spacing , in New roman font 12, should have length no more than 15 pages. Figures should be of high resolution and drawn in standard format. The articles will be reviewed by at least 2 reviewers and the decision will be taken by the editorial board. CGS Units should be used everywhere. References of original shlokas in Agamas are necessary when quoting them. Secondary references are not desirable.

The authors are requested to submit names, email and telephone of 3 experts who may review their papers. You will be required to submit high resolution figures in jpg format, if the paper is accepted for publication.

The authors may use the Template on the previous page or use the same format. The article should be divided in the following sections, as desirable:

1. Title
2. Authors (starting with the last name),
3. Abstract
4. Key words (5 or less)
5. Introduction
6. Methodology
7. Results and Discussion
8. Conclusions
9. Glossary/Appendix
10. Acknowledgements
11. References: should be in standard format arranged alphabetically with last name first, year of publication within brackets, title, Journal or Book, vol, issue No, pages start to end, publisher.
12. Brief (1 to 4 lines) introduction to each author, including their telephone and email, with photograph, may be given.

JSBN CILAN

002

Summary:

JAS

est:2020

JAIN ACADEMY OF SCHOLARS

Web: https://www.jainscholars.com
Email : scienceandspirituality7@gmail.com, nnbhandari@yahoo.com
You tube: https://youtube.com/channel/UCLiCWWAf00GEJ2eNsIyarZA;
Contact : +91-9824077890, +91-48977890