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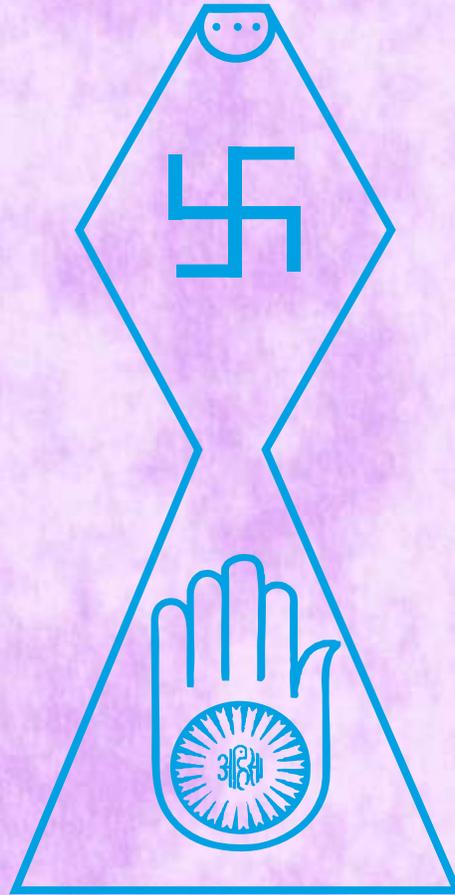
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From the Chief Editor's Desk

Dear readers,

We are glad to present the fourth and last issue of the third volume of ISJS-Transactions. This issue contains four research papers highlighting diverse aspects of Jain Studies: a modern interpretation of the practice of *sallekhan* ; an analysis of the investigation of matter and form of micro-structure in the context of Jain concept of *varga* ; the notions of eco-science and eco-spirituality in Jainism; and the regional distribution of Jain population in India.

The first research paper is on “On a Modern Interpretation of the Practice of Sallekhan ” by Dr. Frank M. Tedesco. The Jain end-of-life custom of *sallekhan* is defined as “external and internal penance to weaken the body and passions before undertaking the practice of *sam dhimara a* or voluntary peaceful death.” In the paper, the author proposes the idea that western hospitals and hospice personnel who treat and care for Jain patients should be familiarized with this revered practice to render culturally competent, compassionate end-of-life care. The author is pioneering a multi-media medical education curriculum about current Dharma practices in India relevant to spiritual care of patients and healthcare personnel.

The second research paper entitled “Matter and Form of Micro-structure, Varga , in Jainism” by Prof. Narayan Lal Kachhara interprets the results of the investigators like Annie Besant and C.W. Leadbeater who observed matter at micro level clairvoyantly and described its nature. Their observations were published in the book *Occult Chemistry*. They found that the smallest constituent of an atom called *a u* exists as vortex having spiral arrangement of flow of force. The author mentions Stephen Philips who examined their observations in scientific perspective and found that most of the observations were of high scientific significance. Dr. Kachhara also analyses the TDVP model of reality by Neppe and Close who also regard the physical reality at all levels to consist of vortices.

The third research paper “Eco-science & Eco-spirituality Convergence of Approaches” by Dr. Shugan Chand Jain explores the relation between environment and individual as similar to our mind and body. Both affect each other as a change in the outer environment brings a visible shift in the internal environment of an individual and vice versa with the individual being the most critical factor affecting the change. The author describes the picture of the cosmos as *loka* in Jainism and the human being, one without the head and the other with head standing with his hands on hips and leg stretched apart.

The final piece “Regional Distribution of Jain Population in India” by Prof. Prakash C Jain presents the regional distribution of the 2011 census data on Jain population in India in terms of the states/union territories and districts therein. *Inter-alia* it also highlights the gender-wise break-up as well as rural-urban distribution of the same. Before discussing the main theme of the article, the author briefly highlights the major population characteristics of the Jain community as per 2011 census data.

I am thankful to all the authors for contributing their scholarly papers to this issue. Thanks are also due to Dr. Shrinetra Pandey for rendering his editorial skills, Ms. Jyoti Pandey for diligently computing the journal and Mr. Sushil Jana for type-setting and putting it on our website. The readers and contributors are welcome to send their valuable suggestions to further improve the quality of the journal.

Prof. Prakash C Jain

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On A Modern Interpretation of the Practice of Sallekhan

Frank M. Tedesco*

The Jain practice of *sallekhan* addresses the inevitable experience of death, an event that cannot be avoided no matter how hard we try to hide from it. Modern medical science, for all its near-miraculous technologies and treatments has learned to prolong life for weeks or months for some of those with terminal diseases. It has not come up with a cure for death, however, whether it be for the very ill or the relatively healthy. Throughout human history, cultures have grappled with the steamroller of time leading to the grave or funeral pyre. People in their later years, in particular, grow more acutely aware of death as the days pass by seemingly more quickly and friends and relatives pass away never to be seen warmly smiling again.

Europeans in medieval times developed a literary genre called *Ars Moriendi*, or the art of dying, when plagues like the Black Death were rampant and death claimed a major part of the populace, young and old, rich and poor, the good and the evil, vicariously. Bodies piled up in the streets. Living with the horrors of massive death all around the Christian devotional poet Jeremy Taylor wrote *Holy Living* to instruct the reader in how to lead a virtuous life, increase personal piety, and avoid the temptations of sin. *Holy Dying* teaches the "means and instruments" of preparing for a blessed death.

Two earlier Latin texts called *Ars Moriendi* dating from about 1415 and 1450 C.E. offered advice on the protocols and procedures of a good death and on how to "die well". This text reminds us of the Jain path of purification leading to the practice of *sallekhan - sam dhimara a* (preparatory penance and voluntary, peaceful death) that has been practiced for many centuries on the Indian subcontinent. For example, the first chapter of *Ars Moriendi* explains that dying has a good side (to enjoy peace with the Lord), and that death is not something to be afraid of. The second chapter outlines the five temptations that beset a dying person, and how to avoid them. These are lack of faith, despair, impatience, spiritual pride, and avarice.¹ This mental practice of avoiding the temptations of hopelessness, fear and clinging onto self-image and one's own life are similar to the counsel given both Jain monks and laymen in order to achieve a state of mental equanimity and to shed karma-matter associated with the soul in *sam dhimara a*.²

Jain dharma articulates the experience of death in theory and practice, akin to the twelve *anuprek* ³. To be relevant to our modern times and the wider circle of humanity outside the Jain community who face impending death, we need to clarify and simplify how Jains today, lay and mendicants, prepare in this life for a "good death" (*sam dhimara a*—"death while in meditation" or voluntary peaceful death)?

* Ph.D., ISJS Summer School, 6W 2019

We need a clear interpretation of the breadth and depth of the final goal of the Jain spiritual path. It should be explained in familiar, easily understood language to Western healthcare personnel, social workers and chaplains who have had little exposure to Jain, Hindu and Buddhist culture and philosophy. There is also a need to differentiate Jain, Hindu and Buddhist ideas about rebirth and divine and human intervention. Notions about the “*bar-do*” (the “intermediate state between lives”- *antar bh va*) in the **Tibetan Book of the Dead** ritual—have entered popular Western culture. Many people have read Sogyal Rinpoche’s best seller **The Tibetan Book of Living and Dying** and hospital and hospice personnel have attended many extensive courses to study its teachings.⁴

While some western medical staff may have passing knowledge of Tibetan Buddhist thought about the afterlife, they rarely encounter Jain patients and their families and when they do, they often confuse Jains with Hindus and their cultural trappings. Unfortunately, this first encounter may be at the most critical juncture in their patients’ lives – when they have the dreaded “conversation” and learn about a terminal diagnosis. Medical staff cannot distinguish the Jain worldview and dharmic values from other Indian Dharma traditions. They ought to for the benefit of their patients and their own spiritual self-development (*sv dhy ya*).

Health care personnel frequently attend to patients with grave ailments and terminal illnesses. They are closer to the dying and death on a daily basis than most of us experience in our lifetimes. They have to process their emotional reactions to death and the loss of the patients they have cared for and befriended all the time. On top of accumulative traumas, they are almost always under pressure to tend to more and more patients and longer hours due to the corporate mentality to strive for greater profits in a very competitive, government-regulated environment.

According to Vinita Parkash, MD, a professor at Yale School of Medicine, suicide and mental illness among American healthcare workers is an ignored epidemic.^{5,6,7} Despite their superior education and prestige, they experience depression, overwhelming stress, a spiritual void, and lack of insight and self-knowledge. The healers require healing themselves. I believe that Jain analysis of the causes of karmic influxes (*sravas*), unwholesome karmas (*p pa*) and karmic bondage (*bandha*)⁸ and consequent suffering—can help these people. Certain Indian practices or *s dhan* techniques like *mantram* repetition have begun to be endorsed in mainstream chaplaincy.

Mantram repetition is a simple, easy-to-learn, evidence-based, and spiritually integrated practice for quickly calming the mind and relaxing the body. A *mantram* has been defined by renowned teacher Eknath Easwaran, as “the living symbol of the profoundest reality that the human being can conceive of, the highest power that we can respond to and love.” Historically, nearly every wisdom tradition has taught the value of repeating certain holy, sacred words that contain a “divine charge” that serves to calm the mind and the body and refreshes the spirit.

There is growing evidence for the efficacy of *mantram* repetition to manage symptoms and behaviors. Nurses have reported its benefits when dealing with stressful situations; and other

providers have reported its usage to reduce exhaustion. In addition, research has shown that *mantram* repetition can help veterans manage symptoms of post-traumatic stress disorder (PTSD), including nightmares, flashbacks, and road rage; and help family caregivers of loved ones with dementia to reduce depression, anxiety, and caregiver burden.⁹

The Jain analysis of karma, in mind, speech and body (three restraints - *guptis*),¹⁰ can help one know oneself better and care for others more sensitively. The Jain practice of *sam dhimara a* is not only for Jains. Senior physicians such as D.C. Jain, M.D. in New Delhi, a sincere lay Digambara devotee, surmise that the disciplines of Jain study can be shared with the interested general public as in “*Santh r* or *Sallekhan* Clubs” such as has been promoted by Dr. Priyadarshana Jain at the University of Mysore in Chennai.¹¹ It is necessary to use popular media as films and YouTube to reach out to Indian and Western medical personnel in order to make this seemingly abstruse topic intelligible to suffering people and caregivers who do not have the background and time available to study it.

To understand death, you need to understand what precedes it. What is life? What is it that dies? Is there a soul that is eternal and that persists after the body turns to dust? Physical bodies are continually changing—from conception, fetal development, infancy, childhood, maturity, sickness, decrepitude, death and decomposition of the corpse. What were we before we were born and what will we be after death? The physical body functions and transforms automatically, without our conscious effort. It undergoes many complex biochemical processes simultaneously and sequentially, genetically predetermined.

Our “minds”, too, are never the same, yet there is some mysterious “stable” consciousness or sense of persistent identity “me” –coupled with a “porous”, unstable memory. We note change while in different states of awareness: awake or attentive, meditative concentration, dreaming, sleep, stupor or ecstasy altered by different substances. Our persons, too, also subject to so-called psychic experiences (psi phenomena), premonitions, déjà vu, past life memories, as well as more common daily anxiety, trauma, PTSD, hallucinations, extreme emotions of terror, grief, etc., or psychiatric disturbances like being drawn to suicide.

Buddhism does not posit an eternal soul or atman as does Jainism and Hinduism but rather than the human personality consists of five ever-changing skandhas. Jainism posits the existence of an infinite number of “souls” or *j va* that are affected by their distinct karma (actions) and are yet capable of influencing their future. The Jain path is a self-reliant path of dynamic spiritual evolution, incrementally progressing and regressing until “its bonds of *sa s ra* begin to unravel, and ultimate salvation is assured”.¹² Although *j vas* are burdened with karmas-karmic matter that obscures true knowledge of the nature of reality and freedom, Jainism teaches that “a soul is free to work for its own salvation” and has “an inherent tendency toward self-improvement”.¹³

The lifelong cleansing of the soul in Jainism is outlined as a ladder of fourteen rungs called *gu asth nas*. The lowest rung is that of the state of “wrong views” (*mithy -dar ana*); ascending to the highest rungs, the states of omniscience (*kevalajñ na*)—the state of the

arhat, *kevalin*, *Jina*, or *T rtha kara* and *ayoga-kevalin*, the state attained by an *arhat* in the instant prior to his death. These states are explained in great technical detail, that includes suppressing or eliminating karmas and passions upon receiving lay *vratas* (vows of restraint) and mendicant *mah vratas* (vows of total restraint).¹⁴

Knowing and climbing every stage of this fourteen-state ladder requires intense dedication and careful self-scrutiny. It is an ideal template or map to a spiritual frontier of perfect selfless purity. Death, however, as we discussed previously, is an experience all of us will meet, lay and mendicant, without exception. Jainism wisely presents the possibility of consecrated dying as a spiritual practice open to everyone. The ancient Jain custom of preparing yourself for a holy death is called *sallekhan* . It is a universal opportunity for great spiritual advancement. It is “good death” Jain dharma practice.

It is *sam dhimara a*—gradual fasting by ritual prescription, usually under close supervision of mendicant teachers. Jaini writes that the term *sallekhan* is a “properly thinning out (the passions and the body”. It is almost always undertaken in old age (*jar*), with onset of such problems as blindness, inability to walk without help, or “senility” (may we suggest early dementia?) that challenges maintaining one’s spiritual vows or *vratas*. Of course, there is, too, terminal illness with imminent death expected (*ni prat k r ruj*).¹⁵ There’s a sense that the body is no longer a vehicle for spiritual growth, so one simply abstains from the violence incurred in eating and drinking...ultimate *ahi s* .

Jains believe that the entire spiritual life of a layman (and, to an even greater extent, a mendicant) is in fact preparation for such a sacred death...Those who do pass away in the proper manner are considered to be close to salvation. It is said that their next birth will be in a heaven or similarly exalted abode, and that within a very few lifetimes they will gain incarnation in the presence of a *T rtha kara*, thus being enabled to complete the path which they have so bravely followed.¹⁶

There is a growing interest about “good death” in the West but very little is known about Indian and especially Jain religious thought and practices.¹⁷ My current project, entitled “***Good Death Auspicious Rebirth***” is to develop an education program for healthcare personnel who treat “dharma-farers” – Jain, Hindu, Buddhist, or Sikh in the US. These patients, men and women—mostly first and second generation immigrants from India or the worldwide Indian diaspora—are approaching the end-of-life like all of us: old age, chronic disease such as cancer, incidents like coronary infarct and strokes or, unexpectedly, as in accidents and natural or human disasters. They ought to be treated with the sensitivity and respect they deserve, as bearers of India’s ancient spiritual heritage. They are often misunderstood or ignored because of cultural differences in the factory assembly line atmosphere of large medical centers. Help from families and Indian community organizations are not always available to them.

On the other hand, many hospice and hospital personnel I know—often remark on the “quality” or “atmosphere” of a patient’s death, whether it be a “good death” or a bad one of uncomfortable “darkness,” with a sense of “unfinished business”.

I have created a four-minute long Good Death Auspicious Rebirth trailer about my film project. This can be viewed at the secure site truedharma.org/death-dying/ that explains shows interviews with Jain teachers as well as Jain physicians and affiliated medical personnel. More footage can be seen on YouTube under “*Good Death Auspicious Rebirth*”.

The **Good Death** program will use narratives about their personal experiences on the Jain path with reference to the practice of primary Jain vows or principles: *ahi s* (nonharming), *anek ntav da* (non-absolutism) and *aparigraha* (non-possessiveness) in end-of-life situations, if they are amenable.

“Jainism is a way of compassion and ascetic self-restraint designed to liberate the jiva or soul from the bondage of karmic matter. Jainas see the universe as a vast organism, pulsating with life. Countless billions of souls pervade the universe. Although trapped in various bodies, all are inherently pure and capable of omniscient knowledge—which means that liberation is possible for all ‘ But because liberation requires the cessation of all actions, the holy death fast is often thought of as the ultimate goal of life, for it liberates the soul from the bondage of the mind and body.” John M Koller ¹⁸

As of August 2015, it is dismaying that the High Court of Rajasthan did not recognize *sallekhan* as a revered religious practice, but rather as a form of collectively approved suicide, a social construct, according to the lawyer Nikhil Soni litigating against *sallekhan* ! The Supreme Court of India temporarily overturned the Rajasthan decision. An official trial date for a hearing on the constitutionality of *sallekhan* is awaited.¹⁹

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Chapter V.

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Matter and Form of Micro-structure, Varga , in Jainism

Narayan Lal Kachhara*

“Matter” in Jainism:

According to Jain metaphysics one form of *Aj vadravya* (Non-living substance) is *pudgal stik ya* (matter substance) which exists in the Universe in various forms. *Pudgala* is tangible reality within the sensuous and super sensuous experiences in perceptible and imperceptible conditions. *Pudgala* is permanent, non-living, non-conscious, extensive, physical, corporeal and concrete, active, disintegrating and integrating, and changeable substance.¹ It is characterized by origination, decay and permanence without giving up its essential nature of existence.²

Pudgala is the only substance which is *m rta* (corporeal) and perceivable. *R patva* (form) /*m rtatva* (corporeality) or sensory perceptibility is the sum total of the four sensuous qualities as follows.³

- Colour-five types of primary colour : Black, blue, red, yellow, white
- Taste- five types of taste: Sweet, bitter, pungent, sour & astringent
- Smell- two types of odour: Good smell and bad smell.
- Touch- eight types of touch: Cold, hot, smooth (positive charge), rough (negative charge), light, heavy, soft and hard.

All colours, tastes and smells can vary in magnitude and range.

Based on the above qualities the matter substance in nature is broadly of three types:⁴

- (i) Matter substance having one colour, one smell, one taste and two touches.
- (ii) Matter substance having five colours, two smells, five tastes and four touches.
- (iii) Matter substance having five colours, two smells, five tastes and eight touches.

Param u is the two-touch matter substance (*pudgala*); it has only one colour, one smell and one taste.⁵ The four-touch *pudgala* comprise the subtle (*s k ma*) class of matter substance, as aggregates (*skandha*), which has significant energy. This matter has five colours, two smells and five tastes. On the other hand the eight-touch matter constitutes the gross (*b dara*) class of aggregates comprising of energy and matter we are commonly familiar with. These aggregates have the five colours, two smells and five tastes.

Cold, hot, smooth and rough are primary touch qualities of *pudgala*. The smooth touch is also regarded as positive charge and the rough touch is regarded as negative charge. The other four touch qualities viz. light, heavy, soft and hard are secondary touch qualities. These touch

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qualities are supposed to develop when bonding between infinite *param us* produces a gross aggregate. The weight (or mass) of the aggregate is said to relate to the light and heavy touch qualities. The four touch aggregates and *param u* are weight less. The weight is a property of gross aggregates having eight- touches.⁶ This aspect is further discussed below:

In the true sense the *param us* and their aggregates as a class have no origination; they have always been in existence. But a particular aggregate or *param u* has a beginning and a life time. The minimum life time of a *param u* as free *param u* and that of an aggregate can be one '*samaya*'⁷ and maximum life duration can be innumerable '*samayas*'.⁸ Thereafter they undergo change. The *pudgala* are of two types, subtle and gross, as mentioned earlier. The subtle does not remain subtle and gross does not remain gross for all time. After innumerable '*samaya*' the subtle changes to gross and gross splits into subtle form.

Jain philosophy provides rules for bonding among *param us* and their aggregates. The bonding takes place due to positive and negative charge of *param us*. Bonding takes place between dissimilar charge *param us* as well as between similar charge *param us*.

Param u: *Param u* is defined in canonical literature in general and in the Bhagavat S tra in particular in various ways from different perspectives. It is the basis (ultimate constituent) of the physical universe. It is indivisible, indestructible, impenetrable, incombustible and imperceptible to sense organs.⁹ It cannot be split or destroyed by any means whatsoever. It has no half-portion, no middle portion and no *prade a*. It has no length, no breadth and no depth. It is truly infinitesimal.

A *Varga* has one of the five primary colours, one of the two smells, one of the five tastes, two of the four primary touches i.e. either hot or cold and either smooth (positive charge) or rough (negative charge).¹⁰ Although the four qualities are permanently possessed by a *param u*, the intensity of the qualities does not remain constant. A *param u* possessing one unit of blackness at any moment may sometimes later possess two, three or many units of *blackness* and so on.

A single free *param u* is invisible not only to the naked eyes but also to other physical instruments. Its existence is to be inferred by the collective action and reaction of aggregates of infinite *param us*. Only the omniscient (*kevala jñ n*) and those possessing superlative visual intuition (*paramavadhi jñ n*) can perceive and cognize the nature of a free *param u*.

The *param u* is the direct unit of physical substance (*pudgala*) and also the indirect unit of space, time and magnitude of quality of attributes. The *param us* have the innate capacity of uniting with one another to form composite bodies. The composite bodies are liable to the process of disintegration and the united *param us* may become free *param us* and thus the process of association and dissociation goes on continuously. *Param u* is capable of being dynamically active (*kriy v na*). When dynamic, it may have spin, vibratory, rotary and migratory motions.¹¹ The activity of a *param u* is not continuous, rather it is in quanta. The dynamics of *param u* in some respect follow certain rules but it also follows some rules of

uncertainty. *Param u* generally cannot be stopped or hindered by any object (*apratigh t*) and at the same time it does not cause hindrance to others.

A *param u* is a vibrating and moving charge. It has also been said that infinite number *param us* can occupy one space point.¹² This means that *param u* is bosonic in character. As the *param u* is indivisible, the energy of a *param u* is the smallest amount of energy that can exist in Free State and therefore it can be regarded as a quantum of energy.

It should be mentioned that the atom described by modern science is not the same as *param u*. The *param u* is weightless (it has infinitesimal energy) and has one colour, one taste, one smell and two touches whereas an atom has mass and belongs to the class three matter; it has five colours, five tastes, two smells and eight-touches. According to Jainism an atom, rather each of its elementary particles, contains infinite number of *param us* as described below.

Varga (Energy Fields)

Varga is an important concept to understand nature particularly at subtle level. *Varga* has been defined as *pudgala* aggregate made up of similar *param us* or as a cluster of *param us*. There are infinite numbers and types of *varga s* according to Bhagavat S tra but eight types are important from the point of view of their association with the soul.¹³ Gomma s ra J vak a provides another type of classification of *varga s* on the basis of number of *param us* present in the cluster.¹⁴ According to this, there are 23 types of main *varga s* found all over *loka*. The *varga s* fall into two broad categories, one has four-touch and the other has eight-touch. The 2nd to 14th order *varga s* are four-touch type and weight less. The 16th to 23rd order *varga s* are eight-touch type and have weight. The 15th order *varga* falls in between the two categories and its nature is uncertain.¹⁵

The lower order weightless *varga s* can be divided in two groups.

1. Associable *varga s* – *varga s* that associate with the soul and form various kinds of subtle bodies and other structures that assist the soul in its worldly functioning.
2. Non-associable *varga s* – *varga s* that do not associate with the soul.

The higher order *varga s* can be divided in three groups.

- 1) *Varga s* that is helpful in formation of gross bodies of plants and small microorganisms (*nigodas*), belonging to category of non-mobile beings (*Sth vara j vas*). These *varga s* assist in formation of plant bodies and bodies of small microorganisms. The *varga* that assists in formation of plant body compares with sun light (photons).
- 2) Permanent Nil (*nya*) *Varga s*. Detailed information about these *varga s s* is not available in scriptures.

- 3) Gross Matter (*mah skandha*) *Varga* (GMV). This *varga* is supposed to constitute all ordinary matter, visible and invisible, in the universe including bodies of mobile beings.

The charge in *varga* produces an electric field. A moving electric charge in *varga* also produces a magnetic field. In view of modern science, a field is nothing but a charge in the space-time continuum. All fields, magnetic, electrical and gravitational, are physical realities. A *varga* contains a bundle or packet of energy. The energy density or energy intensity increases with the order of *varga*. As mentioned above *varga*s of 15th and higher order are supposed to have eight- touch i.e. in addition to four basic touches, namely cold, hot, positive and negative charge, other four secondary touches - light, heavy, soft and hard are also present. These additional touch properties are supposed to come in existence due to bonding between *param us*. The light and heavy touches are supposed to produce the property of weight. In the lower order *varga*s of four touch types the *param us* cluster but do not bond.

Gross Matter *Varga* (GMV) and Matter

All ordinary matter (visible or invisible) is made up of GMV according to Jain view as mentioned above. We examine now how the sub atomic particles may be produced from GMV.¹⁶ Consider the case of leptons first. The neutrino is the smallest lepton having negligible mass and no charge. If neutrino is made of GMV then it must be a combination of at least two GMV, one having positive charge and the other a negative charge. This will be the case when the two GMV have equal and opposite charge. As *varga*s exist with differing charges it is very likely that more than two GMV combine to produce a neutral charge in neutrino. So, a neutrino of negligible mass should be made up of many GMV. There are three types of neutrinos. The mass of all three types is negligible but still there is a minor difference between them. Such minor variation in mass is obtained by variation in number of GMV in the three types of neutrinos. It may be noted that when the mass of a neutrino is considered to be negligible, the mass of GMV is still much less.

Now consider another lepton, the electron. The mass of electron is 0.511 MeV, which is millions of times greater than the mass of a neutrino. This means that an electron is made of millions of GMV. In an electron the number of negative charges GMV exceeds the positive charge GMVs giving a net negative charge of -1.6022×10^{-9} coulomb. This also shows that the charge of one GMV is millions of times smaller the charge of an electron. And since a GMV contains infinite *param us*, the quantum charge of a *param u* is really unimaginably small.

Next consider the stable baryon particles proton and neutron. These particles are supposed to be made up of quarks. The mass of a proton is 1836.12 times greater than that of the electron and neutron is very slightly heavier than proton. The mass of a quark is uncertain but it is many times more than that of the electron. So, a quark is made of that many times more GMV than an electron. There are six types of quarks having fractional charges, both positive

and negative, and masses ranging from 2 MeV to 18000 MeV. According to Jain view the fractional charges of quarks are possible by appropriate combination of positive and negative GMV. Another thing we observe is that the charges of up quark, charm quark and top quark are the same but their masses vary considerably. Similar is the case with down quark, strange quark and bottom quark. Formation of these quarks is clearly possible with suitable combination of GMV. So, in Jain view quarks and leptons are composite particles and subject to gravitational force.

Mass of matter is nothing but transformation of energy, that is, both matter and energy are but two modifications of a single principle, as has been only recently realized in science. Jain physics has identified all forms of matter and energy as modification of the same substance *pudgala*. Intra-convertibility of various forms of energy - mechanical into electrical, electrical into heat, light, sound etc., - which is the basis of modern technology - has been recognized by Jain philosophers as the basic attributes of *pudgala*, since all forms of energy are fundamentally the modification of the same substance, *param u pudgala*.

Clairvoyant Observation of Matter

Omniscient is not present now but the observations of clairvoyant can provide valuable information about reality. Annie Besant and C.W. Leadbeater clairvoyantly examined the chemical elements Hydrogen, Oxygen, Nitrogen, etc.¹⁷ The drawings of the 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 conditions by will power. They found that the gaseous state is succeeded by the etheric state, 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 1. 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 *a u* or Ultimate Physical Atom (UPA). In two of them the three *a u* are arranged in a line, while in the remaining four they are arranged in triangle. It is, of course, impossible to convey in words the clear conceptions that are gained by direct vision of the objects of study.

Two types of *a u* were observed by them as shown in figure 2. In one case force pours in from the “outside” and passing through the *a u* pours out into the physical world. In the second case, it pours in from the physical world and out through the *a u* 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 *a u* positive or male and the sink *a u* negative or female. All *a u* observed by them were one or other of these two forms.

It was seen that the *a u* 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. Each *a u* is surrounded by a field.

According to Besant and Leadbeater, the *a u* 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 *a u* 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 *a u*, see figure 2; 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 form a caduceus with the first three. Each of the finer whorls is formed of seven yet fine ones, set successfully at right angles to each other, each finer than its predecessor, called spirilla. 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.

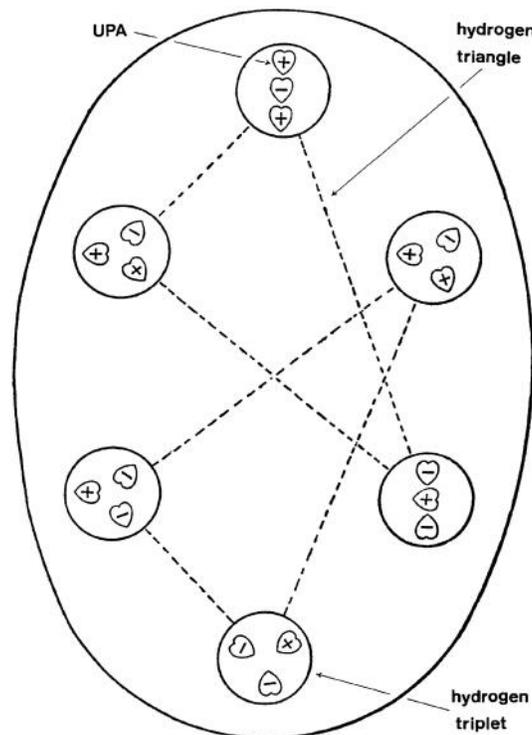
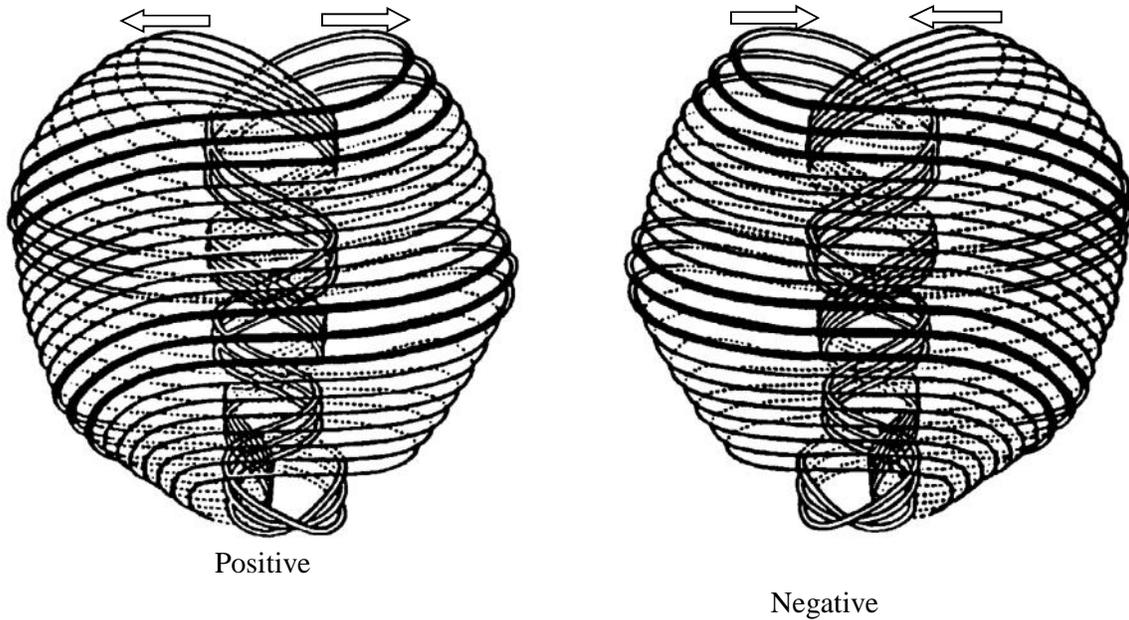


Figure 1. The hydrogen

Figure 2. The $A u$

Force pours into the heart shaped depression at the top of the $a u$, 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 $a u$ depend on the several activities of the spirals, and with the change of activity from one spiral to another the colour changes.

The $a u$ 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.

An electric current brought to bear upon the $a u$ checks their proper motions i.e. renders them slower; the $a u$ exposed to it arrange themselves in parallel lines, and in each line the heart shaped depression receives the flow, which passes out through the apex into the depression of the next and so on as shown in figure 3.

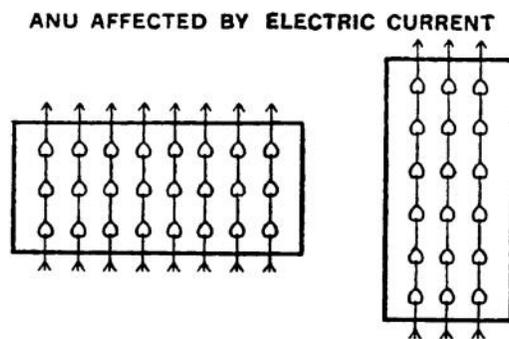


Figure 3.

Two $a u$ positive and negative brought near to each other, attract each other, and then commence to revolve round 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 scientific perspective.¹⁸ In the paper published in 1995 he reports how facts of nuclear and particle physics are consistent with 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 nuclei 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. They may be called subquarks. If quark consists of three sub-quarks, protons and neutrons would each consist of nine subquarks bound together as three groups of three sub-quarks. This view compares with the observations made by Besant and Leadbeater as shown in fig 1 in which each triangular array has three bodies each enclosing a group of three $a u$. Then each body compares to a quark, the $a u$ to a subquark and the upper triangle structure compares with a proton or neutron. The two- triangle form observed by Besant and

Leadbeater could be deuteron or arrangement of two similar nuclei of hydrogen according to Philips.

On detailed study Philips reached at 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 $a u$ 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 $a u$ have opposite magnetic polarity. According to Besant and Leadbeater in the former, source, “force comes out” and in the latter, sink, it disappears.

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

Recently Neppe and Close have 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 [17].¹⁹ 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 of reality.

The authors also proposed (and proved) the hypothesis that mass is nothing more and nothing less than 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 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 as quantum unit.

The authors emphasized that the elementary and compound particles cannot be point particles (mathematical singularities), or even classical solid spinning particles forming the basis of an atomic description in a quantized model. They also showed that conservation of mass, energy and gimmel in a dynamic system ensures that the moment of inertia of a spinning vortex that merges with another spinning vortex, and becomes part of a compound vortex is conserved in the total angular momentum of the larger vortex.

Jainism Interpretation of Clairvoyant Observations

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

It was mentioned above that an electron should be made up of millions of GMV shows that the *a u* observed by Besant and Leadbeater must contain billions of GMV. The *a u* 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? The force must comprise of a stream of GMV entering the sphere. Billions of GMV are packed inside the spherical space in a spiral arrangement and a continuous flow of GMV is maintained in the spirals. The flow takes place in thousands of spirals before finally exiting the spherical space. The GMVs have vibration, rotational and linear movements in the *a u*. This *a u* is not a “thing” as rightly said by the authors but it is conglomeration of billions of GMVs which themselves are aggregation of infinite number of *param us*. It is the electrical force between the GMVs that keep them bound in a spherical space. It may be noted that a sphere has minimum surface area for a given volume and thus has minimum energy loss for a given content of energy and is the preferred shape to be formed in nature. The depression on the sphere where the force pours in is due to inflow of energy of GMV. If this flow were checked the *A u* would not form a stable structure of quark as explained below.

The flow of charge in a spiral or helical path produces a magnetic field. The GMV has positive or negative charge. As the *a u* consists of thousands of spirals a strong magnetic field is produced which exerts a magnetic force on another *a u* in close vicinity. This magnetic force binds the three *a u* together. If the GMVs were not flowing the quark structure would not exist. Similar magnetic force exists between the quarks in a proton. This magnetic force has been called strong force in science?

Besant and Leadbeater observed three types of motions in *a u* spin, rotation and pulsation. We know that there is no stationary object in the universe, every object is moving for stability. Spin and rotation are natural tendencies for stable structures in nature. Pulsation requires further explanation. The GMVs in cosmos are supposed to exist with differing charges and so the flow of GMV entering the *a u* does not have uniform charge. The variation in charge of GMV would change the size of the sphere which appears as pulsation motion of *a u*.

Besant and Leadbeater identified two types of *a u* positive and negative, the former having source like flow and the later sink lie 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 *a u* with opposing magnetic forces that would keep the *a u* bound together in a quark. The *a u* are also seen to arrange themselves in triangular and linear fashion. In the former case the *a u* forces are at 120 degree to each other and in the latter case the forces lie on the same axis. Both of these arrangements would produce magnetically stable structures. Conversely, we can say that the *a u* arrange themselves in a way so as to produce a stable structure.

Neppe and Close considered quarks as rapidly spinning energy vortices and protons as spiral vortex created by combination of three elementary vortices of quark. In the Besant and Leadbeater observations even the quarks are combination of three vortices of *a u*. Nevertheless, the Neppe and Close theory that physical reality exists in vortical form is supported.

Science considers only energy and mass as the fundamental properties of matter. Presence of electrically charged GMVs in subatomic particles is a new aspect of matter introduced by Jain philosophy. Jain philosophy says that charge (*param u*) is the fundamental constituent of matter and this causes bonding between *param us* and its clusters, *varga*, and gives rise to magnetic forces at subatomic level for producing stable structures.

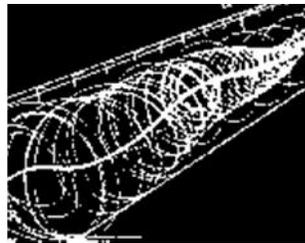
Besant and Leadbeater also observed colours in *a u*. Jain philosophy says that GMV is eight-touch matter and has all the five colours. These colours manifest in appropriate conditions and are seen in the *a u*. The authors also observed that *a u* arrange themselves in parallel lines by electric current. This further validates the electric, and magnetic, nature of *a u*.

The Form of Varga

We have seen that the *A u* is a spherical unit having spiral arrangement of flowing GMV. What is the form of GMV? Extending the inquiry, what is the form of any *varga*? Neppe and Close have shown that the physical reality exists as energy vortices. In Jainism *varga s* are groups of *param us* and a *param u* is a quantum of energy. The *varga* is therefore a three dimensional structure in space. In order that such a structure is stable the *param us* must be moving in some pattern. Intrinsically, a *param u* is dynamic; it has vibration,

rotational and linear kinds of motions. So, in all possibility the *varga* must exist as vortex in which the *param* us are vibrating, rotating and moving to give an extension to *varga* .

As mentioned before there are two classes of *varga* s four-touch type and eight-touch type, the former are weightless (massless) and the later have mass. It is also mentioned that as the number of *param* us increase the *varga* s occupies less space that is the *param* us are packed densely in higher *varga* s. The *param* u, and therefore energy, density is highest in GMV, which extends relatively a tiny space. From this consideration the massless *varga* s may exist as some kind of elongated vortices and a GMV as a spherical vortex of micro size. Figure 4 shows artist's conception of the two kinds of *varga* s. Figure 4a shows that in a four touch type massless *varga* the *param* us, or groups of *param* us, are whirling around and the *varga* extends a certain space. In a GMV, figure 4b, the *param* us are packed in a spherical space and inside this space the *param* us are dynamic having all kinds of motion. The GMV is thus not a particle but a dense structure of closely packed dynamic *param* us. In both kinds of *varga* s continuous flow of *param* us in and out maintain a dynamic balance. So, what is flowing in and out of spherical *au* is also tiny spherical *varga* packed with energy.



4a



4b

Figure 4.

4a presents artist's concept of four-touch mass less *varga* .
4b that of eight-touch GMV in which the *param* us are in bound state.

Conclusion

Matter in Jain philosophy is one of the non-living substances. *Param* u is the smallest indivisible constituent of matter and is the quantum of energy. It exists as charge. All other forms of matter are combinations of *param* us. At subtle and micro level matter exists as *varga* . The largest *varga* GMV has the highest energy density among the *varga* s.

The clairvoyant observations of atom by Annie Besant and C.W. Leadbeater reveal the details of subatomic parts of chemical elements and shows that the smallest part *Au* is a vortex structure having continuous flow, in and out, of some kind of force. They said that the *Au* can be positively or negatively charged depending on the direction of flow of the force in the spherical space of vortex. Stephen Philips regards the observations of Besant and Leadbeater of great scientific significance and compares the *Au* to subquark. Neppe and Close in their TDVP model also consider the physical reality at all levels to exist as vortices.

They developed mathematics for combining vortices of quarks in formation of protons and neutrons.

Jain philosophy proposes that the force flowing in *a u* observed by Besant and Leadbeater must be GMV and that GMV acts as brick from which all gross matter starting from quark is formed. It is further proposed that all kinds of *varga s* are some kind of vortices. Jain philosophy shows that matter at subtle level exists as energy and the high energy density GMV is the source of formation of all kinds of gross matter in the universe.

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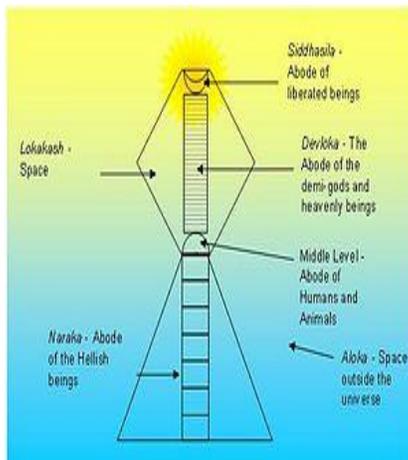
Eco Science & Eco Spirituality Convergence of Approaches

Shugan C. Jain*

Introduction

Ecology is the scientific analysis and study of interactions amongst organisms and their environment. It is an interdisciplinary field that includes biology, geography and earth sciences. Thus ecology includes the study of interactions that organisms have with each other, other organisms, and with a biotic/non-living components of their environment.

Modern spirituality typically includes a belief in a supernatural (beyond the known and observable) realm, personal growth a quest for an ultimate/sacred meaning or an encounter with one's own "inner dimension." Picture below shows the Jain view of entire cosmos in the shape of a human being with different abodes of existence of different types of living and non-living beings and a human being with all cosmic processes going on within him. So it seems that eco-balance (peaceful co-existence of all beings) and eco spirituality converge.



Our planet today

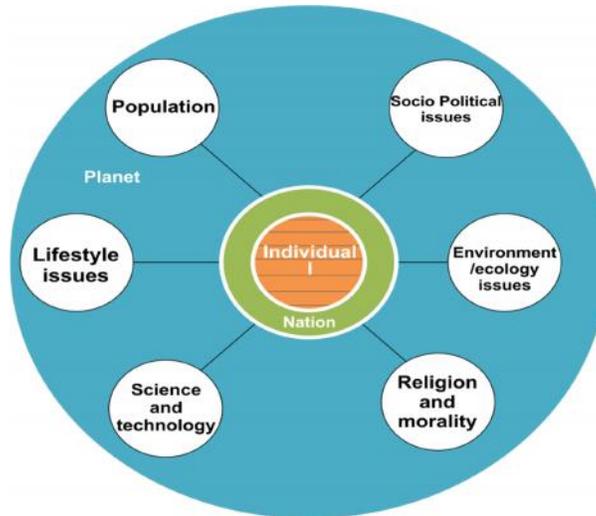
Advances in Scientific research have provided us an insight in the working of our planet earth with the functioning of various a biotic and biotic entities; ability to harness all natural resources for the benefit of mankind. All types of elements constituting the environment be they insentient and sentient, including the individual human beings influence each other and affect eco-balance. Today this process of interaction has become critical due to the scientific research and increased *ego and associated greed* in individual human beings to become the master of the entire system, (Survival of the fittest). Thus in less than two centuries of industrial revolution, the man has managed to deteriorate his habitat, the Earth, the beautiful and fragile result of millions of years of evolution. Examples:

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- A majority of the world's population is living in cities that are efficient hubs connecting international flows of people, energy, communications, and capital thriving economy. However, the same factors also make them vulnerable to terror and violence by even individuals and small-groups like ill motivated gang membership to religious extremism, illicit commercial flows, environment pollution to and from elsewhere and availability of new technologies to cross the threshold necessary to become terrible threats. September 11, 2001, marked their arrival at that threshold. Other examples are Mumbai attack on 26/9/2013, trucks driving in crowds (Nice, Berlin and London etc), Baghdad's 5 million people suffering due to irreparable damage to their electrical network and so on. This development suggests individual human beings become the fulcrum that maintains eco balance.
- Similarly concentration of efficient production centres for even food like milk, vegetables, and now raising cattle have come up. Such centres cause enhanced emissions of pollutants in the environment (CH₄, CO₂ etc) and degrade the water, earth and plant bodies by dumping their waste in them. The results are Global warming and climate change resulting in increased incidences of Al-Nino, tsunamis, floods, heavy rains, forest fires and deforestation and extremes of temperatures on earth.
- Mass production promotes consumerism, demand generation and greed to have more. The slogan 'Maximize profits and Greed is good' results in need for more resources, more comfort and convenience and greater waste generation as well.
- Scientific research also contributes to enhance our health and age. More population.
- Heavy dependence and promotion of the use of Animal (non-plant) based diet world over and consequently the tremendous need of resources (land, water etc) for the same.
- ICT (Information and Communication technologies) helps in processing and dissemination of knowledge to reduce human effort greatly and generate more leisure time, forecast natural disasters and preparations to face them.

The world is becoming a closely-knit village accompanied by the fact that the demand per person starts growing towards the norms of the western (developed) world. As a result, natural balances are becoming more fragile than men have been used to imagine before. The erosion of biodiversity has reached a level unique in life's history on Earth.

Issues arising out of and causing the present scenario are depicted in the picture below with nation and individuals like you and me in different roles. At the center of this great eco system and its degradation or beneficiation is individual like you and me. Even a tiny network element causes total system malfunctioning and failure. So eco-spirituality converges with the spirituality of individual beings.



We now look at three main developments, namely the eco-science, economics and lifestyle briefly as the first greatly affects the second which in turn affects our psychology and third.

A. Eco-Science developments

Scientific research earlier focused on finding new solutions to our old beliefs, understanding different aspects of nature, improving the material life style and now analyzing the performance of individual products and systems.

Developments before 19th century

Beginning of scientific enquiry based on observations and experimentation at gross level: Solar system and planetary movement, experiments with electricity and magnetism, earth is a magnet, Laws of motion and gravity, Atomic theory by Dalton, role of heart, veins and arteries in blood circulation, Germ theory and antiseptics, pasteurization etc.

After 19th century

- Theory of general relativity by Einstein refuted fixed background of space-time, Hubble's observation that the speed at which galaxies recede positively correlates with their distance led to the understanding that the universe is expanding, and the formulation of the Big Bang theory, Darwin's theory of origin of species, nuclear fission leading to development of radar and atomic bomb, synthesis of urea leading to a new research field of organic chemistry, exploitation of the Earth's petrochemicals, systematic production of refined materials provided a ready supply of products which provided not only energy but also synthetic materials for clothing, medicine, and everyday disposable resources; physical modeling of DNA, *the secret of life* and so on to basic constituents of proteins, simple amino acids. In 1924, Louis de Broglie proposed that there is no fundamental difference in the

makeup and behavior of energy and matter on the atomic and subatomic level, either may behave as if made of either particles or waves.

- Rapid developments in quantum mechanics reveal that objective reality does not exist until it is measured and to a principle called superposition to the claims that while we do not know what the state of any object is, it is actually existent in all possible states simultaneously, as long as we don't look to check; 2nd interpretation of quantum theory is the *many-worlds* or *multi-verse* theory; how the things that make up atoms work as well as electromagnetic waves (like light) work to help us make sense of the smallest things in nature like protons, neutrons and electrons.
- The advent of computers and later communication technologies coupled with AI (artificial intelligence) and recently the drones and DNA made the entire cycle of scientific discoveries very rapid providing extremely fast and accurate means to analyse through mathematical and simulation techniques the finest details at the subatomic levels as well as on the largest systems constituting the complex network of galaxies. Results are use of scientific research in all walks of a life, be it medicine, reproduction, food production, exploitation of natural resources and finding their substitutes, development of security and weapons of mass destruction, efficient and instant systems of communications-knowledge processing and transport.

Even here we see some scientists use such developments for curing dangerous illnesses like cancer, blindness etc through the use of laser and nano technologies while others use them to make precision attack systems for destruction of enemies to meet the personal objectives of those who control the society at different levels. This is evident from vast expenditure incurred on building up weapon systems, enhanced usage of dangerous chemicals in food production and replacement of men by machines to improve productivity.

B. Social, economic and other considerations affecting eco balance

There are a number of system elements, besides science technology and spirituality, like social and political developments, economic theories, availability of natural resources and their consumption that affect eco-balance as well. The era of mass production in 20th century saw the economic theory of **'Increase demand /consumption as resources are infinite, Maximize profits and Greed is good'** as evident from World Economic Forum's recent Report,¹ to demystify some earlier thinking on their relative linkages. Their findings are:

- What matters most are evolutions in technology, preferences, policies and prices about Resource availability and not just physical supply? Consumer preferences and behaviors vary widely across countries and cultures even at same levels of economic development (Japan and USA).

- Population growth will cause the world to run out of resources is negated as “Economic growth and development are the major drivers of future resource demand.” Estimates based on trending energy and population demand for 20 years indicate that China, will contribute only 4% of the world’s expected population growth, but will account for almost 40% of additional energy demand.
- Interconnections between different natural resources occur primarily at a biophysical level is negated by economic, political and social interconnections as these play an increasingly important role in their availability. Shale gas revolution in the US has proven difficult to replicate in European countries could show close interconnections at all levels cultural, legal, political, economic and technological.
- Social justice and fairness of access is central to ensuring stable production and distribution of resources “Social justice is an important but auxiliary concern in ensuring supply of resources.”
- Resources and the environment are two sides of the same coin, but that also means they may be solved hand in hand. “Choosing between resource availability and environmental conservation is a Sophie’s choice.”

C. Lifestyle

Twentieth century saw rapid movement from an agrarian to industrial to information societies. This movement has created total lifestyle changes from big family to nuclear family to now individuals living alone in big cities; hard physical work being replaced by either light physical work, robots or just intellectual work; rich, packaged and fast food replacing fresh home cooked food; more leisure time activities available on one hand and extremely stressful work to perform as daily routine requiring continuous enhancement of professional skills and be productive, big divide between those who have everything and those who have little or nothing. Here we shall discuss only the lifestyle issues facing individuals which are primarily health (inclusive of physical-mental-spiritual as per UNO) related.

- Too many poor: deprived of education and health services, enough nutrition, living in ghettos and cause of increase violence in the society.
- Growing middle class and rich for whom life style issues have become serious. Their thinking and its effect on their lifestyle results in over consumption, greed, convenience (requiring fast food, shifting to western food habits, readymade foods and packaging), laziness, excess of leisure requiring travel and converting natural forests /water bodies mountains for leisure spots etc. The resulting issues are:
 - ✓ Practically 24 hour work day (doing business all over the globe with different time zones) and its effects on health, social and family structure
 - ✓ Drift from their religion to materialism
 - ✓ Rise in health issues like stress, dementia, heart and diabetes, cancer etc)
 - ✓ Drifting from family life to individual lifestyle increasing unhappiness

- ✓ Increase in aggression and selfishness.

D. Eco spirituality in Jainism

Na hanyet na gh tayet- “should not kill and should not cause to kill” Mah v ra

Jainism believes in self-effort to achieve one’s objective rather than just faith in God. All existents in this cosmos are real with persistence and change simultaneously as their characteristic. Existents are classified as sentient and insentient beings, each affecting the other and fill the entire cosmos.

Jainism considers the entire eco system comprising both sentient and insentient beings. Sentient beings with consciousness, with subtle to gross bodies like air, water, fire, earth and plant bodied immobile livings and 2 to 5 sensed mobile living beings fill the entire ecosystem. Each sentient living being affects and is affected by other living beings as well as insentient beings (matter/*pudgala*) in very subtle to subtle to gross and gross-gross states as well. Insentient beings also, with their nature of fusion and fission randomly affect each other as well. Mah v ra in *c r ga S tra*² has clearly spelt out their existence as well as their interactions with individual human beings. Further He clearly tells us that harming these living beings results in not only their but our own happiness as each action results in similar reaction and bondage of karmas and hence is *hi s*. Eco system scientists have proved, as well as our own observations confirm that water, plant, fire, earth and air bodied one sense living beings have consciousness and react to our emotions of love, hate, anger etc. This inter-relatedness is also seen as we emit CO₂ and plants absorb CO₂ to give O₂ for our use.

Sentient beings /particularly the empirical souls are the main cause of affecting the eco balance due to their attachment with worldly objects including their own body and mental state/ ego. This ego gets reflected as tainted emotions /*ka yas* (anger, arrogance, deceit and greed) and results in loss of self-restraint. So eco spirituality in Jainism is based on individual human being. Examples of black bee and the flowers,³ *le y* tree (see Appendix I), Madhubindu (see Appendix II) and Nemi Kumar wedding (see Appendix III) in Jain literature amply demonstrate the impact of activities of sentient beings in maintaining eco-system balance.

All living beings wish to be in peace and happiness forever as indicated in Jain dictum the ultimate objective of all human beings is to attain *mok a*. The path to minimize and ultimately eliminate these four tainted emotions in called *mok am rga*. The path is based on dharma (supreme spiritual values as *ahi s*, *sanyama*/self-restraint and *tapa*/austerities)⁴ conduct based on an institution of vows based on *ahi s*, *anek nta*/pluralism in thought and speech and *aparigraha* as lifestyle and society. *Ahi s* is based on equality of all living beings and not just human beings. Mah v ra further gave 60 synonyms of *ahi s*⁵ like equanimity, forgiveness, compassion, pity,

tolerance, love etc to enable us practice the same. The real life impact of these practices is now being amply proven by scientific studies globally through experimentations.

Analysis:

From these discussions, we see the need to take a holistic (*anek ntika*) approach for resolving issues concerning eco-balance similar to WHO's pronouncement of being healthy implies Physical, Mental and Spiritual wellness.

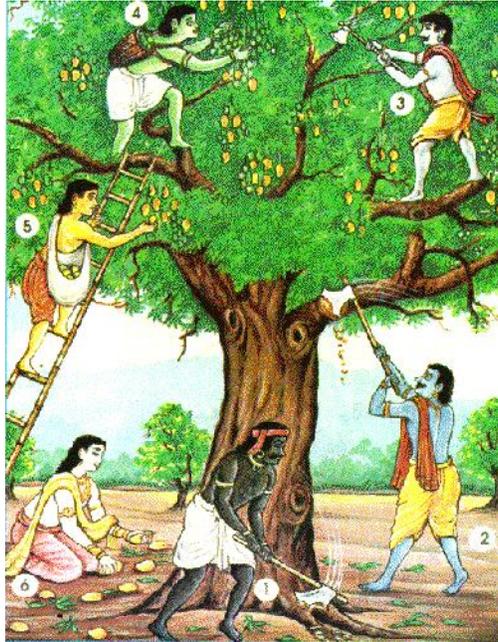
In all our discussions, we saw individuals are the consumers, suppliers, scientists, spiritualists and social beings all at the same time and hence the biggest factor in maintaining eco-balance. Scientists help in discovering new approaches/materials, but some of us use these for welfare (like medical science) while others (like terrorists) use the same for destruction depending on the rise of four *ka yas* (anger, arrogance, deceit and greed) in them. The same is true of others involved in politics, business, economic activities etc. To reduce the *ka yas*, Jainism suggests:

- To keep nonviolence */ahi s* at the forefront in our thoughts and way of life process. *Ahi s* implies respect for all forms of life, non-hurting /non-killing of any living beings, compassion and tolerance, forgiveness, maintaining sense of equality towards all living beings exercising self-restraint (*sanyama*) and making strenuous efforts to maintain and improve the eco/spiritual balance for our own happiness as well as of others. Jainism suggests lifestyle based on nonviolent food (adopting a vegetarian life style we can stay healthier as well as reduce Greenhouse emissions), practicing forgiveness to curb anger, exercising restraint on our wasteful activities like using foods and goods packaged in non-degradable/reusable material, setting thermostat 2 or 3 degrees higher in summer and lower in winter, limiting use of private transport and compassion towards Have-nots and destitute, self-criticism (*pratikram a*), auto-suggestion (*bh van s*) yoga and meditation.
- *Anek ntav da* imply that we need to take a holistic and pluralistic approach rather than individual as the same can be misleading. So we need to adopt attitude of tolerance, co-existence of opposites and reconciliation rather than confrontation. The first verse of *S m yika P ha*⁶ suggests how our attitude towards others should be.
- Non possession asks us to differentiate the needs versus greed and share our surplus for the wellness of the society as a whole.
- *Parasparopagrahoj v n m*⁷ Living beings help each other.

The world already possesses the necessary technical and spiritual knowledge to service resource needs for the near future. Unlocking the potential of this knowledge, however, will require stakeholders to build a shared and holistic picture of the factors driving tomorrow's resource availability.

Thus we see convergence of eco science-spirituality in solving our present day issues.

APPENDIX I



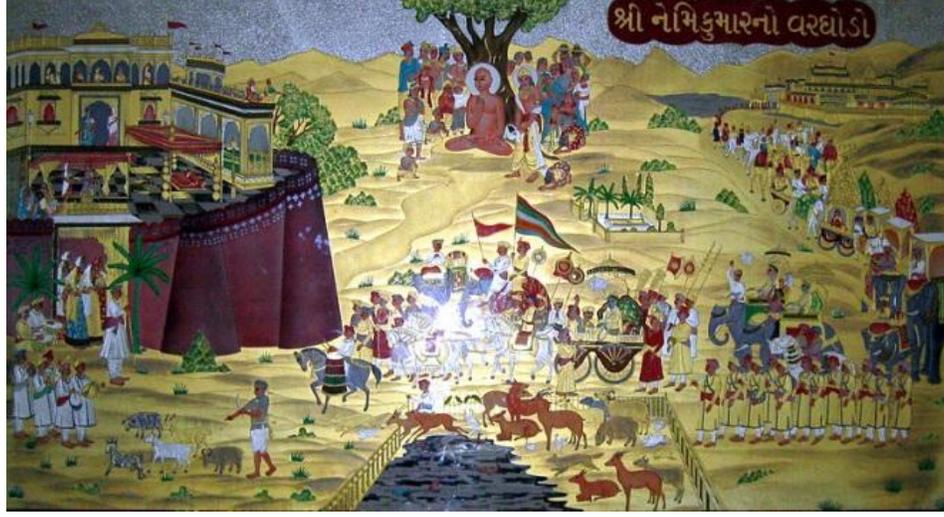
Le y Tree

APPENDIX II



Madhubindu

APPENDIX III



Nemin tha Wedding

References:

- 1 "The Future Availability of Natural Resources: A New Paradigm for Global Resource Availability." *World Economic Forum*. November 2014. Web. October 2019.
<http://www3.weforum.org/docs/WEF_FutureAvailabilityNaturalResources_Report_2014.pdf>.
- 2 c r ga S tra 1/1/1-7.
- 3 जहा दुमस्स पुफ्फेसु भमरो आवियइ रसं ।
न य पुफ्फं किलामेइ, सो य पीणेइ अप्पयं ॥ (Da avaik lika S tra 1/2.)
As the black bee drinks gently of the blossoms of the tree, hurting not the flowers, and yet drinks deep to its heart's content. (Da avaik lika S tra 1/2.)
- 4 This is aptly indicated in the following opening verse of Da avaik lika S tra.
धम्मो मंगलमुक्किट्ठं, अहिंसा संजमो तवो ।
देवा वि तं नमंसंति जस्स धम्मे सया मणो ॥ (Ibid, 1/1)
- 5 Pra navy kara a S tra 2/1.
- 6 S m yika P ha by Amit Gati in Sanskrit and Hindi translation by Yugal Kshor Mukhtar.
प्रेम भाव हो सब जीवों से, गुणी जनों में हर्ष प्रभो ।
करुणा—स्रोत बहें दुखियों पर, दुर्जन में मध्यस्थ विभो ॥
- 7 Tattv rtha S tra 5/21.

Regional Distribution of Jain Population in India

Prakash C Jain*

The 2011 census not only enumerated the largest Jain population ever in modern times at about 4.5 million, it also revealed for the first time in the Indian census history that the Jain population was spread all over the country – in all the states and union territories in India. Other demographic features included about 5.4% decadal growth rate during 2001-2011, urbanization 80%, sex and child sex ratios 954 and 889 respectively, fertility rate 1.6 persons, literacy rate 94.88% (male 96.78% and female 92.91%), and work participation rate 35.53% (male 57.71% and Female 12.27%). Overall, these data clearly highlight the urban middle/upper middle class character of the Jain community.

Of the six major religious communities in India, Jains have been the smallest one.¹ In 1881 when the first systematic census was conducted in the country, the Jain population was enumerated at 1,221,896, or 0.48 percent of the total Indian population. Since then the Jains have seldom constituted more than half-a-percent of the total population of India (See Table 1). With the enumeration of 4.45 million (0.37%) Jains in the 2011 census of India they still constitute the smallest religious community in the country. The corresponding figures for other religious communities are: Hindus 966.62 million (79.80%), Muslims 172.2 million (14.23%), Christians 27.80 million (2.3%), Sikhs 20.8 million (1.72%), Buddhists 8.44 million (0.7%), other religious communities 10.8 million (0.89%).

Table 1: Jain population: Variations in the number, decadal percent change, urbanisation and sex ratio, 1881-2011

Census	Number of Jains (in 000s)	Percentage of total population	Decadal percent change in the number of Jains	Urbanization (%)	Sex Ratio
1881	1,222	0.49	-	-	-
1891	1,417	0.51	15.94	-	-
1901	1,334	0.47	-5.83	30.0	929
1911	1,248	0.41	-6.47	29.6	940
1921	1,177	0.39	-5.26	33.9	931
1931	1,251	0.37	6.28	34.6	940
1941	1,440	0.37	15.81	41.4	930
1951	1,618	0.45	11.67	-	927
1961	2,027	0.46	25.17	53.9	924
1971	2,605	0.47	28.48	59.8	940
1981*	3,206	0.48	23.17	64.0	941
1991**	3,352	0.40	4.42	71.0	946
2001	4,225	0.40	26.0	75.0	940
2011	4,451	0.37	5.4	79.7	954

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- * Excluding Assam where, census was not held in 1981 owing to disturbed conditions.
 ** Excluding Jammu & Kashmir where 1991 census was not held.

Sources for this and all subsequent tables (as appropriate):

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2. Census of India, 1961, Paper No. 1 of 1963, Religion, R.G. Office, New Delhi, 1963.
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4. Census of India, 1981, Paper No. 4 of 1984, Household Population by Religion of Head of Household, R.G. Office, New Delhi, 1984 (figures amended as per Errata issued subsequently by this office).
5. Census of India, 1991, Paper No. 1 of 1995, Religion, R.G. Office, New Delhi, 1995.
6. Census of India 2001, First Report of Religion Data. R.G. Office, New Delhi, 2004.
7. Census of India 2011 data are taken from Dheeraj Jain, *Population of Jains in India (A Perspective from the Census 2011)*, International School for Jain Studies, New Delhi, 2017.

Urbanisation

With about 79.68% of them living in urban areas, the Jains are the most urbanised religious communities in India (Table 2).

Table 2: Population of India by religious communities and Rural-Urban distribution, 2011

Religion	Total Population	% of total	Rural	%	Urban	%
Total	121,08,54,977	100.00	83,37,48,852	68.86	37,71,06,125	31.14
Hindu	9662,57,353	79.80	68,40,93,951	70.80	28,21,63,402	29.20
Muslim	1722,45,158	14.23	10,35,04,739	60.09	6,87,40,419	39.91
Christian	278,19,588	2.30	1,66,57,065	59.88	1,11,62,523	40.12
Sikh	208,33,116	1.72	1,49,30,792	71.67	59,02,324	28.33
Buddhist	84,42,972	0.70	48,14,849	57.03	36,28,123	42.97
Jain	44,51,753	0.37	9,04,809	20.32	35,46,944	79.68
Other religions and persuasions	79,37,734	0.66	71,99,007	90.69	7,38,727	9.31
Religion not stated	28,67,303	0.23	16,43,640	57.32	12,23,663	42.68

Table 3: Population of India by Religious Communities and Gender

Religion	Total Population	% of total	Male	% of male	Female	% of female
Total	121,08,54,977	100.00	6232,70,258	100.00	5875,84,719	100.00
Hindu	9662,57,353	79.80	4983,06,968	79.95	4679,50,385	79.64
Muslim	1722,45,158	14.23	882,73,945	14.16	839,71,213	14.29
Christian	278,19,588	2.30	137,51,031	2.21	140,68,557	2.39
Sikh	208,33,116	1.72	109,48,431	1.76	98,84,685	1.68
Buddhist	84,42,972	0.70	42,96,010	0.69	41,46,962	0.71
Jain	44,51,753	0.37	22,78,097	0.37	21,73,656	0.37
Other religions and persuasions	79,37,734	0.66	39,52,064	0.63	39,85,670	0.68
Religion not stated	28,67,303	0.24	14,63,712	0.23	14,03,591	0.24

Population Distribution by States/Union Territories

Table 4 presents data regarding distribution of Jain population by States and Union Territories for six consecutive census years since 1961. The variation in Jain population across the states and union territories has not obviously been uniform. Data in this table clearly suggest that in the 2001 census all the states and union territories showed varying percentage of increase in the Jain population. The same cannot be said about the 2001-2011 period as the Jain population has decreased in eight states and UTs, namely Rajasthan, Haryana, Jharkhand, Uttarakhand, Kerala, J&K, Chandigarh and Meghalaya. It must be noted however that for the first time in 2011 census the Jain population has been recorded in all the states and union territories of India (Table 4).

Table 4: Distribution of Jain population by States/UTs, 1961-2011

States/UTs	1961	1971	1981	1991	2001	2011
India	20,27,281	26,04,646	32,06,038	33,52,706	42,25,053	44,51,753
Maharashtra	4,85,672	7,03,664	9,39,392	9,65,840	13,01,843	14,00,349
Rajasthan	4,09,417	5,13,548	6,24,317	5,62,806	6,50,493	6,22,023
Gujarat	4,09,754	4,51,578	4,67,768	4,91,331	5,25,305	5,79,654
Madhya Pradesh	2,47,927	3,45,211	4,44,960	4,47,111	5,45,446	5,67,028
Karnataka	1,74,366	2,18,862	2,97,974	3,26,114	4,12,659	4,40,280
Uttar Pradesh	1,22,108	1,24,728	1,41,549	1,68,389	2,07,111	2,13,267
NCT of Delhi	29,595	50,513	73,917	94,672	1,55,122	1,66,231
Tamil Nadu	28,350	41,097	49,564	66,900	83,359	89,265
Chhattisgarh	\$\$	\$\$	\$\$	43,213	56,103	61,510
West Bengal	26,940	32,203	38,663	34,355	55,223	60,141
Andhra Pradesh	9,012	16,108	18,642	26,564	41,846	53,849
Haryana	**	31,173	35,482	35,296	57,167	52,613
Punjab	48,754	21,383	27,049	20,763	39,276	45,040
Assam	9,468	12,917	*	20,645	23,957	25,949
Bihar	17,598	25,185	27,613	11,332	16,085	18,914
Jharkhand	\$\$\$	\$\$\$	\$\$\$	11,717	16,301	14,974
Odisha	2,295	6,521	6,642	6,302	9,154	9,420
Uttarakhand	\$	\$	\$	7,870	9,249	9,183
Kerala	2,967	3,336	3,605	3,641	4,528	4,489
Nagaland	263	627	1,153	1,202	2,093	2,655
Jammu & Kashmir	1,427	1,150	1,576	*	2,518	2,490
Chandigarh	**	1,016	1,889	1,531	2,592	1,960
Himachal Pradesh	95	626	1,046	1,206	1,408	1,805
Manipur	778	1,408	975	1,337	1,461	1,692
Puducherry	76	237	277	470	952	1,400
Dadra & Nagar Haveli	120	303	372	529	864	1,186
Goa	68	333	462	487	820	1,109
Tripura	195	375	297	301	477	860
Arunachal Pradesh	14	39	42	64	216	771
Meghalaya	***	268	542	445	772	627
Mizoram	***	-	11	4	179	376
Sikkim	19	-	108	40	183	314
Daman & Diu	+	223	140	212	268	287
Andaman & Nicobar Islands	3	14	11	17	23	31
Lakshadweep	-	-	-	-	-	11

* No Census conducted, ** Included under Punjab, ***Included under Assam, \$- Included under Uttar Pradesh, \$\$-Included under Madhya Pradesh \$\$\$- Included under Bihar, +- Included under Goa. +- India figures for 1971 excludes population of Sikkim that is 209, 843 as per 'Household population by Religion of Head of the Household, Paper 3 of 1985, Series 19, Sikkim.

Notes:

1. The Census 2001 Population figures for India and Manipur exclude those of Mao Maram, Paomata and Pural sub- divisions of Senapati district of Manipur.
2. In 1991 figures for Uttaranchal, Uttar Pradesh, Jharkhand, Bihar, Chattisgarh and Madhya Pradesh have been recasted as per the Jurisdiction in 2001 census.
3. All religious communities include 'Religion not stated'.

Decadal Population Growth Rate

Since the 1931 census, the Jain population has been growing at varying rates ranging from 4.4% during 1981-91 decade to 28.48% during 1961-71 decade. In spite of these however, 1991 and 2011 growth rate data clearly reveal the lowest population growth rate in the Jain vis-a-vis other communities (Table 5). The jump in the Jain population in 2001 census as explained elsewhere was a short-term phenomenon.² The 2011 population growth rate clearly confirms the middle class character of the Jain community.

However the birth rate still continues to be low among the Jains. Thus the proportion of child population (0-6 age group) among the Jains was found to be only 10.6% in 2001 and 8.89% in 2011, which the Commissioner's report of the 2001 census attributed to "low fertility" in the community.³ Comparative figures for the year 2001 for Hindus, Muslims, Christians, Sikhs and Buddhists were 15.9%, 15.6%, 13.5%, 12.8% and 14.4% respectively. The total fertility rate (TFR) among the Jains was estimated to be 1.6 for the year 2011 as against the national average of 2.17.⁴

Table 5: Decadal growth rate of population in India by religious community, 1961-2011

Decade	India	Hindu	Muslim	Christian	Sikh	Buddhists	Jains
1961-1971	24.75	23.67	30.84	32.58	32.28	17.08	28.48
1971-1981	21.41	21.29	22.95	13.65	26.01	23.8	23.09
1981-1991	26.05	25.08	34.54	21.5	24.33	35.33	4.57
1991-2001	22.66	20.35	36.02	22.61	18.18	24.54	26.02
2001-2011	17.72	16.76	24.65	15.53	8.42	6.13	5.37

As in previous censuses, in 2011 census too, a vast majority of Jain population continues to live in western half of the country. Among the union territories the largest number of Jains lived in Delhi: about 94,600 in 1991, 155,122 in 2001 and 166,231 in 2011. In other Union Territories, namely Chandigarh, Dadra & Nagar Haveli, Pondicherry, Daman and Diu, Andaman & Nicobar and Lakshadweep only 4,675 Jains were enumerated in 2011 census (Table 4).

Concentration in Ten States/Union Territories

Table 4 presents data about variations in the number of Jains in all the States/Union Territories of India. In 2011 census the top ten States/UTs with largest concentration of Jain population were as follows: Maharashtra, Rajasthan, Gujarat, Madhya Pradesh, Karnataka, UP, Delhi, Tamil Nadu, Chhattisgarh and West Bengal. About 95% of the total Jain populations is concentrated in these ten States/UT.

Districts with Major Concentration of Jain Population

In 1981 census there were only 4 districts in India each with 100,000+ Jain population: Greater Bombay (341,980), Belgaum (127,306), Kolhapur (121,722) and Ahmedabad (119,235). The combined population of Jains in these four districts was 710,243, that is about 22% of the country's total Jain population.⁵ This situation changed significantly in 2011 census with the doubling of the number of districts in this category to 8 and the Jain population to 1,464,581, or 32.9% of the total Jain population (Table 6a).

The number of districts in 2011 with more than 50,000 and less than 100,000 Jains was seven. These districts hosted 516,656 Jains, or 11.6% of the total Jain population (Table 6b). The third category of districts numbering 24 with Jain population between 25,000 and 49,999 had 14.5% (644,839) of the total Jain population (Table 6c).

Table 6a: Districts with Jain population > 1 lakh

S. No.	Name of District	Population of Jains as per Census 2011		
		Total	Male	Female
1	Mumbai Suburban	343,639	1,72,042	1,71,597
2	Ahmadabad	209,287	1,06,152	1,03,135
3	Belgaum	178,310	91,671	86,639
4	Thane	172,052	87,903	84,149
5	Mumbai	166,000	82,950	83,050
6	Kolhapur	154,882	80,024	74,858
7	Pune	127,786	65,560	62,226
8	Surat	112,835	58,575	54,260

These 8 districts together consist of 32.90% i.e. around one-third of the total Jain population.

Table 6b: Districts with Jain population > 50,000 and <1 lakh

S. No.	Name of District	Population of Jains as per Census 2011		
		Total	Male	Female
1	Sangli	87,453	45,284	42,169
2	Bangalore	83,090	42,383	40,707
3	Jaipur	81,079	41,785	39,294
4	Udaipur	78,647	40,221	38,426
5	Indore	71,667	36,462	35,205
6	Sagar	62,992	32,691	30,301
7	Chennai	51,708	26,519	25,189

Table 6c: Districts with Jain population > 25,000 and <50,000

1	East Delhi	46,927	24,108	22,819
2	Ajmer	45,614	23,231	22,383
3	North West Delhi	43,460	22,513	20,947
4	Ahmadnagar	38,718	19,776	18,942
5	Nashik	38,212	19,548	18,664
6	Jodhpur	36,697	18,555	18,142
7	Bhilwara	35,149	17,775	17,374
8	Barmer	34,010	17,453	16,557
9	Jabalpur	33,728	17,345	16,383
10	Rajkot	33,591	16,820	16,771
11	Aurangabad	30,981	15,920	15,061
12	Bikaner	30,850	15,500	15,350
13	Ratlam	29,353	14,891	14,462
14	Dharwad	29,037	14,895	14,142
15	Solapur	28,134	14,635	13,499
16	Vadodara	27,650	13,993	13,657
17	Jalgaon	27,404	14,205	13,199
18	Bhavnagar	26,974	13,613	13,361
19	Bhopal	25,950	13,145	12,805
20	Chittaurgarh	25,843	13,139	12,704
21	Kota	25,742	13,396	12,346
22	Kachchh	25,312	12,387	12,925
23	Bagalkot	25,198	12,939	12,259
24	Damoh	25,005	13,180	11,825

To sum up, in 2011 about 59.0% of the total Jain population lived in 39 districts of the country where the Jain population ranged from 25,005 in Damoh, for example, to 343,639 in Mumbai Suburban.

Concluding Remarks

The following trends can be discerned in the regional distribution of the Jain population in India as per the 2011 census enumerations:

1. For centuries now the Jain population continues to remain concentrated in the western half of India.
2. As per 2011 census data, Jains have been found to reside in all the states and union territories of India. This has happened for the first time in independent India.
3. Of all the major religious communities in India, the Jains continue to remain the most urbanized community (about 80%).
4. About 95.0% of the Jain population in India is concentrated in nine states and the Union Territory of Delhi.
5. The 2011 census has recorded a small percentage of negative growth in Jain population in Rajasthan, Haryana, Jharkhand, Uttrakhand, Kerala, Jammu & Kashmir, Chandigarh and Meghalaya.
6. About 33.0% of the total Jain population resided in 8 districts with 100,000 or more Jain population, namely Mumbai Suburban, Ahmadabad, Belgaon, Thane, Mumbai, Kolhapur, Pune and Surat.
7. The number of districts with Jain population between 50,000 and 100,000 was 7 which included Sangli, Bangalore, Jaipur, Udaipur, Indore, Sagar and Chennai. These districts hosted a little more than 516,000 Jains, or about 11.6% of the total Jain population.
8. In another category there were 24 districts with the Jain population between 25,000 and 50,000. About 645,000, or 14.5% of the total Jain population lived in these districts.

References:

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- ¹ For a comprehensive sociological account of the Jain population and society, see Sangave, Vilas A. *Jain Community: A Social Survey*. Bombay: Popular Prakashan, 1980. See also Jain, Prakash C. *Jains in India and Abroad: A Sociological Introduction*. New Delhi: International School for Jain Studies, 2011. For historical demographic studies of the Jain population since 1881, see Jain, Prakash C. ed. *Studies in Jain Population and Demography*. Jaipur: Rawat Publications, 2019.
 - ² See Jain, Prakash C. op. cit. 2011, Chapter 3.
 - ³ Banthia, Jayant K. (2004). "Introduction", *Census of India 2001: First Report of Religion Data*. R.G. Office, New Delhi, 2004.
 - ⁴ For all the major population characteristics of the Jain community as per 2011 census data, see Jain, Dheeraj. *Population of Jains in India (A Perspective from the Census 2011)*. New Delhi: International School for Jain Studies, 2017; also Jain, Prakash C. op. cit., 2019. Chapter 7.
 - ⁵ See Jain, M. K. "A Demographic Analysis on the Jains in India." *Jain Journal*. 21.2 (1986): 48.

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