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Contents

Speciation model based on Jain theory of *Shriṣṭivāda* and limited intra-species Darwinian evolution

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ABSTRACT

Many theories, philosophical, religious and scientific, abound about the existence of living beings on Earth. Jain philosophy propounds a 'Steady State theory' of living species, called *Shriṣṭivāda*, with fixed number of possible species (termed Yoni), estimated to be 8.4 million and *Kul* types (possibly subspecies) estimated at about 200 trillion. Intra species evolution does not occur according to Jain *Shriṣṭivāda*, i.e. one species does not evolve into another species. This is in contradiction with the generally accepted evolutionary theory proposed by Darwin, where species evolve from one type into another, due to natural selection, depending on the environmental stress and limits of adaptation. This theory has been developed on the basis of the fossil records found in the dated sediment sequences, which has been taken to imply a gradual, multi branch development from unicellular species to humans over the 3.8-billion-year geologic history of life on the earth. There are fundamental differences between the Jain *Shriṣṭivāda* which considers the *karman sharira*, attached to the soul as the prime cause of birth as a particular species and Darwinian evolution which considers physical stress and natural selection as the main factor, responsible for temporal and spatial biodiversity. We recount the basic features of both these theories and make an attempt to incorporate their main features in a 'Chemical dependent formation model of Yonis on earth' and suggest that the fossil record in sediments mimics the availability of Yonis on earth and does not represent a sequential evolution of species.

The proposed model can explain the fixed and limited number of total species based on the law of 'Requirement and Availability' of ingredients and implies (i) place and time dependent formation of yonis of different species determined by the ambient physico- chemical environment, i.e. chemical ingredients in the atmosphere (anoxic to oxic), oceans (injection of calcium, phosphorus etc.), and in earth's surface rocks and physical conditions, e.g. temperature during the past 3.8 billion years. (ii) limited intra-species evolution and (iii) The observed fossil record in sediments reflects the time sequence of yoni types becoming available due to geochemical evolution of the earth. Were the physico- chemical conditions on earth to reverse from oxic back to anoxic, we predict that the fossil sequence which is taken to be 'evolutionary' will reverse into a 'devolutionary' sequence.

1. Introduction:

The presence of a variety of species on Earth is a complex, if not mysterious, phenomenon. Abiotic origin, i.e. origin of life from matter is not established and is a highly improbable, if not an impossible phenomenon. Many philosophies invoke ātmā (soul) or *Brahmn* and ascribe it to an intelligent creator. On the other hand, many scientists consider organisation of self-

reproducing molecules to be responsible for it. Whether *atma* and matter (*pudgal*) are independent entities or not, life seems to be a necessary and inevitable consequence of the laws of nature based on which the earth and the whole universe were formed and are evolving with time.

The best approach to understand life on earth is by a two-step process: origin and evolution. Two theories have been proposed for origin of life: biotic and abiotic. Biotic theories assume that living species, howsoever simple they may be, cannot be produced without pre-existing life, requiring *atma* as an additional entity (real), whereas abiotic theories presume that matter under certain circumstances can organise itself to give rise to complex organic compounds (proteins, nucleic acids etc.) which, in turn, can result in simple cells. Once a cell is formed, the rest is evolution, resulting in more choices, mutations and complexities, eventually leading to evolution of species, from monocellular organisms to humans with a complex neural system. It is an extension of Darwin's original observations on his famous south African trip, over 150 years ago, in which he found species acquiring different physical traits, depending on the prevailing environmental conditions (Behe et al, 1996; Jansma, 2015). It is largely accepted because the fossil records, preserved in sediment sequences, show diversification with time. This evidence cannot be ignored although alternative mechanisms can be proposed to explain the fossil record. The question we will raise in this article is that whether the fossil record reflects the evolution of species or it is a consequence of availability of different chemical ingredients that produced different types of specific *yonis* or suitable receptacles for life as a function of time, and we will produce evidence in the favour of the latter hypothesis.

In this article we review various hypotheses for origination of life and explain the 'apparent' evolutionary sequences, popularly called the tree of life, beginning with a common ancestor of all living beings (see Bhandari, 2015), based on fossil records- from monocellular organisms to complex humans via several abrupt evolutionary steps and extinction events, and propose a new hybrid model, which will be consistent with Jain model of *Shriṣṭivāda*.

2. Theories of origin of life

Theories regarding the origin of species can be grouped in three broad classes: Creationism, Steady State theories and materialistic theories:

1. Creationism:

Vedanta, Christianity and some other philosophies propose that the *Brahmn* or the Omnipotent God created all species in the beginning. We will not discuss this theory further because existence of omnipotent creator who could create the universe by His will, out of nothing, is a topic beyond scientific logic and investigation. Questions about pre-availability of ingredients, reason for doing so (causality) and physical, chemical and biological processes involved arise but need not be explained rationally in creationism, since it is taken as the will of God, involving miracles and supernatural powers and creation of all living and non-living entities of the universe out of nothing.

2. Steady State Theories and its variants

A variety of Steady State theories have been proposed in different philosophies and can be grouped as follows:

(i) Traducianism: Souls generate souls as and when bodies generate bodies by sexual or asexual processes. There are two basic requirements: a material body (yonis i.e. material receptacles or structures) and a conscious, choice making, *karmic* soul (with attached karmas), which makes the body a living entity. Here a soul creates living species of various types one by one, determined by the type of yoni available, rather than creating all the species at once as in creationism.

(ii) Infusianism: The karmic souls preexist in the universe and are infused into the body at the time of conception. In fact it presumes that the universe is packed with infinite number of souls of all kinds, i.e. with different types of karmic matter attached. Type of Karma is the ultimate cause of various species.

(iii) *Shriṣṭivād* is a Steady State theory, proposed in Jain, Bauddha and some Hindu philosophies, and includes the two additional elements (i) fixed number of viable species, always present somewhere, eternal and without origination (ii) existence of infinite number of karmic souls of finite types in the universe. Union of a karmic soul with 'yoni' (appropriate material receptacles or structures) gives rise to a living being, as in infusionism.

Birth is thus possible by association of three components: a pure soul, attached karma and a suitable yoni. Every karmic soul is different, depending on its karma load, and requires a specific type of appropriate yoni to take birth.

To conclude the above discussion we may state that the basic process of birth, according to Jain philosophy is

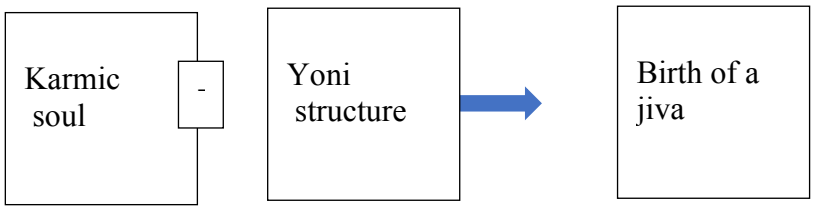


Fig. 1 Schematic showing that a jiva is born by integration of a soul with Karman sharira with a yoni.

Furthermore, *Shriṣṭivāda* is based on four propositions:

1) **Karmic Souls** :There are infinite numbers of independent, Karmic or mundane souls in the Universe.
2) **Fixed number of possible Yonis**: Number of viable, functional species are limited. The maximum number is fixed at 8.4 million.
3) **Eternal existence of yonis**: These 8.4 million species have always existed in the universe, somewhere or the other, not only confined to the Earth, and will always continue to exist, as they do now.
4) **Biotic origin**: Only life (and not non-living matter) can give rise to life. In contrast materialism subscribes to chemical or abiotic origin of life.
5) **No origination**: Life cannot be created form non-living matter. Souls exist as independent reals since eternity (infinite past). Therefore, there is no origination of life, *per se*, i.e. abiotic or chemical origin of living beings out of non-living matter is not permitted.

3. Materialism :

There is yet another hypothesis in which matter, under some special conditions, can create organic molecules, essential for life which, in turn, combine to form primitive, simple living cell and, once created, that living entity multiplies, mutates and evolves into different species. As already mentioned, the materialistic theories involve two processes : origination and evolution. further more, origination has two possibilities: Exogenic and Endogenic, that is origin outside the earth, in space or elsewhere and on the earth, respectively.We will discuss them in some detail below:

4.1. Origination of Life

The materialistic theory got a big boost when Miller (Miller and Urey, 1959) in a simple experiment, starting with some simple inorganic compounds like H_2, N_2, CO_2, CH_4, NH_3 and water, and by providing a simple source of energy like an electric spark, created many organic molecules, considered to be the building blocks of life. This is shown in Figure 2.

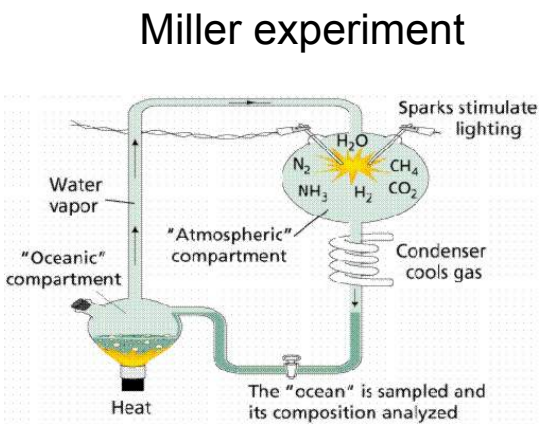
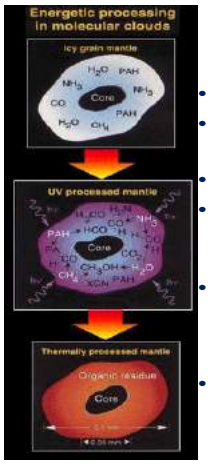


Figure 2: Urey-Miller synthesis which may have formed building blocks of life on Earth in its primitive reducing atmosphere abundant with methane, carbon di oxide, nitrogen, hydrogen ammonia, water etc.

The Urey-Miller synthesis can occur anywhere in the universe, on planets, in interstellar or interplanetary space or in molecular clouds. It may be noted that all the amino acids required by living systems have been identified in carbonaceous meteorite rocks, which have carbon and water, coming from space, implying that these compounds must have been produced in interstellar space. Taking the case of Earth, for example, the first living cell, howsoever improbable, can possibly appear in an organic soup, in ponds scattered over the surface of the earth, or in the oceans. Interstellar molecular clouds (Figure 3, 4), where all these ingredients, including source of energy, in form of e.g. ultraviolet light or cosmic rays is available, are more favourable, thus implying origin of life in space and supporting the theory of *panspermia*. The life bearing grains of rocks can then impinge on earth or other habitable planets and can grow in multiple evolutionary chains.

Earth is the only place in the universe, we know so far, where life exists. Exogenic theories, such as *panspermia*, are based on the presumption that life exists everywhere in the universe and originated in the interstellar space, in molecular clouds and the seeds of life are then brought to the earth and other planets, riding on meteorites and cosmic dust. Discovery of mineral grains, formed in space, even before the sun came into existence, called 'presolar' grains, and interstellar dust etc., found in meteorites recovered on earth, indicate that a plausible mechanism of transport from interstellar space to earth, without much heating or alteration over billions of years, exists in nature.



Organic molecules in dense Interstellar clouds

- H,C,N, present in abundance
- Abundant cosmic rays, U.V. light, electrons
- Longer time and diverse conditions exist
- Gas and solid phase reactions with ice crystals produce large organic mols. Molecules with up to 10 atoms.
- UV + chemicals(H2O,NH3,PAH,CH4 etc) around ice grains form Organic matter which behaves like glue and the grains stick together
- Amino acids have been identified in Sagittarius B2 interstellar medium in the region of our galaxy

Fig. 3. Formation of large organic molecules, the building blocks of life, is favoured in interstellar clouds because all the ingredients, including sources of energy are available and conditions suitable for chemical gas-grain reactions and grain surfaces etc exist there. PAH are Polycyclic aromatic hydrocarbons.

Endogenic theories presuppose synthesis of living cells on earth, but It must be emphasised that it is extremely improbable to create cells ,howsoever primitive ,by chemical processes One has therefore to resort to some special mechanisms involving a template or catalytic processes for this purpose or a yoni as discussed in this paper.

Fig. 4. A huge nebula exists in Orion constellation which contains interstellar clouds offering one of the favoured sites for synthesis of life forming large organic compounds by gas-grain-surface chemistry, mentioned in figure 3.

We will again return to this vital question later ,but let us first discuss ,how a simple cell ,if somehow created ,will grow into more complex forms of life ,under Darwinian evolution .

4.2. Darwinian evolution

The most primitive forms of life found in the oldest rocks on earth are some simple kinds of algae (Cynobacteria). Darwinian evolution presupposes that these are formed by abiotic or chemical synthesis and then the species evolve due to three factors: mutation, heredity and struggle for existence. Natural selection and struggle for existence develops the body organs as required for adaptation and survival in changing environments and this way species get transformed into other types, governed by the environmental stress. Neo-Darwinism, incorporates Mendelian theory of genetic mutations and further strengthens Darwin's hypothesis by providing a mechanism through genetic changes and modifications of genome. The modern synthesis theory incorporates the basic features of Neo-Darwinism i.e. interactions of genetic variations and natural selection (Varsha Shah, 2017). Let us then discuss the data we wish to explain:

1. History of life on Earth and the fossil Record:

The history of life on the earth is well preserved in sediments deposited at the bottom of the ocean. Whatever happens on the earth eventually goes down in the sea with the rivers and gets deposited together with the sediments. Thus we have a layer by layer record of the events on the earth which represents the time sequence, the bottom layer of sediment sequence is the oldest and the uppermost layer represents the current condition. Sometimes these sediments are brought to the surface by tectonic activity and are available for analysis in the laboratories.

Based on fossil records in the sediments which have been dated by different techniques, the palaeontologists have reconstructed the sequence of living species on the earth. The earth accumulated into a planet by impact of planetesimals, 4.6 billion years ago but life started, a billion years later (~3.8 billion year ago) by which time the newly formed hot earth' crust had cooled to hospitable temperatures. The earliest evidence of living cells has been documented in rocks about 3.8 billion years ago in form of monocellular algae and these are believed to evolve into the present day humans. This journey has not been smooth and has been punctuated by periodic and abrupt revolutions and catastrophes (see Sepkoski (1996), for a review). Seven major evolutionary stages and five major extinction events have been documented in the sedimentary records during the biogeologic history of the Earth, and we are already at the verge of the 8th revolution in evolution and 6th extinction event, as listed below:

2. Major revolutions inferred from fossil records

The biodiversity sequence of species after the origin of life progressed through invertebrates, vertebrates, reptiles, avian species and mammals etc., while algae developed into another evolutionary branch involving gymnosperms and angiosperms and to plants. The seven major events are as follows:

1. Abiotic origin of life as mono cellular species: Prokaryotes: 3.5-3.8 billion years ago
2. Multicellular species, i.e. static or *sthawar* jiva
3. Mobile species, i.e. *tras jiva* (Cambrian explosion) 540 million years ago:
4. Avian species
5. Mammals
6. Trees and plants
7. Humans or *sangyani* jiva (*Homosapiens sapiens*): (with mind_ thinking, meditating powers); 200,000 years ago with a unique capacity that by psychological effort and meditation, humans can evolve to the next stage.
8. NEXT anticipated Super humans

This fossil sequence is shown in Figure 5. In fact, the sediment sequence and the various stages are now being classified by the types of fossils that appear, develop and become extinct. It seems that the next, 8th, revolution in evolution is already at an advanced stage.

Here we want to point out that severe chemical changes in the atmosphere (for example from anoxic i.e. methane rich to oxic i.e. oxygen rich) in the ocean (from pure water to rich in minerals like calcium, phosphorus and other elements) and on earth' surface (from siliceous to calcic etc.), in addition to physical changes like temperature have taken place which have determined the type of species that will exist or survive at a particular time. Our argument is that if such chemical changes were to reverse in future due to geologic factors, the fossil record will follow and show a reverse trend. Thus evolution cannot be a unidirectional process, as it has so far been. For example, if the atmospheric oxygen is usurped by terrestrial rocks, anoxic environment will prevail and life will return to anoxic bacteria, where it began. Therefore, the chemical environment is the determining factor for the type of species that exist on the earth. Thus Darwinian evolution is not unidirectional, as has been claimed.

3. Major Extinction events in this evolutionary sequence:

The change in the number of families identified in sediment sequence show that the following episodic, abrupt massive extinction events have taken place, but the species quickly recovered following the collapse and emergence of new ecosystem:

1. Late Ordovician:: 445 million years ago
2. Late Devonian: 372 million years ago
3. Permian -Triassic extinction: 252 million years ago
4. Late Triassic: 202-237 million years ago
5. Cretaceous -Tertiary extinction: 65 million years ago
6. Next: Anthropogenic, manmade extinction: Now in advanced stage?

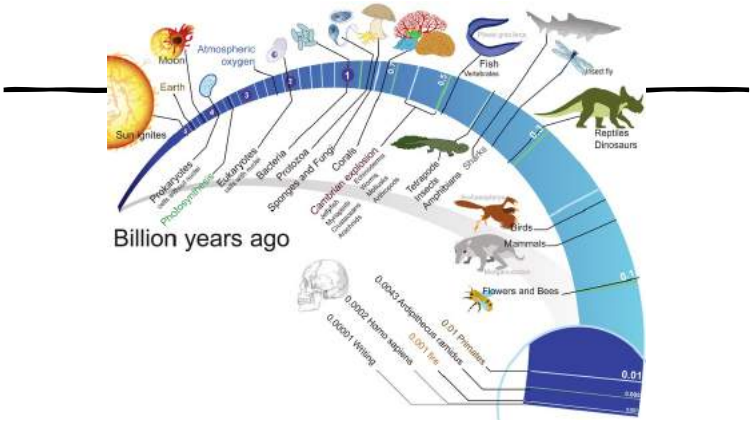


Figure 5. Evolution of species as revealed by records in sediments, since the earth was formed (source: Google, Wikipedia).

A few points can be summarised from the evidence provided by the fossil records

1. Most of the species which were ever born have become extinct, and the same fate awaits the existing species.
2. More species have become extinct than are alive.
3. After every extinction, the species that survive, thrive and become stronger, and at the same time new species evolve, because of radical physico-chemical changes in the environment. Biological diversity follows chemical and physical environment.

In Darwinian evolution, there is no limit to number and type of species, that can exist or evolve into. It simply depends on environmental stress and response of species. There is thus a competition between adaptation and rate of change of environmental conditions.

Those who cannot quickly adapt to environment changes become extinct, as has happened during sudden and intense volcanic events or instantaneous impacts of bolides.

We thus see that biologic evolution, chemical evolution, geologic evolution and atmospheric evolution have been going on simultaneously, hand in hand, throughout the history of the earth, each depending on and influenced by the other. The above discussion provides the basic framework based on which any theory of living species on the earth must be developed.

The question now arises whether Jain *Shriṣṭivāda* is consistent with this kind of record or some modification is required. We should therefore first describe the main features of *Shriṣṭivāda.*

5. *Shriṣṭivāda*

According to Jain view, the Loka is packed with an infinite number of mundane (karmic) souls, which not only occupy the body which takes birth, dies and is born again but has three additional subtle (invisible) entities: (AKT) (Atma+Karman + Tejas sharir) and they are born in one of the already available appropriate yonies (or life sustaining structures). *Karman sharir* is the causal body, which is the cause of all births and *Tejas sharir* is the astral body, the energy body, which manages or sustains the visible, physical body, called *audarik sharair*.

According to Jain philosophy, the *karman* body and *tejas* body accompanies the *atma* when the *audarik* body dies and instantly takes rebirth in a new body. When the *karmas* are totally dissolved, the soul attains nirvana, never to be reborn again; there is no rebirth, thereafter.

In Jain *Shriṣṭivāda*, in contrast to the role physical stress plays for evolution of species in Darwinism, karmic soul, specifically karmas attached to it, is the prime force for type of species one is born into. This results in two-way transformation: both evolution i.e. evolving into a more developed life form and devolution, going into a less developed life form. Number of sense organs and manifestation level of consciousness is taken as the index of development. Higher life forms have better manifestation, i.e. more number of sense organs or higher degree of consciousness compared to the lower life forms. The main difference between Darwinian evolution and Jain *Shriṣṭivād* is the role of karmic soul, whose existence evolutionists deny. Acharya Mahaprajna has mentioned two processes responsible for evolution: *Prayog* (conscious effort by the Self, or one's soul) and *Visrasā* (natural, i.e. by environmental stress).The ultimate result depends on a combination (*misra*) of both conscious effort and natural selection (Samani Chaitanya Prajna, 2017). In the changing environment, under the influence of ambient temperature, pressure conditions and the availability of various *pudgal varganas,* different types of yonis were formed, giving rise to corresponding species. In this way, environmentally controlled new species kept on being created (Anil Kumar Jain, 2002).

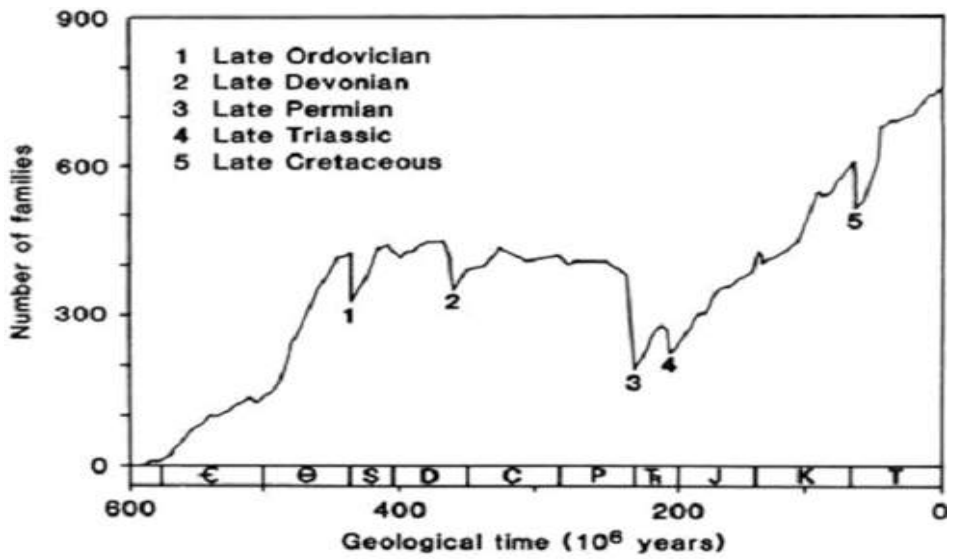


Figure 6: The evolution of life of Earth is punctuated by 5 major and some minor extinction events. The major extinction events on the Earth, shown by abrupt dips, over the past 540 million years are labelled 1 to 5 and the curve shows the number of families as a function of time. (Source: Google). After growing to the large number of species in the history of the earth, we are now heading towards the 6th man-made extinction. This anticipated (6th) extinction is due to anthropogenic and not due to natural causes as happened in the past. The causes are many: industrial waste in form of toxic chemicals is killing the microbes, leading to infertile soil, Bees and birds which are necessary for pollination for plants to multiply are plummeting. Animals have complete dependence on plants, whose number is dwindling because of loss of their habitat due to industrialisation and urbanisation. The perfectly balanced, natural ecological cycles of the Earth is broken due to human activity, leading to gradual extinction of many species.

Jain theory of speciation, thus propounds that

1. Matter and life are two independent, non- interconvertible 'reals'. Therefore, life can originate only from life (possessing a soul or consciousness) ; Life cannot originate from matter or vice versa.

2. The number of living species in the universe is fixed at 8.4 million. Thus only fixed number of species (YONI or pre-zygote stage) are possible in the universe (Loka).
3. All the species have always existed and will always exist, somewhere in the universe. The living universe, just as the material universe has always been as it is now. Thus it does not subscribe to temporal, sequential evolution of species from one form to another, as Darwin proposed, but in eternal existence of all species for all times.
4. Jainism subscribes to rebirth or repeated embodiment of karmic soul, as a species (within the four realms (*gati*s): *Dev* (deities), *Manushya* (humans), *Tiryanch* (animals) and *Naraki* (hellish beings)) determined by their karmic load.
   We confine here to *humans* and *animal* realms, that inhabit the earth and will not discuss *heavenly and hellish beings* because they fall outside the scope of Darwin's theory of evolution.
5. The main difference between the Jain theory of speciation (Eternalism) and modern theory based on Darwinian evolution is summarised in Table 1.

Table 1 : Comparison of modern theory of Darwinian evolution and Jain theory of karma resulting in evolution as well as devolution.

	Modern theory	**Jain model**
1	Number of species = No limit	Fixed number of species = 8.4 million Number of sub-species *(Kul)* ~ 200 trillions.
2	Darwinian Evolution and catastrophic extinction. Competition between environmental stress and adaptation. Natural selection is the primary mechanism for survival.	Evolution and devolution from one sensed to five sensed beings and vice versa, based on Karma. Karma is the motive force.
3	Abiotic (chemical) Origin	Eternalism " life has always existed as it is and will continue like this"
4	Sequential, multibranch evolution by mutation and diversification beginning with single cell to complex humans as per fossil records (fig. 5); Intra-species evolution is an important mechanism.	Limited Inter-species transformation but no intra-species evolution.

The total types of yonis (species) are distinguished by their colour (*varna*= 5), smell (*gandha*= 2), taste (*rasa*= 5), touch (*sparsha*= 8) and shape (*sansthan*= 5) .These amount to 2000 varieties but these are superficial in the sense that they do not represent species (*prajatis*) but only some external qualities and appearance. Here, we are interested in the number of species (basic yonis), which are given in the third column of Table 2.

The number of these basic yonis are determined by the available material in the universe, i.e. elements, compounds, and their properties, as discussed later.

6. Chemical evolution of Yonis and speciation

It has been difficult to identify a single, unique, defining characteristic which will define life, at symptomatic level. *Shriṣṭivāda* mentions that structurally it is the presence of soul (ātmā, and the accompanying consciousness) which distinguishes a living being from non-living. Pannāvana sutra functionally identifies a living being by the presence of at least one of the ten

sangnās[1] (desires and emotions). Jains ascribe faculties of perception (*darshan*), knowing (*gyan*), potency (*virya*), bliss, instinct of survival (*Jivatava shakti*), together with many other faculties (*shaktis*) of the soul (see Bhandari, 2015) as essential characteristics of living beings. One essential requirement, generally mentioned in scientific definitions of life is reproduction, i.e. each type of life should be capable of reproducing itself from generation to generation. Jainism, however, does not consider reproduction as an essential characteristic of the living; there could be living entities which do not reproduce. None of them are physical features so a living and a non-living entity cannot be distinguished on a physical basis. However, on symptomatic basis, we see the soul manifest by organising the random or chaotic molecules of the matter of the body in an orderly fashion so much so that its entropy decreases in comparison to its environment (negentropy), with which it is in exchange all the time. It can

Table 2: Category wise yonis (species) and kul * (sub-species)

Type 1. Molecular structures

Form of life (*sachitta*)	Number of Yonis/ structures or receptacles (species) Total 8.4 million	Basic yonis (probably equivalent to Order) Total=4800	Kul* yonis (sub-species) Total=199.5 trillion[#]
Solid phase molecular structures	700,000	350	22 trillion
Fluid phase molecular structures	700,000	350	7 trillion
Gaseous phase molecular structures	700,000	350	7 trillion
Energy forms	700,000	350	3 trillion

Type 2: Plants

Form of life (*sajiva*)	Total # of Yonis/structures or receptacles	Basic Yonis	Sub species
Plants	2.4 million	1200	28 trillion

Type 3. Living beings

Form of life (*sajiv*)	Total # of Yonis/structures or receptacles		Sub species
Two sense organisms	200,000	350	7 trillion
Three sense organisms	200,000	350	8 trillion
Four sense organisms	200,000	350	9 trillion
Five sense organism (animals)	400,000	200	Marine:12.5 trillion Avian : 12 trillion Terrestrial: 19 trillion
Five sensed with Neural network (brain), e.g. humans	1.4 million	700	14 trillion

Type 4. Hellish and heavenly beings: having only energy bodies

[1] Ten *sangnās* are: *āhar* (appetite), *bhay* (fear), *maithuna* (sex), *parigrah* (storage), *krodh* (anger), *māna* (pride), *Māyā* (attachment), *Lobha* (greed), *Loka* (following the tradition) and *Ogha* (involuntary/reflex action).

Form of life (sajiv)	Total # of Yonis/structures or receptacles		Sub species
Hellish beings	400,000	200	25 trillion
Heavenly beings	400,000	200	26 trillion

*Modern taxonomy sequence, based on structure, classifies hierarchy of Life in Domain, Kingdom, Phylum, Class, Order, Family, Genus and Species. Jain Darshan uses functional or *Indriya* (sense organ) based classification of Jiva (Life) in two types: *yoni* (species) and *Kul* (literally meaning family). It is not possible to compare the two classification systems since Kul sometimes is taken to represent subspecies.
#: According to interpretation of some texts e.g. Mulachar, Tathvarthasutrasar and Gommatsar. Some scholars interpret *kul koti* as type of families and the number given in this column is divided by 10 million (see Samani Chaitanya Prajna, 2017). Resolution of this controversy lies out side the scope of this paper and is a topic of further study.

also be defined as ordropy. We prefer to formulate an entropy based definition of life. It can be quantitatively measured, and increases with complexity, from one sensed organisms to 5 sensed organisms with psychological faculties. Higher the complexity, less is its entropy compared to the surrounding with which it is in constant exchange of energy. The living beings derive their energy from the environment, increasing its entropy. However, here we will concern only with four functional requirements of every living being: Input or food, (called *ahar sangna*), metabolic activity (*Tejas* or *astral body*) converting food into energy required for sustaining the body, and excretion or rejection of left overs. The fourth requirement is the presence of at least one sensory organ, e.g. feeling of touch, vital for their survival without which the living organism cannot protect itself. There could be more requirements of physical functions and organs in higher organisms, up to 5 sensed psychological humans. We will argue that number of products in any system depends on availability of ingredients and therefore with limited number of materials (chemicals, elements, organic compounds etc.) available, minimum functional organs can be made only in a limited number, and that determines the limited number of species of various types, listed in Table 2.

6.1. Characteristics and types of life

According to Jain philosophy (Table 2), there are fixed numbers of various types of species and families, classified into 24 major types (*Dandak*). Here we confine to 10 such types (1 species of humans with 5 sensory organs and brain, 1 animal (mammals) species with 5 sensory organs+3 with 2, 3, and 4 sensory organs which include insects, avian, marine and terrestrial species etc. respectively and 5 species with a single sensory organ of touch (gases, liquids, solids, plants, and energy forms, called *vāyukāy, apkāy, prithvikāy, teu kāy, and vanaspati kāy*). The other 14, including 3 species of dieties (*Devas*), 10 of *Asurs* and 1 of hellish beings (*Narakis*) in the seven hells, are not considered here, because not much is known about them. We thus confine here to the first three categories (molecular structures, plants and creatures), mentioned in Table 2, but the same argument can be applied in other cases.

Jain philosophy considers *vāyukāy, apkāy, prithvikāy,* and *teu kāy*, which must be translated as gaseous, fluids, solids and energy bodied organisms in its classification scheme. In comparison, modern medical science recognises only two states of living beings: alive and dead (non-living), but Jain doctrines mention a graded sequence from non-living to living termed as *Jad* (*Ajiva*), *Nirjiva*, *Achitta*, *Sachitta*, and *Sajiv*. *Jad* has no potential of ever being converted into the other catagories, but several stages exist between *Achitta* to *Sachitta*,

having an increasing degree of consciousness (*chitta*), all being interconvertible from one form to another, till a soul enters *sachitta* and makes it living (*sajiva*). When the soul leaves the body, it becomes *Nirjiva.* This sequence is based on increasing orderliness (or increasing negentropy) as has been discussed elsewhere (Bhandari, JASP-2). In this classification presented here, *sachitta* and *sajiva* are distinctly different. For the sake of clarity and for understanding the functional behaviour, we can divide all these forms in 4 catagories:
1. Achitta: chaotic or random, unordered, but potentially organisable, molecular structures
2. Potentially or feebly *Sachitta* : ordered molecular chains but without a stable independent structure:
3. *Yoni*: Fully developed *sachitta* structure, a receptacle suitable for a soul to enter and capable of sustaining and growing a body (*aharak sharir*) by supplying all its requirements. In case of bisexual reproduction, it can be considered as a pre-zygotic stage. Here we assume that different Yonis produce different species i.e. as many yonis, as many species.
4. *Sajiv*: Presence of soul in the structure makes it alive.
Sachita is one which possesses *chitta* or consciousness (order) and Achitta means random or devoid of consciousness. Thus we have entities with different levels of consciousness: Sajiv, Sachitta , Achitta, and Nirjiva, which represent inter-transformable states. A grain of wheat for example illustrates this sequence: Sprouted grain is sajiv, Dry grain is *sachitta* i.e. capable of becoming a yoni and therefore called *yonibhut*, Crushed grain – *achitta* means it can never become a yoni.

6.2. Available material in the Universe

We now discuss the availability of various types of materials in the universe. Big Bang is the most favoured theory for the origin of the universe. A few nuclei, H, He, Li are synthesised in the nuclear processes that occurred in the Big Bang universe but the heavier elements, beyond carbon, were synthesised in stellar nucleosynthesis, in large stars (Burbidge, Burbidge, Fowler and Hoyle, 19757); see Bhandari, 2017 for a popular account). These nuclei combined later with electrons, due to electromagnetic forces and formed elements and then molecules under suitable conditions by electro chemical bonding and, in turn, formed inorganic compounds, minerals, and aliphatic and aromatic organic compounds. The number of elements so produced due to nuclear reactions in Big Bang and stellar nucleosynthesis are limited. In all we have only 92 stable elements from Hydrogen to Uranium, but there may be some more unstable elements going up to atomic number 118, with about 2000+ isotopes, which eventually give rise to 3000+ minerals, several thousand compounds, both organic and inorganic, dozens of gaseous species, some liquids and rest all solid rocky matter under thermal and pressure conditions prevailing on the earth at different times. These make up the Earth, atmosphere, oceans, etc. and is the total material available from which formed the large organic compounds which act as the building blocks of life, the basic ingredients required for living species. As such all the 92 elements in nature are required for sustaining human body but the most important elements (abundance by mass) are Oxygen (65%), Carbon (18%), Hydrogen (10%), Nitrogen (3%), Calcium (1.5%) and Phosphorus (1%). On trace level, Potassium, Sulphur, Sodium, Chlorine, Magnesium and Iron also play a vital role.

6.3. Chemicals required for life processes

Once, ringed organic molecules are formed, processes like polymerisation, lead to formation of suitable chain compounds like peptides, proteins, amino acids, enzymes, sugars, chromosomes, RNA, DNA etc. required for life to form and sustain. We recount here some of the common chemical processes leading to these complex molecules.

Dehydration is the main process by which polymerization generally occurs. In this process, one H^+ ion is removed from the amino terminus, and an OH^- group from the caroboxylic terminus and the two combine to form one molecule of water. A chain consisting of 15 or fewer amino acids is called a peptide chain which in turn can form longer polypeptide chains. A protein is a chain of amino acids. A polypeptide chain commonly forms a spiral structure, called α-helix that has positive helicity and contains amino acids. Another common protein structure is the β structure, in which two or more parallel or antiparallel chains are stabilized by hydrogen bonds between chains. Proteins form tissues. Globular proteins, which include the vast group of catalytic proteins called enzymes, contain alternating α helix and β structure.

In coenzymes, the core usually is a metal ion. Chelates (cytochromes, a group of enzymes) are compounds that can grab and hold for future release an atom or group of atoms. Polymerization of amino acids on the primitive Earth may have taken place on the beaches, where the tide would have caused alternating wetting and desiccation, and where UV radiation from the Sun can provided the energy needed to break and form chemical bonds. It is believed that all sorts of proteins, including enzymatic proteins, formed and were carried to the ocean by the waning tide. The ocean thus became a sort of "primordial soup" in which the concentration of organic compounds may have reached 10^{-4} molar. It seems that the ancient beaches, inlets, bays, and ponds of the world were suitable places where life could have emerged. The ordering of amino acids in protein chains is arranged by nucleic acids, the repositories of genetic information. The nucleic acids, RNA (ribonucleic acid) and The dominant gases in the earliest atmosphere were (in order of abundance) CH_4 (methane), H_20, N_2, NH_3 (ammonia), and H_2S. Life probably originated when methane was still the dominant gas in the atmosphere. That is suggested by the famous Urey-Miller experiment discussed above (Fig. 2).

It is to be noted that only a limited number of molecules are formed in this reaction, no matter how long one waits. This is easily understood because the number of input compounds and types of environmental conditions are limited. Thus we see that a limited number and types of ingredients and limited environmental combinations, can result in only a limited number of processes, governed in turn by the few rules of combinations based on electrical bonding, determined by the forces of nature, and lead to only a limited number of products.

It should be emphasised that no living cells were synthesised in the Urey-Miller experiment howsoever much time was given. Taking clue from Jain *Shriṣṭivād*, we can say that living cells were not formed because the molecules could not organise themselves to form Yonis. Jain model requires a *sachitta* yoni and an appropriate soul for synthesis of a cell. Urey-Miller process produces material (jad) products, not suitable for a soul to occupy to make them alive. Thus forming a living cell is a complex, multistage, highly improbable process: Supply of basic material ingredients are required, and then this matter should organise into a suitable structure, the structure should become a sachitta yoni by incorporation of chitta, and then becomes sajiv, by incorporation of an appropriate soul.

Following the above arguments, we propose that it is for this reason that number of yonis suitable for sustaining life is also limited, and is estimated at 8.4 million in Jain and Hindu scriptures.

Every living being needs energy for various processes that sustains it. The Earth has two sources of energy available: external energy (i.e., the Sun) in form of photons and internal energy which can be chemical or thermal.

As soon as the early atmosphere of the Earth began forming, photolysis-the dissociation of molecules by light- began splitting H_2O into H (which escaped) and O (which went to oxidize CH_4 to CO_2). In a short time, all CH_4 was transformed into CO_2. At the time, the sky was red, and the Sun was bluish. The earliest photosynthesizing organisms had to use that kind of optical spectrum. The descendants of those earliest photosynthesizers may be the modern extreme-halophile archaebacteria, which use only chloropbyll-a. Cbloropbyll-a uses red light (peak absorption at 680 nm) and blue light (peak absorption at 440 nm). Earth, however, had abundant liquid water. In the presence of water, CO_2 reacted with silicates to form carbonates. As CO_2 was removed from the atmosphere, the sky turned blue. Then Chlorophyll-b was adopted, which uses blue light (peak absorption at 490 nm). The prokaryotic Prochlorophyta and all higher photosynthesizers use mixtures of chlorophyll-a (70%) and chlorophyll-b (30%).

We now describe some details about the role of various elements and different types of chemical reactions, leading to life forming molecules, like nucleotides, aminoacids, sugars, RNA, DNA etc. Life is based on the properties of carbon and nitrogen, each of which can assume eight oxidation states (from C^{4+} to C^{4-}; from $N^{3+}$to N^{5-}). The major component elements of living matter are, in order of abundance, O, C, H, N, Ca^{+}, P, K^{+}, S, Na^{+}, Cl^{-}, Mg^{2+}, and Fe.

The amino acids are a family of relatively simple organic compounds characterized by a common, monovalent NH_2-CH-COOH group, with side groups attached to the C of the CH segment. Amino acids can link to each other by dehydration. DNA (deoxyribonucleic acid) are polymers consisting of nucleotides. A nucleotide consists of a pentose sugar with a PO_4 group attached to the 5' -C in the pentose ring (meaning the carbon in position 5), and one of the four bases (adenine, cytosine, guanine, and uracil in RNA; adenine, cytosine, guanine, and thymine in DNA).

The pentose sugar is ribose in RNA and deoxyribose in DNA. The difference is that the DNA pentose has an H attached to the carbon in position 2 instead of an OH as in RNA. The bases are ring structures that are either single (pyrimidines) or double (purines). The purine bases are adenine and guanine; the pyrimidine bases are cytosine and uracil in RNA, and cytosine and thymine in DNA.

Phosphorus is present as apatite, which is quite stable in the terrestrial environment. For phosphorus to go in protein chain requires reducing conditions that existed on the initial Earth environment. Incidentally the core of the earth contains not only Ni and Fe but also P, S and C. Reduced phosphorus compounds occur as NiFeP and are known to be present in asteroids.

Sugars are readily formed from the polymerization of formaldehyde (HCHO).

If the base is adenine, the nucleoside is called adenosine, and the nucleotide is called adenosine monophosphate (AMP). The addition of a second $-PO_3$ group makes AMP into ADP (adenosine diphosphate), and the addition of a third $-PO_3$ group makes ADP into ATP (adenosine triphosphate). Bond energy between the first and second phosphate groups is 0.33 eV, and that between the second and third phosphate groups is 0.32eV. These bonds are weak because the negative oxygen ion in each bound PO_3 group strongly repels its equivalent in the next group and therefore these bonds can be broken by simple hydrolysis. This is the reason that nature has chosen ATP as the molecule responsible for storing and releasing chemical energy.

The formation of primitive RNA is particularly critical, because RNA can be autocatalytic, which means that it can catalyze its own duplication without the help of enzymes.

Carbohydrates are molecules consisting of C, H, and O atoms. The fundamental carbohydrate is glucose ($C_6H_{12}O_6$). Lipids are a family of substances that include carboxylic acids (also called fatty acids) and their complexes, glycolipids and phospholipids. Thus we see that all the important chemicals required for life can be formed in a simple way, but yoni is a structure which cannot be easily made, and without yoni, a living species cannot be created.

6.4. Fixed number of species

We will now show that the above constraints allow only a limited types of species, mentioned as 8.4 million in Jain, Bauddha and Hindu darshan, and point out various difficulties in Darwinian evolution (Darwin, 1862) of species within the framework of *Shriṣṭivād.*

The proposed model is based on the following three conditions:

(i) **The number of available raw ingredients** (organic molecules, or the so called building blocks of life) are limited, because the chemical elements occurring in nature and the number of ways they can combine are limited in addition to the constraints posed by laws governing their synthesis in nuclear reactions, i.e. nucleosynthesis, and subsequent formation of various compounds by laws of electrovalency.

(ii) **The minimum number of functional organs** required by various types of living organisms. We have shown that a minimum of four organs of input, metabolism, excretion and sense of touch, working in mutually synchroneity are required for the most elementary organism. This number increases significantly for advanced creatures like mammals and humans (Figures 5).In Jain darshan these requirements are termed as Paryapti. A maximum of six parayptis are required for a highly developed living beings, like humans: 1. ahar (food),2. sharir (body),3. indriya (sensory organs, minimum one of touch, i.e. skin and maximim 5, i.e. touch, taste (tongue), smell (nose), optical (eyes) and sound (ears)),4. shasochawas (breath), 5. bhasha (vocal) and 6. mana (mind).

(iii) **The mechanism of birth of living species**. For example, in case of humans, modern medical science assumes a two body process involving a male and a female, whereas in Jain darshan the birth is a five body problem, involving a soul, a karman sharira, a suitable yoni fertilised by the union of a male and a female parent.

We first discuss the fixed number of species8.4 million ,no more ,no less (or their families)Table 2 (exist and the factors responsible for limiting this number .If we follow the dictum that‘ whatever can happen will happen ,’then such types of species must have simultaneously existed when the universe was formed or from the very beginnIf the universe is beginningless and endless as in Steady state theories ,then ,the species are also eternally existent in the universe.

It seems a reasonable proposition, considering that

1. the number of elements (92) and compounds (several thousands) that exist in nature is fixed,

2. The environmental conditions on different habitable planets can only vary between a limited types (see e.g figure 8 for earth), because the types of atmospheric constituents (gases) are fixed.
3. The number of organs required by different species required for living beings to sustain are also limited in number, as discussed above.

Another fundamental feature of Jain theory of speciation is that it propounds natural creationism, and not divine creationism or Darwinian evolutionism. It implies that all these 8.4 million species have always existed in the universe, somewhere or the other, and will remain so, whereas the fossil record implies that the species have evolved from a monocellular organism like algae through a evolutionary chain of organisms to humans.

Thus there are four main differences between Jain philosophy and modern theories as listed in Table 1.

Two illustrative examples can be given in support of fixed number (8.4 million) of species (Yonis), in view of the limited number of ingredients available. A crude but apt example is the kitchen:

It is well known that only a fixed, and not unlimited, number of edible dishes (product) can be prepared from a limited number of grocery items (availability). In the light of this example, since number of ingredients for production of yonis are limited, only a fixed number of yonis can be formed.

The second case is the classification of crystals of minerals in which each point group defines a so-called (geometric) crystal class. In general infinite three-dimensional point groups are possible. However, the crystallographic restrictions result in there being only 32 crystallographic point groups. Similarly, symmetry or repetition of something in space and/or in time, limits the options. There are translational and rotational operations by which the motif can be repeated. Additionally, there are symmetry planes (reflection planes, or mirror planes, inversion symmetry, reflection symmetry, etc.). In crystals, the rotation axes can only be two-fold, three-fold, four-fold or six-fold, depending on the number of times that a motif can be repeated by a rotation operation. Thus, in crystals symmetry axes of order 2, 3, 4 and 6 are possible resulting in only 32 point groups. Thus, only a fixed numbers of functional yonis can arise from the limited number of ingredients and rules of formation of structures etc.

Take for example vayukayik jiva: only about a few hundred types of gaseous molecules are available which can form molecular chains according to the laws of electrochemical bonding (valence etc.).This turns out to be 350 basic yonis (Table 2), excluding superficial characteristics like colour, smell, taste, touch, etc. according to Jain philosophy, considering universal environments and physical conditions of temperature and pressure. The same number i.e. 350 basic yonis are given for simple life-forms of liquids, solids and energy bodied jivas which reduces to 200 for jivas with 2, 3 or 4 sensory organs, which require more organs. In case of humans, with psychic capabilities, a larger variety of 7000 basic yonis is mentioned (Table 2). The reason for this increase requires further study.

In summary a fixed number of species (8.4 million, in all) under all the environmental conditions existing all over in the universe are possible as stipulated in Jainism, depending on supply of various chemicals to fulfil the basic needs of sense organs (1 to 5) without which the species cannot be born or survive. This is a probabilistic, environment dependent mechanical

calculations of producing viable yonis or receptacles for soul. The basic requirement of input(food), output (excreta), sense organs from 1-5 senses and the maximum number of 92 elements which exist in nature and the various compounds which make the environment reducing or oxidising, or supply of water and other nutrients (phosphorus, energy, e.g.) puts a severe limit on the number of species which can self-sustain or can take birth.

6.5. Chemical evolution of the atmosphere

Chemistry of atmosphere, oceans and earth rocks changed as the earth cooled due to geologic evolutionary changes. In case of metamorphism in rocks, the same elements in different set of physicochemical conditions produce different set of minerals. if the temperature-pressure conditions during the history of earth have changed, the elements of pre-existing minerals get mobilized and form new set of minerals. The same thing holds true when the set of environmental conditions change due to asteroid/cometary impacts or due to volcanism or magnetic reversals or ice ages etc. Equally important is the question of the energy received from the Sun, since it is believed that the sun was much fainter in the beginning (Archean period) compared to the present, pushing the earth into periodic glaciation (Catling and Zahnle, 2020). The various elements required for life form different types of yonis, possible under the prevailing physico-chemical conditions.

The environmental changes had a significant effect on the types of species existing on earth and their survival.We therefore discuss changes in the atmosphere, and surface rocks. The atmosphere was anoxic when the earth was formed 4.5 billion years ago and was rich in methane, ammonia, carbon di oxide, water, hydrogen etc. Methanogens are responsible for the high abundance of methane on the early earth. Negligible amount of free atmospheric oxygen in the beginning continued for a long time and oxygen became abundant, half way over the history of the earth, about 2.3 billion years ago, with the advent of Great oxidation event. The major jumps in the atmosphere composition (partial pressure) of methane, carbon di oxide, nitrogen and oxygen are shown in figure 8 (Catling and Zahnle, 2020). Nitrogen concentration in the atmosphere varied only slightly, but photosynthesis, escape of hydrogen, and spread of land plants brought in major jumps in oxygen abundance and conversion of methane in to CO_2. The thermal state of the atmosphere (in degrees Kelvin) changed bringing in major glaciation events on Earth

Combining the fossil data with the thermal conditions on the earth reveals major events shown in Figure 9. It may be noted that the Cambrian explosion in number of species witnessed about 540 million years ago may be a consequence of major chemical changes and availability of some elements necessary for formation of muscles, which gave rise to mobile species. Thus we come to the conclusion that the history of life on earth as revealed by the fossil records has occurred in synch with environmental chemical changes, and may be as a consequence of such changes.

The conclusions from the above discussion is that

(i) With limited number of ingrediants (chemicals) available, and with minimum requirement of organs required for living organisms, only limited yonis can form.Whether it agrees with the numbers given in Table 2 requires further study.

(ii) The types of yonis (or species) at different times in the geologic history may be determined by the chemical evolution of the earth's environment and may mimic the fossil sequence in sediments. It does not necessarily reflect the inter-species evolution.

6.6. Shriṣṭivāda with intra- species evolution:

Considering the above data, which are based on well documented observations, we now propose a hybrid model, a modified *Shriṣṭivād*, by including limited intra-species evolution but without inter-species evolution. This implies that a species can evolve from one type into another within its *Family* or *Genus*, but cannot, due to physical stress, evolve into another type of species, outside of its *family/genus*.

6.7. Alternative to Darwinian evolution

Another basic data to be explained is the fossil record in sediments and for this purpose we propose the following in light of the Jain theory of birth, which requires appropriate yonis: Yonis are physical, non -living, *achitta* structures, but can become *sachitta* and *sajiv*, capable of providing everything a particular species requires for sustenance and development.

1. Fossil sequence in sediments is nothing but reflects and mimics the chemical evolution of the planet, Earth in our case. To begin with the earth had methane-rich reducing environment in which only some single cell species (blue algae) could exist and survive. With further changes in the environment and as oxygen and other elements, like phosphorus, calcium etc required for new species became available, multi cellular species, animals, birds, plants, trees and humans came into existence. In reality it is the chemical evolution of the earth providing a suitable structure for birth of a particular species to take place, rather than this species evolving itself from single cell to multicellular species etc. in the sequence given above.

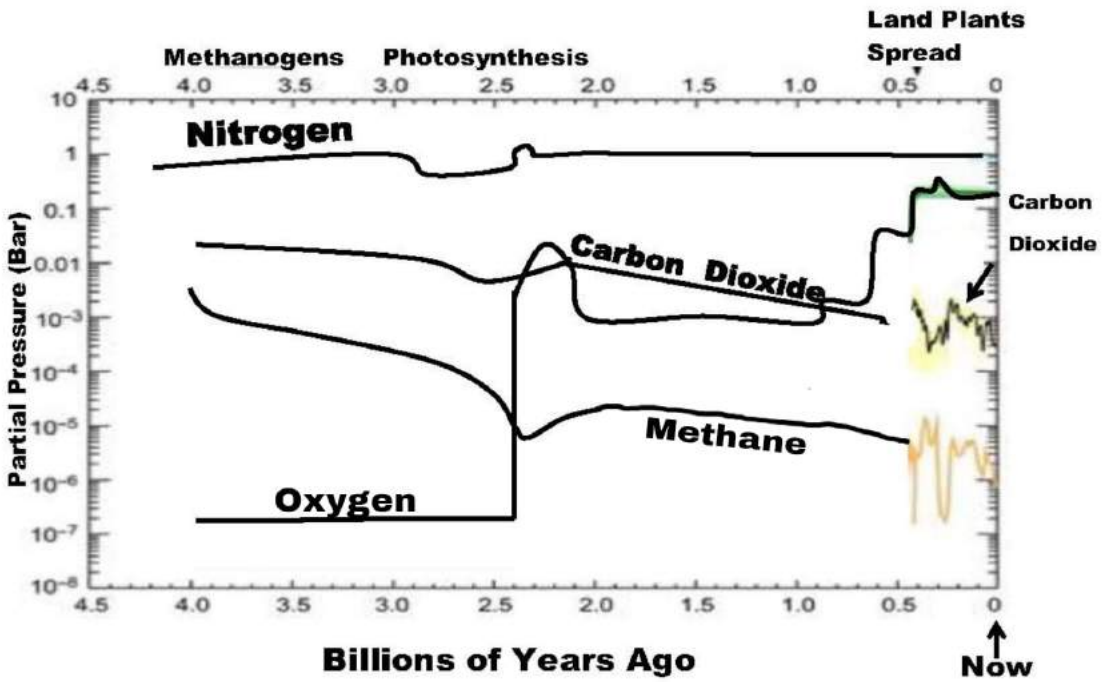


Fig. 7. Partial pressure of O_2CO_2 ,and CH_4 in the earth's atmosphere estimated as a function of time (from Catling and Zahnle , 2020). Uncertainties in these curves have been ignored for the purpose of discussion here and the reader may refer to the original paper by Catling and Zahnle (2020). The Great Oxidation Event, by which the atmosphere changed from reducing to oxidising occurred about 2.3 billion years ago.

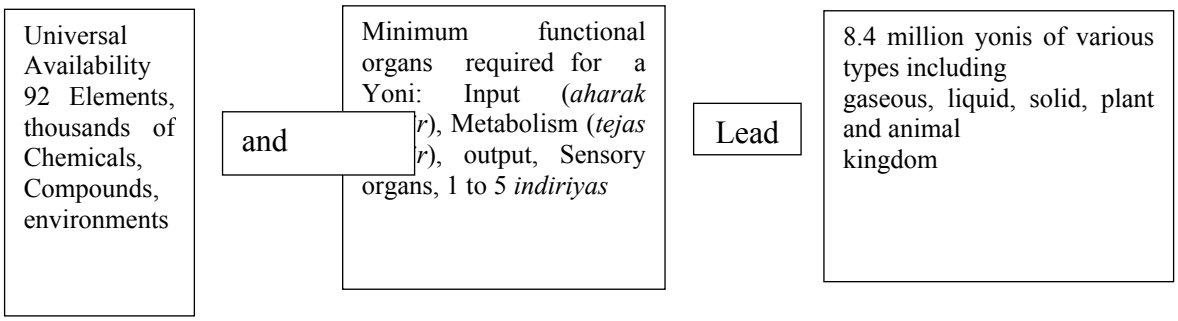


Fig. 8. Schematic shows that the formation of a fixed number of yonis (right) depends on the ingredients available and organs required.

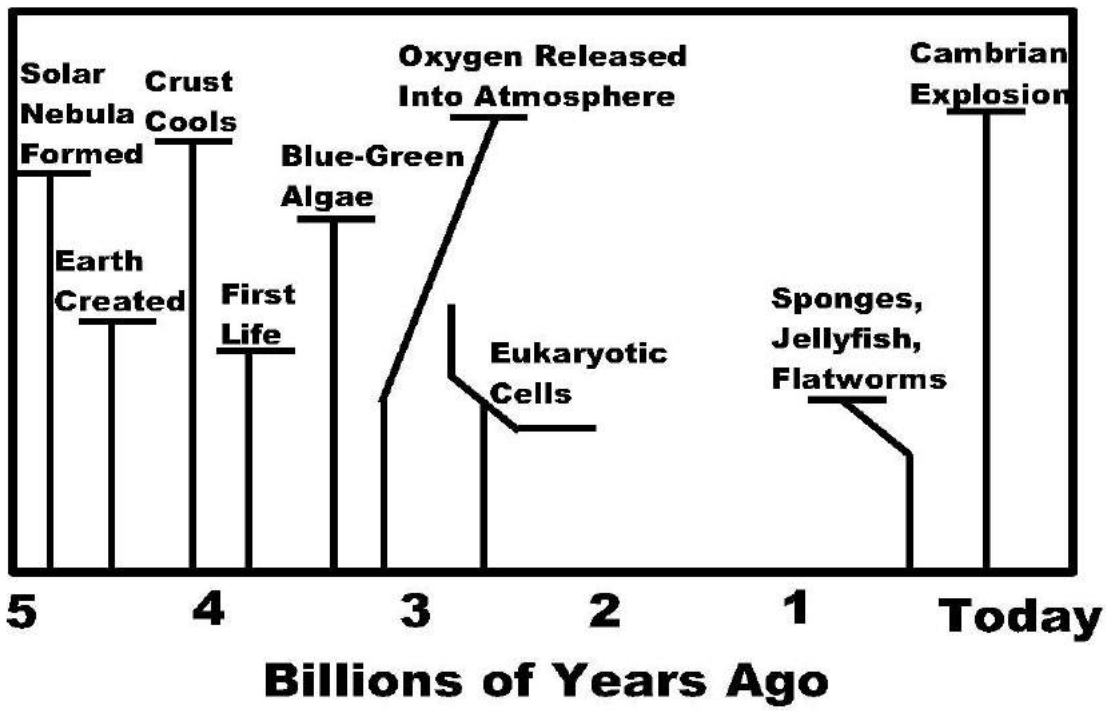


Figure 9. Major events in geological, biological, and environmental history of the earthsince it was formed 4.5 billion years ago from solar nebula. The earth had reducing atmosphere in the beginning, as shown in Fig. 8, when life originated (from Catling and Zahnle , 2020).

2. fossil record can be understood if the environmental conditions evolve in such a fashion such that only a certain type and number of species can find suitable conditions of birth and survival. The fossil record mimics the chemical evolution of the earth and gives a false impression of evolution of species.
3. Darwinian evolution is valid to a limited extent in intra-species evolution but not in inter-species evolution. For example a bird can grow a long or short beak or large or small wings and evolve or devolve into each other, by Darwinian principle of natural selction and survival of the fittest by struggle for existence, but cannot convert into a

mammal, which not only requires evolution of certain existing organs, but all together new organs. Supply of chemicals which produce strong muscles (calcium for bones and marine shells; phosphorus for muscles, ATP etc.) and a suitable yoni is required for such a transformation.

4. Neo-Darwinism through genetic changes can also be understood as a consequence of chemical evolution of the earth environment.

An overview of post-Archean physical (temperature) and chemical evolution of earth reservoirs in the context of biological evolution show that nitrogen may have tracked O_2 levels due to an oxidative weathering and denitrification source of N_2. Methane was oxidized as O_2 rose but could have been protected subsequently under an ozone layer, depending on post-Archean CH_4 sources. The secular decline of CO_2 is attributed to geological carbon cycle induced by decreasing solar luminosity. Cenozoic glaciations have been determined to occur at a global mean temperature below ~20°C. Archean glaciations suggest a more conservative 25°C upper limit. Low CO_2 during the Phanerozoic correlates with glaciations, such as Carboniferous-Permian events, 335 to 256 Ma ago. Precambrian greenhouse gases must have also fluctuated. Here we follow the discussion of Catling and Zahnle (2020) in which they have summarized the changes in the atmospheric composition from Archean to the present (Fig. 8 and 9).

The above propositions would require further observational proofs and evidence and much work is required before it becomes a viable and acceptable model. If supported by chemical evolutionary history of the earth as the dominant cause, this can resolve the major issues related to Jain and modern theories of living species. Available chemical and physical conditions can activate corresponding genes and can give rise to new yonis, in which appropriate souls (with *Karman* and *Tejas shariras*) can descend and occupy to give rise to new species, which will mimic the fossil records.

7. Conclusions

We show in this paper that intra-species (without inter-species) Darwinian evolution, i.e limited *vikāsvād*, and Jain *Shriṣṭivāda*, in which formation of various types of yoni's depends on the availability of basic material ingredients, can best explain the fossil records in terrestrial sediments over the geologic history of the earth. We follow the Karma based model, described in the Jain texts, according to which when a karmic soul enters an appropriate yoni, it give rise to birth of a *jiva*.

Karmic soul+ Yoni = jiva

One of the main features of *Shriṣṭivād* is the fixed number of species, which we explain by proposing that types of yonis are limited because of limited types of ingredients available in the universe and minimum organs required for various species. The proposed speciation model leads to the following corollaries:

1. Various species are born in a three step process: (i) formation of an appropriate yoni, (ii) descent of a karmic soul into it, and (iii) Based on its compatibility with the yoni's characteristics, it grows into a particular species.
2. Darwin's evolutionary sequence reflects the sequence of formation of different types of yonis with time on Earth, which in turn reflects the physical and chemical evolution of environmental conditions, supply of ingredients etc. This sequence apparently mimics

the evolutionary sequence seen in fossil records. This model does not sunscribe to gradual, multi-pronged, evolution of single cell algae, ultimately to humans as seen in the fossil record.

3. Limited intra-species evolution, within the same species under environmental stress occurs but inter-species evolution, from one species to another, is not possible.
4. Karmic matter plays an important role in evolution as well as devolution from one sensed organism into 5 sensed organism (jiva) and vice versa. Thus evolution is not a one-way process from lower to a higher animal but can occur either way depending on the karmas.
5. It so happens that the physico-chemical conditions on the earth have changed in such a manner that it apparently appears that species are sequentially evolving, whereas in fact, only yonis (which are non-living structures) evolve as the supply of nutrition and ingredients changed on earth, with time due to geochemical and astronomical events.

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Jaina Antiquities from Tatgram, Purulia District (West Bengal)

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Introduction:

From the very beginning of civilization, rivers played an important role in the growth and development of the human settlements. The western part of West Bengal, mostly covered by the extension of the Chhotanagpur plateau, is the playground of rivers like Mayurakashi, Ajay, Damodar, and Kansavati. These rivers also played a prominent role in the expansion of settlements in this region. Similarly, the small and seasonal rivers likes Dwrakashwar, Silabati, Kumari, Harai also played crucial role in the settlement history of this area and during the recent extensive exploration programme it was possible to successfully record both Jaina and Brahmanical remains from large number of villages along these seasonal rivers.

Archaeologically, Para is one of the important blocks in the Purulia district which helps in reconstructing the early medieval archaeological profile of the district in general. In the last three to four years, authors have extensively explored this block and able to document dozens of archaeological sites. Among these sites some are already reported and few are newly documented.

The site **Para** itself is one of the important archaeological sites in this district. The site is located at a distance of about 20 km from Purulia town on the eastern bank of the river Harai. On a low mound at the center of the village are two temples, of which one is carved of stone and another is brick-built.500m. away from is a dilapidated temple constructed with brick and stone known as Raghunath temple. J.D.Beglar first reported this site and documented in details. He

reported the presence of several sculptural specimens including a solitary piece of hero-stone, at present this is unnoticeable. He also mentioned about the presence of four temples at the site in different stage of preservation (Beglar 1878/1966: 162-169). In 1903 T. Bloch also visited this site and saw a much mutilated 'Lakshmi' image in the stone temple while the brick temple in his time contained 'an image of Durga with ten arms (Bloch 1903:15). Chakrabarti reported seeing a *lingam*, a Nataraja medallion, an Uma-Mahesvara image and an unidentified female figure besides several other mutilated sculptural specimens in the brick temple now known as Chandimandir (Chakrabarti1993: 127). Another sacred spot in the village known as Yamraj *sthan* contains a mutilated specimen of a Vishnu image. Intensive survey at each and every locale in the village made it clear that besides its Brahmanical character, the site also possesses ample evidence of Jaina religious ethos. In the Raghunath temple, the fragmentary piece of the feet of a Tirthankara and another specimen of a tree with a depiction of a figure in its branching part clearly authenticate the above statement. Besides, administrative records also shed light on the presence of a sizable population of Jain communities still occupying a considerable portion of the site and its nearby area.

The present study mainly promises to highlight the following issues: 1) to briefly discuss the iconographic details of the newly documented sculptural remains from Tatgram, a newly reported archaeological site; 2) to discuss about the archaeological potentiality of the newly identified archaeological site/settlement; 3) try to emphasis on the logical uses of the memorial stones reported from this site and 4)to search for logical explanations behind the presence of Brhamanical sculptural material in an otherwise Jaina milieu.

Tatgram and its Archaeological remains

Location of the village between the two seasonal rivers Harai and Gorai flowing along the two sides of this village presents a beautiful landscape. The village is situated about 19 km north - west of Para and 7 km east of Chandankiyari –an important archaeological site in Jharkhand. The site Tatgram is full of archaeological wealth and interestingly during our recent visit at this site we discovered few Black-and-Red Ware shards from allow habitational mound at the centre of this village (Majumder 2017). This discovery indicates that the formation of this village was much earlier than what we usually consider. The area essentially forms an extension

of the Chhotanagpur Plateau region, parceled out from the erstwhile Manbhum district and characterized by a hilly western part and an open upland eastern part (Chakrabarti 1993: 116).

Jainism strongly survived in this village during the early medieval period and we documented good number of Jaina antiquities from different localities of the village. At present a substantial section of the present day population of the village is represented by the Jaina 'Sarak' community. It is interesting to mention here that during the extensive exploration in this village we also documented some remains of Brahmanical sculptures.

We found the archaeological remains in form of the sculptural fragments from the four localities of the present village. Among these localities three are situated inside the village and one find spot is located at the outside of the village near the river bed of Harai.

Locality No 1: Two Jaina images including some fragmented sculptural specimens were found outside the house of Bakreshwar Mahato **(Plate 1).** His house is located at the center of the village and constructed over the ruins of the ancient structural foundation. Both these Jaina images are very small and due to their abraded condition it is very difficult to identify them properly. Among them one is complete and measures 20 x 32 cm **(Plate 2).** This image is made of chlorite stone. The Jina is in *kayotsarga* posture and stands on a full blown lotus placed on a *tri-ratha* pedestal. The top of the back slab is crowned with a tri-liner *chatra,* each smaller than one below. The tri-liner *chatra* is flanked by the divine hands playing on drums and cymbals. The garland bearers are also neatly depicted just below the divine hands playing musical instruments. The Tirthankara is attended by the usual two fly-whisk bearers. Both the sides of the back-slab of this image is without any decoration.

The other Jaina image is half buried and the head of the Tirthankara is missing. However, the back-slab of this image shows the depiction of planetary deities, though only six are visible but it was very difficult to identify the planetary deities individually. Except these two Jaina images some sculptural fragments of Jaina images including a broken memorial stone are also reported from this locality.

Locality No 2: This locality is only 500m. west of the first locality. In front of a school building some Brahmanical and Jaina sculptural remains are kept and preserved in very bad condition **(Plate 3)**.

Among the fragmented sculptural specimens, a defaced **Jaina Tirthankara (Plate 6)** image (60 x 45 cm) was also noticed, though the iconographic features of this are completely washed out. However, from the remaining portion it is clearly mentioned that this is a Jaina Tirthankara image. Except these images there are some other fragmented specimens of sculptures belonging to Brahmanical as well as Jaina ideologies.

Locality No 3: This locality is situated in the western side of the village **(Plate 7).** During our exploration we noticed some broken sculptural specimens along with one stone pillar lying under the pipal tree of a modern religious spot known as Sasthi Tala. This religious spot was constructed over the low structural mound. The remains of the earlier brick structure are still visible near this spot **(Plate 8).** Among the broken sculptural remains some noteworthy specimens are a damaged Siva *linga*, small image of seated Jaina Tirthankara (10 x 8 cm), pedestal of a female deity (12 x 20 cm), one damaged *amalaka* etc **(Plate 9).** The undecorated stone pillar (1.50m height) is kept just outside the religious spot **(Plate 10).** The presence of this pillar indicates that there must be a temple near this locality, which survived during the early medieval period and destroyed after the abandonment of the settlement.

Locality No 4: In the eastern side of the village, near the left bank of the river Harai, there is a religious spot known as Dumai Chandi Sthan. This area is 500maway from the village located on the top of the small hillock **(Plate 11).** Though this locality is at present under religious worship but from the nature of the find spot is indicates that this area must have been used as the memorial ground during the early medieval period. We have documented sufficient evidence to support our present assumption. In this locality we have reported good memorial stone pillars and most of them are lying in the ground. We have found in all total 8 stone pillars from this area and these memorial stone can be divided in three types:

(i) Memorial pillar, top portion decorated with *amlaka* **(Plate 12).**

(ii) Memorial pillar, top portion decorated with *jhampa simha* **(Plate 13)**

(iii) Memorial pillar, upper portion decorated with figures **(Plate 14).**

Among these three types of memorial stone pillars, type 1 is more in number than the remaining two types. Five memorial pillars documented from this site belong to type 1. Among these five, the larger one measures 120 cm x 15 cm and the smallest one measures 70 cm x 15 cm. The lower portions (buried portion) of this type of pillars are undressed, the upper portions are square in plan and a projection found horizontally in the central part of the memorial pillar. The top portion of the pillar decorated with stylized *amlaka*. This type of memorial stone may have been be used to commemorate persons who had strong religious association with Jainism and Brahmanism like the *archaryas* or *gurus.* Because the decorations of the memorial pillar indicate that it has association with a temple.

We have noticed only two specimens of the second type of memorial pillar. These two pillars measure 80 cm x 25 cm and 28 cm x 25 cm (broken). Both these pillars are rectangular in plan and the top portion is crowned with triumphing lion (*jhampa-singha*). This type of memorial stone may be used to commemorate the person who was involved in warfare.

The remaining one belongs to type three. The top portion of this pillar was broken and the remaining part measures 56 cm x 20 cm. In the central part of this pillar depicts an image of male figure (Siva ?) and female figure (Parvati ?) in very low relief. In this image the divine couple is depicted as seated on a lotus pedestal. The male figure is seated on *lalitasana* posture and female figure sits on his left lap with her right leg hanging down. Due to the abraded condition of this image it is very difficult to study the iconographic features of this image in detail. This type of memorial stone may have been used for the person who was a devotee.

Observation:

In the foregoing pages authors' have tried to analyze the explored data to achieve a clear picture of the archaeological site and its sculptural remains. It is quite clear from the above data that these evidences, ascribable to the Jaina religious idiom, throw light on the growth and development of Jainism and the spread of Jaina settlements, rituals and their relationship with the sculptural art of the said site. It is quite obvious that such concentration of Jaina heritage is not restricted to these particular sites alone. There are some other sites/settlements associated with Jaina ideology in an around the Para block region. It is also worth mentioning here that during our survey in this area we documented some Brahmanical sculptural specimens, mainly Visnu

and Surya images. The presence of these Brahmanical images in the site indicates that though Jainism was very much popular in the area, Brahmanism also simultaneously marked its presence in the religious life of the people of the region.

It has a general tendency among the scholars that the presence of the memorial stones (hero stones) in the site indicates the historical processes of formation of state and society in the tribal-oriented society and presence of memorial stones (hero stones) is a matter of over emphasis and simplicity of historical objectivity. Therefore to extend the theory of interrelationship between hero stones and the processes of formation of state, as highlighted by some authorities as B D Chattopadhyaya in the context of Rajasthan may not be equally applicable for the present study area (Chattopadhyaya 1982:139-49). It is not only in the absence of epigraphic sources but also the nature and context of occurrence that suggest a regional identity, though there are elements in the form of local ruling authorities and subsequent adoption of the tribal modes of belief systems. Gautam Sengupta has also studies the historical identities of hero stones of West Bengal and has suggested that the original purpose and contexts of these specimens have gone into oblivion (Sengupta 1999:77-97). However, in the present context it may be assume that the erection of the so called memorial stones (hero stones) in the site is not always indicates the historical processes of formation of state and society. There are some different reasons behind that process and the religious association was not ruled out.

Sculptures briefly described and discussed above on stylistic and iconographic grounds may be assigned to the period between the eleventh and the thirteenth centuries CE. These, including the other stupendous sculptural remains from this district as well as other parts of the Radha region of Bengal, were products created by the fusion of the art idioms of neighboring areas of the Chhotanagpur plateau region and were laid in an essentially local matrix from which came out this distinct center of a regional tradition. These newly reported sculptures shows some local variation within the district.

The present work thus shows that the western sectors of West Bengal deserve more careful archaeological investigation in order to understand the nature and pattern of distribution of early medieval sites/settlements and of locating the regional cultural and artistic identities as well as the nature of their religious character. The sculptural remain of this site exhibit that it has some regional variation however, the influence of Pala Sena art also reflected in the sculptural

heritage of Tatgram. So both the school of art were present in a particular area reflect that though the art style restricted its stretch for a particular area but the product of this art style travelled different zones. The regional art style of this area was so strong that dynastic art not influence this style.

This type of present study indicates that micro-regional case studies are expected to throw new light on the nature of linkages witnessed by the different religious orders and art styles within a local matrix, which also help us to reconstruct an overview about the history of the socio-religious character of the region.

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CORAŚĀSTRA- (THE ART OF THIEVING) IN JAIN LITERATURE

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INTRODUCTION

Indian Society had a rich contribution to literature from the Ancient past that deals a lot about the religion, social, political, philosophical and other aspects in great detail. They based their activities on *Dharma, Artha, Kāma* and *Mokṣa* thus leading a balanced blissful life in harmony with Nature. At the same time, society was tied down by anti-social behaviours time and again leading to crimes that were punishable. Among the different forms of crime in vogue, theft (*Steya*) was common and had been specially treated much in literature. Stealing or theft is an outcome of man's natural instincts when he is unguarded by morality, ethics and legal code. The harmful activities of thieves and robbers, their characteristics, skills used, the articles stolen and the punishment given by society to them find rich description in ancient texts. Such descriptions of theft in ancient Indian literature especially Sanskrit texts and fiction have been dealt by various scholars like Maurice Bloomfield[1], K.V.Sharma[2] and K. N. Jadhav[3]. The present paper briefly gives a description of these contributions with special attention to theft in some ancient Jain literature.

THEFT IN VEDIC AND EPIC TEXTS

A study of Vedic literature reveals that from very early period Indians were disturbed by criminal activities of robbers and thieves. The *Ṛgveda*[4] makes specific mention of thieves (*steya*) RV (I.65.1) and robbers (*Taskara*) in RV (4.38.5). There were instances of theft of cattle as evident in the case of *Pāṇis* who stole the cattle and hid them in caves. *Saramā*, the heavenly bitch had discovered them on the request of Indra. RV (6.29.6) states that *Pūṣan* knew the various paths and treasures as well as thieves. The *Vājasaneyī Saṁhitā*[5] (YV) [10.79] classifies four kinds of thieves of which *Sāyaṇācārya*, the commentator describes as –

stenā guptacorāḥ taskarā prakaṭacorāḥ atiprakaṭā nirbhayāḥ grāmeṣu bandikarā malimlavaḥ।

Early law givers elaborate many details about theft as it had affected society too much. The *Manusmṛti*[6] [8.332] mentions two types of theft namely '*Steya*' (stolen in a person's absence without his knowledge) and '*Sāhasa*' (stolen forcibly from a person in his presence). *Nārada Smṛti*[7] [XIV.12-13] defines theft as an act done by fraud either openly or in a concealed manner. Theft is again declared by the wise to be of three sorts according to the value of the stolen goods, since articles of inferior, middling and superior value may be stolen. *Bṛhaspati Smṛti*[8] [XXII.2] holds that thieves are subdivided into 1000 folds according to their skill, ability and method of cheating. He states that cheats, fraudulent traders are open thieves while house breakers, robbers and stealers are secret thieves. *Yājñavalkya Smṛti*[9] [II.275] states the gravity of theft was decided in accordance with value of stolen article. These texts prescribe nominal fines, death sentences and other types of punishment according to gravity of theft committed. *Bṛhaspati* held the view that for stealing grass, wood, flowers, fruits the criminal should have his hand cut off and stealers of grain should pay fine 10 times the price of stolen amount. *Nārada* prescribes fine of 8 times the amount for stealing articles sold by weight and measure. Likewise for lifting domestic

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animals, the fine was according to its size and value. The text also prescribes punishment for cut purse or openers of knots of cloth (*Granthibhedaka*). Further the text also deals on robbers who infested a country, village or house or those who disturbed sacrificial acts. *Nārada* states that a dog's foot was branded on forehead when a *Brāhmaṇa* committed theft. Harmful activities of thieves and robbers are also mentioned in Sage *Vyāsa's Mahābhārata*[10]. The episode of Sage *Māṇḍavya* who was impaled on a stake mistaking him for a thief who dropped his stolen goods at his hut is mentioned by the text. The theft of butter and clothes by Lord *Kṛṣṇa* is well described in various *Purāṇas*.

THEFT IN POST-VEDIC TEXTS

Several Post -Vedic texts offer a rich glimpse of the art of stealing. *Kauṭilya* in his *Arthaśāstra*[11] (AS) [III.17] refers to thieves and robbers as pests of society. He distinguishes between robbery and theft. The question as to whether to regard theft as being an act in accordance to *Dharma* or whether it was *Adharma* is still puzzling as later texts show. Poet Kālidāsa says theft of precious jewels was punishable by death. In his work, *Mālavikāgnimitram*[12] he refers to highway robbery [V.90].

Founders of the science or art of Theft and their manuals

Sanskrit literature harbors a widespread tradition that there exists a Manual of thievery called '*Choraśāstra*'. A thief's manual of a systematic nature is found in the *Atharvaveda Pariśiṣṭa*[13] known as *Dhūrtakalpa* or *Skandha Yāga* that has been edited by scholars[14]. It presecribes the worship of Lord Skandha (also known as Kārtikeya). Mūladeva (also known as Karṇīsuta or Gaṇikāputra) is supposed to be an arch thief and supreme preceptor of all thieves. His story is narrated by himself to a king in the '*Kathāsaritasāgara*'[15] of Somadeva. Another story of Mūladeva is preserved in *Devendra vṛtti*[16] (a commentary) on the Jain text '*Uttarādhyāyanasūtra*'. He is known as Karṇīsuta, an author of science of thieving (*steyaśāstrapravartaka*). He is also mentioned in the '*Vetālapañcaviṁśatī*'[17] of Śivadāsa, '*Śukasaptatī*'[18] and '*Bṛhatkathāmañjarī*'[19] of Kṣemendra. The various stories of Mūladeva are dealt by scholars[20]. The '*Padacandrikā*' commentary by Kavīndrācārya Sarasvatī on poet Daṇḍin's '*Daśakumāracaritam*'[21] [*Ucchvāsa* II] mentions Karṇīsuta as an author of science of theft –

karṇīsutaprahite karṇīsutaḥ steyaśāstrakartā tena prahite pravartite।

The '*Maṭṭavilāsa Prahasanam*'[22] (580-630 A. D.) mentions Kharapaṭa as one who promulgated the science of theft. Satyasoma, a mendicant asks Nāgasena to pay reverence to Kharapaṭa as –

namaḥ khaṭapaṭāyeti vaktavyaṁ yena coraśāstraṁ praṇītam।

He further comments that Lord Buddha may be superior to Kharapaṭa in this field as he formulated his canons by gathering ideas from *Mahābhārata* and *Vedānta* texts. The Kauṭilya's Arthaśāstra AS [IV.8.24] also mentions Kharapaṭa.

The *Mṛcchakaṭikā*[23] (MC) of *Śūdraka* throws interesting details on art of stealing. Lalladīkṣitā, the commentator of *Mṛcchakaṭikā* gives such quotes from ancient works. In this text, the thief

Śārvilaka speaks about himself as being Skandha's son. From his soliloquoy as in MC [Act III], it is assumed that works on *Choraśāstra* attributed to Skandha (Lord Kārtikeya), Kanakaśakti, Bhāskaranandin, Devavrat*a* and Yogācārya existed. Daṇḍin's *Daśakumāracaritam* also describes similarly the science of burglary. He states that there was a standard book on '*House Breaking*' attributed to 'Karṇīsuta' used by thieves. He was known by the names Gaṇikāputra and identified as Mūladeva.

Tools of a thief, his methods and types of breaches

Daṇḍin's Daśakumāracaritam[24] states that a thief generally surveyed the house, carried necessary equipments like scissors (*Kākali*), tongs (*Saṁdaṁśaka*), magic powder (*Yogacūrṇa*), magic lamp (*Yogavarttikā*), hook (*Karkaṭaka*), rope (*Rajju*), casket containing bees (*Bhramarakaraṇḍaka*) for extinguishing light, or a dummy wooden head or image of a man (*Pratipuruṣa*).

Thieves are also supposed to know many charms by which they can make themselves invisible, turn water into fire, break open locks [*Tālodghāṭinī*] or to make everyone asleep in the house using *Yogachūrṇa* [magic powder] by means of the *Avasvāpini Vidyā* .

The theft was initiated by digging a tunnel or cutting a breach into the house. These breaches (*Khātra*) had special names such as *Bhāskara, Bālacandra, Vāpī, Vistīrṇa, Svastika, Pūrṇakumbha, Padma, Akāśa* and so on as stated in MC [Act III, verse 13]. The same text MC [Act III] has Śārvilaka quoting Kanakaśakti who has laid down four types of breach making processes as tabulated in **Tab. 1.**

Tab. 1. Types of houses and breaches made by a thief as in *Mṛcchakaṭikā* (MC) of *Śūdraka*

Type of house	Mode of Breach
House made of burnt bricks	Remove the bricks to enter
House made of unbaked bricks	Bricks are Flaked
Clay house	Bricks soaked or sprinkled with water
House made of wood	Cut is made to make a breach

Bhāsa's drama *Chārudattam*[25] dealing in a section on burglary gives other names of breaches not specified by MC such as those shaped like mouth of a crocodile (*Jhaṣāsya),* elephant (*Gajāsya*), tiger (*Vyāghravaktra*), Full Moon (*Pūrṇacandra*), Crescent Moon (*Ardhachandra*) and triangular. The *Buddhist Jātakas*[26] flourish interesting details on theft. In the *Mahilāmukha Jātaka* thieves describe the way to dig a tunnel into a house, break the walls. It instructs that a burglar should get rid of all goodness and virtue. The *Sattigumba Jātaka* speaks of a robber village of 500 robbers.

Lakṣmaṇa kavi in his '*Rāmāyaṇachampu*'[27] attests that the art of stealing was one among the 64 arts.

añjanaṁ naradṛṣṭestu vañcanaṁ svaravañcanam। maṇimantrauṣadhīnāṁ ca siddhayaś corakarma ca।।

An important thief manual titled '*Shaṇmukhakalpa*'[28] in the *Asiatic Society of Kolkata* has some details of art of stealing. It deals on various charms for collyriums to make one invisible, to break open locks (*Tālodghāṭana*), to put inmates of house to sleep invoking demon Kumbhakarṇa (of '*Rāmāyaṇa'* fame). There are charms to inspect treasures, for arresting (*stambhana*) of fire and water, rites to make inmates of city asleep [*Nagaraśāntikartukāmaḥ*], various magic pills [*Guṭikāyoga*]. The *Śivatattvaratnākara*[29] of Kelaḍi Basavarāja, an Encyclopaedic text defines theft as taking away by any of the several deceptive means the property of persons asleep, disordered in intellect or intoxicated [VIII.1.228]. The text states that thieves may be detected and caught by officers either by tracing their footsteps, seizing one who has been convicted already [VIII.1.229 -230]. There are different rules determining punishment for different types of thefts. A *Brāhmaṇa* should be branded and banished from kingdom [VIII.1.233]. Stealers of horses, elephants and cows are to be impaled on stakes [VIII.1.236] while punishments like cutting of hands, feet or awarding death are prescribed for stealing articles like gold, precious stones and clothes [VIII.1.239-241]. The '*Dharmacauryarasāyaṇa*'[30] of Gopālayogīndra is brief work in about 275 lines in which the ethics of thievery are highlighted in a tale of a brahmin thief named Dharmasaṁgrahin. It was composed either in Andhra Pradesh or Tamil Nadu perhaps not more than 200 or 300 years ago. It propounds '*Steya*' (or theft) as a Dharma based on the *Śāstra* principles involved in finding the proper place and locations for burglary, the time involved and so on as king Dharmaketu is led by the brahmin into the city pointing out various houses that could be robbed and the latter stating that wealth stolen in these houses had to be earned by righteous means. Only then could a thief could rob them. Finally this leaves the king's palace itself that can be robbed. Several other aspects of this work have been dealt by scholars[31]. The '*Dhūrtākhyāna*'[32] of Haribhadrasūrī mentions four rogues (or thieves including Mūladeva) meeting at an old park north of city of Ujjain narrating their experiences.

THEFT IN JAIN LITERATURE

The Jain canonical texts consists of the 12 *Aṅgas,* 12 *Upāṅgas, Chedasūtras, Mūlasūtras and Chūlikasūtras* with their commentaries. Of these, the texts speak on several aspects of the art of stealing that are dealt as below.

The '*Uttarādhyāyanasūtra'*[33] (UDS) [9.28] mentions several types of robbers and burglars. It states that robbers were experts in making breaches in the walls of houses like *Kavisīsa* (*Kapiśīrṣā* – Cornice shape), *Kalaśa* (pot), *Nandāvarta* (flower or fish shape), lotus and other human shape. The *Vṛtti* (commentary) of Devendra on the same text UDS mentions the story of robber Maṇḍiya of Beṇṇāyada who worked as a tailor during day time and robbed during the night. He smeared his knees with ointment on the pretext of having some sores and walked with support of a wooden staff. By night, he dug breaches into houses, depositing the stolen goods in an underground cell outside the town. Close to the cave in the outskirts of the city his sister dwelt who pretended to wash the feet of those who carried the loot from underground cell into the cave, pushing them to death inside the well in the cave. One day Mūladeva who had learnt of the citizen's complaints came to the place. Hiding at night there, Mūladeva tricked Maṇḍiya and bought him to the king who then sought his sister's hand in marriage for a dowry. The king cleverly procures all the stolen goods on this pretext and then impales Maṇḍiya.

The '*Bṛhatkalpabhāṣya*'[34] mentions about thieves who destroyed ships, extracted money at the point of sword and entered into residences of monks.

Another Jain text namely '*Vipākasūtra′*[35] (known as *Vivāgasūya*)' gives description of torture instruments to thieves in prison like iron jars filled with copper, jars containing urine of animals, fetters, wooden frames to fasten feet, whips, stones, clubs, ropes and so on. It also mentions about a robber settlement (*Chorapalli*) in the dense forests of *Sālāṭavī*, a place north of *Pūrṇimatala* city. The '*Vipākasūtra′* also elaborates on the details of this hideout and states that it was impregnable, surrounded by bamboo thickets, boulders, gorges and natural waterfalls. It was an unapproachable mountain ravine having caves and secret passages for entry-exits and also having its own water supply. The text further elaborates that bandit leader Vijaya was the undisputed leader of 500 thieves in *Sālāṭavī*. He was proficient in aiming objects by hearing sound [*Saddavehī* or *śabdabhedī*]. The text states that Vijaya taught several magical spells of art of stealing to Cilāya, a slave boy of merchant Dhanna of *Rāyagiha* [*Rājagṛha*] who joined his gang. The '*Vipākasūtra′* also has another interesting episode of *Choraśāstra* while narrating the story of thief Abhagnasena and his 500 bandits. He also lived in *Sālāṭavī* hideout. The text mentions several rituals performed by robbers for success of their mission. These include a sumptuous banquet with various food delicacies, some ritual marks applied on the forehead for success, followed by the ritual of '*Ardhacarma Ārohaṇa′* [riding over wet leather] and finally equipping themselves with iron armour and weapons. Ācārya Abhayadevasūri commentating on these rituals states that '*Ardhacarma Ārohaṇa′* was an auspicious ritual to remove all possible hurdles conveying the bond of unwavering resolve.

Another Jain text '*Nāyādhammakāhao*'[36] narrates some other episodes of the thief Vijaya. It adds that Vijaya kidnapped Devadutta, son of Dhanna and threw him in a well where he died. Dhanna also was in prison for some reason wherein thief Vijaya also was caught and both were together bound by feet in same wooden frame. This incident shows how thieves were punished. After Vijaya died, Cilāya became a ring leader of bandits and attacked city where Dhanna lived. He recited spells to open locks of the gates [*Tālugghādanī vijja*], took out water from his water bag [*Udagabatthi*] and sprinkled it over the doors. When they opened, he looted the wealth of citizens and kidnapped Dhanna′s daughter. The text further adds that a thief who had murdered the daughter of Dhanna to steal the ornaments was punished by blows showered on his body, binding him behind with ropes, suspending the stolen ornaments from his neck and leading him to the city square amidst the beating of lashes with whips (*kasalayachiva*), sprinkling dust, ashes and filth on his body, then putting him in prison tying his feet to a wooden frame (*haḍibandhana*). He was deprived of food, drink and beaten with lashes thrice a day leading to his death finally.

The Jain text '*Ācārāṅga Cūrṇī′*[37] mentions about a priest who robbed a purse of a merchant containing wealth. Such robberies were termed as '*Ganthibhedhaka*' in Jain literature.

Jain text '*Paṇhavāgaraṇa ṭīkā′*[38] mentions 7 types of robbers and 18 ways of encouraging theft. The '*Praśnavyākaraṇa Sūtra′*[39] in the third chapter titled '*Udattādāna*' elaborately deals on stealing in the form of conversation by Sudharmasvāmī to Jambusvāmī. Stealing is defined as worshipping a thing that belongs to someone other than the self without the owner's permission or his knowledge. It mentions four types of stealing namely 'Stealing things of owners' [*Svāmi Adatta*], 'Stealing life or limbs (taking away life)' [*Jīva*], stealing from teachers [Guru] and stealing from *Tīrthaṅkara*. These can also be based on the thing stolen (*Dravya*),

place (*Kṣetra*), time (*Kāla*) and the intent or cause for stealing [*Bhāva*]. The text elaborately also gives description of thieves stating that they reside in hilly areas, move about in odd hours in cremation grounds, forests, ruins, stone huts and undulating areas. Sometimes they lived on flesh of wild animals and roots or had to consume half-burnt corpses. They wore turbans of black, red, green, yellow or white colors. The '*Praśnavyākaraṇa Sūtra'* also mentions 30 synonyms of words meaning 'stealing' or 'theft'. The text also mentions about sea robbers (pirates) who waved black and white flags at other ships and robbed sea travelers.

The Jain text '*Kāma Kumbhādikathāsaṁgraha'*[40] mentions about a prince named Baṅkacūḍa who turned as the chief of thieves, taught new methods of stealing to several bandits and was transformed by an ascetic who mentioned four vows to him leading him to a noble life later.

The Jain '*Pārśvanāthacarita*'[41] (PNC) mentions about seven kinds of thieves. It also mentions about how thieves enter a king's palace by means of unknown magic spells called *Kṛṣṇākṣara* as well as some lock breaking charms. PNC [I.570ff] narrates the story about a person Skandila well versed in magical charms and teaches a thief being pursued by the king's guards for having stolen a jewel casket. The thief acquires '*Adhiṣṭhāyinividyā*' and obtains a celestial car, poses himself as a *Vidhyādhara* holding on top of the rope near a tree and threatens the guards by holding a big stone stating that he would throw it down on whosoever injured his teacher Skandila. The soldiers inform the king who comes and learns how Skandila became his teacher. PNC [2.619ff] describes the story of a thief Mahābala who comes from a good family, loses his relatives and leads a dissolute life as a gambler and becomes a thief. He was accused by the king's guards when another thief who was pursued for theft of a jewel casket dropped it in front of him. They beat him with staffs and lead him to execution. PNC [6.447ff] mentions a merchant's son Vasanta who was spoilt in bringing up committing certain acts that make his father to drive him away from home. He becomes a vagabond beggar, sleeps in temples and becomes addicted to vices leading to committing theft. PNC [7.148ff] has a prince making signal to four thieves (known as *Caurasaṁjñā*) gaining their confidence, tricking them out of their valuable loot. PNC [8.124ff] describes the story of thief Bandhudatta who tries to rescue his wife Priyadarśana captive with a *Bhilla* chieftain named Caṇḍasena. Both Bandhudatta and his uncle Dhanadatta who are put in prison for stealing a jewel casket marked with king's name are cleared of suspicion after confession and freed. PNC [2.46ff] describes that theft is worse than murder. PNC [8.236ff] describes the story of Śrīgupta, son of a wealthy merchant who was honored by the king but goes down as a thief due to evil association. PNC [2.439ff] gives a story of a mother Candrā and her son Sarga who then curse each other and are reborn as daughter and son of two merchants. Innocently both get implicated in an act of a thief and are impaled on a stake. PNC [6.458ff] mentions a thief who enters a king's palace by means of a magical spell called *Kṛṣṇākṣara*. PNC [8.157ff] mentions a thief using a lock-breaking charm.

Jain texts also narrate story of thief Rauhiṇeya who during the reign of king Śreṇik led a gang of bandits. The '*Rauhiṇeya Carita'*[42] (RC) of Devamūrti (undated) mentions about the conversion of a thief named Rauhiṇeya who hails from a family tradition of thieves. After his father died he is urged by his widowed mother to take up the profession. She arranges *Nyuñcanas* (some arrangement of decorations probably), lamp with seven wicks and applies the caste mark on his forehead giving her blessings as stated in RC [122] –

nyuñcānāni vidhāyāśu pradīpaṁ saptavartibhiḥ। vidhāya tilakaṁ mātā putrāyetyāśiśaṁ dadau।।

Rauhiṇeya was the son of Lohakhura and Rohiṇī. Lohakhura was in turn the son of Rūpyakhura and Rupyakhurā thus indicating a family tradition of thieves. Rauhiṇeya lived in one of the several families of thieves that dwelt in the caves of the *Vāibhāragiri* mountain range in *Rājagiha* (known as *Rājagṛha*) on the bank of the Ganges. The text states that the mountain had several trees, waterfalls and was infested with wild animals making sounds such as roars of lions and tigers, howling of jackals and hooting of owls. Several ascetics dwelt and meditated around the range living on bulbs, roots and fruits. One day as Rauhiṇeya came near city of *Rājagṛha*, his ears fell on the sermon of Lord Mahāvīra against the promise given to his dead father that he would not hear it. He was caught in an act of theft but could not be arrested without proof. King Śreṇik ordered his wise minister Abhayakumāra who tricked Rauhiṇeya into being dressed as a God living in a seven storey palace attended by beautiful maids posing as Goddesses. Rauhiṇeya sees through the trick played by Abhayakumāra remembering Lord Mahāvīra's sermon and transforms himself into a good citizen after being pardoned by the king. The Rauhiṇeya episode occurs in other Jain works as well such as the '*Mahāvīracaritra*'[43] of Hemacandra, the commentary of Hemacandra to the '*Yogaśāstra*', the '*Paryuṣaṇāṣṭāhnikavyākhyāna*' (15th CE), '*Upadeśaprāsāda*', various '*Abhayakumāracaritras*' and also in the drama '*Prabuddharauhiṇeya*'[44] that was edited later. Some other aspects of the story of Rauhiṇeya have been dealt by scholars in literature[45]. An interesting aspect of the story is the means by which thieves were detected and arrested. Abhayakumāra detected Rauhiṇeya in a Jain temple when the latter came in the guise of a Jain disciple. He did not make the necessary rituals around the assembly as required by Jain principles and concluded that he must be a thief. While tricking him into his plan, Abhayakumāra also noticed that Rauhiṇeya made obeisance to him in a worldly language not used by the Jainas. He was then arrested but Abhayakumāra turned down all his proposals to face any ordeal to prove his innocence. Abhayakumāra then brought an automated contrivance in the form of a beautiful lady (called thief catcher) to strike a blow with the sword when thieves bent in front of it. Rauhiṇeya refused and was tricked by the minister when he worshipped the puppet with ablutions of a strong mixture of water and liquor that he offered to Rauhiṇeya to drink. Rauhiṇeya became unconscious when struck by the blow after being intoxicated by the drink. He was later moved into the seven storey palace. The text RC [17] has king Śreṇik entering into a pact with thief Lohakhura to furnish him provisions on the condition that he stop pillaging the king's city of *Rājagṛha*. The '*Samyaktvakaumudī*'[46] (SK) mentions king Uditodaya and his minister Subuddhi who make themselves invisible, wander through the city at night and detect thief Suvarṇakhura (or Lohakhura). Lohakhura was skilled in the use of magic pills and salves for invisibility. All the three listen to a merchant's account of his conversion to Jainism. Lohakhura makes himself invisible and then ate with the king habitually. He was tricked to shed tears so that the collyrium (*Añjana*) was washed away from his eyes and thus made visible to all. Lohakhura was then caught and impaled.

The '*Samarādityasaṁkṣepa*'[47] [SS] of Pradyumnācārya has a teacher Skandarudra who presents his pupil Caṇḍarudra with a magic pill that makes him invisible as stated in the text SS [6.114]. Likewise the text SS [4.128ff] also presents a story where a teacher presents a pupil a charm for breaking locks on the condition that he does not utter a lie. The pupil

transgresses, steals goods after uttering a lie and is caught finally being punished. SS [6.455ff] describes a story of Dharaṇa and his wife Lakṣmī who plots the destruction of an enemy by depositing the loot. The motif of depositing loot to destroy an enemy is also found in the story of Cakradeva, a merchant and Yajñadeva (son of a *Purohita*) in SS [2.187ff]. The text SS [6.93ff] has Lakṣmī abandoning her husband Dharaṇa for a thief or robber Caṇḍarudra who applies a magic pill (*guṭikā*) given by his preceptor Skandarudra. He deposits all loot with Dharaṇa and implicates him in a case. In SS [4.104ff], a merchant Dhana has been cast into the ocean by his wife who plots his death. He saves himself by a wooden plank swimming to the shore, finally arriving at Śrāvasti where the treasure of king Vicāradhavala has been robbed. Dhana is falsely implicated in a case due to possession of a necklace and ordered to be executed. He resuscitates the prince bitten by a snake using a charm given by a gambler and is finally freed by the king. In SS [5.30ff] prince Sanatkumāra secures release of highly trained thieves. The king orders thieves to be executed without the prince's knowledge. SS [6.73ff] has Dharaṇa rescuing *Cāṇḍāla* Maurika who is unjustly accused of theft by ransoming him of a huge sum.

Hemavijaya's '*Kathāratnākara*'[48] (KR) also has some interesting narratives of thieves. The text KR [Story No. 82] mentions about a thief who steals fruits from a mango tree in a pleasure garden of queen Cellaṇā and king Śreṇik by magically bending it towards him by a spell in order to satisfy the desires of his pregnant wife. The minister Abhayakumāra tricks the thief by narrating a story of a lady who steals flowers from a garden and is desired in the process by four people - her husband, the gardener, some robbers and a demon. The real thief responds to a question put by Abhayakumāra and finally he is delivered to the king. KR [Story No. 129] has another novel method by a thief Vasana who steals the golden peacock placed by the king Puruṣadatta on top of a Śiva temple carefully not disturbing the sleeping guards. He tricks them by carrying the loot along with a dead child fooling the guards that follow him by making false cries. Along with assistance of another thief Chatura, Vasana buries the loot in a cemetry with the dead child and enacts as though removing it himself, giving the stolen artefact to courtesan Rūpasenā to prove his ingenuity. In the process, he sticks the dagger into several other dead bodies as well as into hand of Chatura who keeps quiet. Later Vasana cleverly implicates Chatura in the case and tells the king that one who is suffering from dagger wounds cannot be cured without betel leaf (*Tāmbūla*) which increases its market value. Vasana adores the garb of an ascetic and as he sells it himself in the market, one of the slave girls of Rūpasenā comes to buy the exhorbitant betel leaves and thus he implicates Chatura stating that he is living with her and gets him arrested. The king on learning the matter after investigation was pleased with the cleverness of both thieves thus appointing both of them as chamberlains in the royal court. KR [Story No. 45] mentions about a magic ring that protects against thieves. The text KR [Story No. 61] has thief Musala paying a friendly visit to thief Siddhisuta and notices a golden bowl which he decides to steal. The latter aware of it hangs the bowl full of water above his head near the bed but Musala sucks it out using a reed when Siddhisuta is fast asleep. He then hides the bowl in a pond. Siddhisuta feels Musala's wet feet and shoes, tracks his footsteps to the pond and then takes it out. At the breakfast next day, Siddhisuta chides Musala (when he has a doubt) that it was the same bowl which he had thrown in the pond. KR [Story No. 110] narrates the episode of a thief Kharpara who uses the oil in lamp hung before the statue of Goddess Harasiddhi to lubricate the cakes he bakes on coals of a funeral pyre. She sticks out her tongue to frighten but he asks Her to draw it back else he would smash the statue into pieces with stone.

In this act, he obtains a reward in gold as well as magical powers from the Goddess as She had been threatened by him. KR [Story No. 178] has king Vikrama who catches four thieves with magic powers but releases them after verifying their skill and truthfulness.

The '*Vardhamāna Deśānā'*[49] of Śrī Śubhavardhanagaṇi dated to about 1495 CE is inspired by the seventh *Aṅga* of *Śvetāmbara* Jains named *'Ubāsagdasao'* (also known as *'Upāsakadaśa'*). It describes the story of a thief Sahasramalla who lived with his aged mother. He disguised himself pretty well and tricked various merchants and a dancing girl stealing their jewels, clothes, horses finally even tricking the chief of Police and king himself by posing as an expert in massaging his limbs. Finally, Sahasramalla realizes that he has no one else to steal and on hearing the sermon of a monk Vasuddha transforms into a noble citizen being pardoned by the king. That thieves were well versed in '*Ākāśagāminīvidyā'* (the art of flying) is also evident from the story of Kesarī, a thief who wore a pair of magic sandals that enabled him to fly and loot the citizens. The text '*Vardhamāna Deśānā*' states that Kesarī used to offer gems at feet of temple deity and was finally found by the king himself later surrendering himself to a monk.

The '*Śrādhanākathāprabandha*'[50] (or *Kathākośa*) of Prabhācandra (11th CE) has a story of a thief named Sūrya in the *Upagūhanākhyānaka*. He disguised as a novice (*kṣullaka*) on the orders of Suvīra, son of king Yaśodhvaja and queen Suśīma who lived in Pāṭalīputra. He had the passion of possessing the priceless cat's eye gem crowned on the umbrella of a highly protected idol of Lord Pārśvanātha that was with the merchant Jinendrabhakta. Sūrya went to *Tāmralipta* and inspired the people of villages and towns and this reached the ears of merchant Jinendrabhakta. He set out for a voyage after assigning Sūrya to guard the jewel after being impressed by him. Sūrya stole the jewel at midnight but was caught due to the lustre of the gem. He pleaded at the merchant who just returned but to conceal the fault regarding the religion Jinendrabhakta pardoned the thief.

This tale of thief Sūrya is also narrated in the '*Yaśastilakacampū'*[51] (YC) of Somadeva (10th c. A.D.). The YC [Book V] narrates the story of a thief who was produced in the court of king Sudatta having being accused of murder and robbing the wealth of a barber while he was asleep. The thief is condemned by the judges to imprisonment and torture so that he might expire in 10 to 12 days. Somadeva states in the text YC [Book III] that a thief on account of his wickedness suspects another even though he is not a thief. The text also narrates episode of another thief Lalita, the misguided son of a king who turned as thief. He stole the necklace of the queen of Kuśāgrapura. However he was followed by the city police and threw away the necklace to evade them. In course of this process, he acquires the magical powers that Dharasena was attempting to achieve by certain rites. Later the thief became a Jaina ascetic and attained salvation. Elsewhere the episode of prince Vāriṣena (the son of king Śreṇik of Magadha) who was implicated on theft of a necklace of a merchant's wife is narrated. The necklace was stolen actually by a thief Mṛgavega at the instance of his mistress, a courtesan named Magadhasundarī. The thief then put the necklace in front of Vāriṣena to evade the police.

The '*Kuvalayāmālā*'[52] of Udyotanasūrī narrates the story of a merchant Sthānu who was pushed into a well by Māyāditya, another treacherous merchant from Vāranasi. A party of robbers saved Sthānu from the well and gave him his share of five jewels. The '*Upadeśamālā*'[53] (dated to 12th CE) of Hemacandra Mālādhārin describes a horde of thieves (*dhāṭī*) well practiced in *ṭhagavidyā* (trickster's wisdom and magic spells to break locks on houses) who were

put to flight by Samayarāja. The text also mentions that the sons of king Adṛṣṭasaṁcaya and Aśubhapariṇati were deluded by certain *Vidyās* using which they could open locks and gain access to houses.

The five vows on non-stealing to be observed by all *Śrāvakas* and monastics as stated in Pūjyapādācārya's '*Sarvārthasiddhi*'[54] [VII.27] was to not prompt the stealing of items either by oneself or through others or approval of theft, not receiving stolen goods, not to buy precious things cheaply in disordered state, not cheating others by use of false weights and measures as well as deceiving others with artificial gold or gems. In the context of the *Jīvaśarīravāda* (body-soul relation discussions) between king Pradeśi and Keśikumār Śramaṇ there are some views regarding theft expressed in the '*Rāyapaseṇiyasūtra*'[55] (Part II). King Pradeśi narrates some experiences with regard to punishment to various thieves such as one of them being placed in a narrow necked long iron pot with the iron cover being sealed air-tight. King Pradeśi questions that in spite of trusted men guarding it, the soul had escaped from the thief's body when he died even though there was no hole in the pot. Similarly when a thief who weighed same when alive as well as when he was dead indicated that the soul and body were different entities. Likewise another thief's corpse that was cut into number of pieces does not show anything other than flesh.

Many Jain texts allude to certain *Vidyās* or spells that a thief needed to be aware of so that he could steal. Such magical spells are mentioned in literature[56]. Another text of Karnataka namely the '*Vaḍḍārādhane*'[57] in Kannada language attributed to Śivakoṭi Ācārya dated to about 10th c. A. D. has interesting details on *Choraśāstra.* It states that the crown prince Yamadaṇḍa studied '*Surakha*' [a treatise on science of catching a thief that is not available now]. Likewise, the prince made his friend, the city guard's son Vidyutchora, bet on the act of thieving and how he would find him out. Vidyutchora is supposed to have also studied '*Karapaṭaśāstra*' [treatise on thievery] which is attributed to Kharpara as stated in the *Kathāsaritasāgara* accordingly -

tanage takka kaḷḷaranārayva teranampeḷvi surakhameṁbodaṁ kaltonānuṁ kaḷvu pāyamaṁ peḷvi karapaṭa śāstramaṁ kalteniṁtemaganyonya prītiyiṁdaṁ kālaṁsale||

The text also lists the aids and tools used by Vidyutchora that he manifests these arts throughout the story. These are as follows-

vidyuccoraneṁboṁ kaḷḷanātaṁ jṛṁbhinī stambhini mohini sarṣapi tālodghāṭini vidyā mantracūrṇa yogaghuṭikāñjanameṁdivumodalādagoḍeya taskaraśāstraṁgaḷoḷādamānukuśalanaṁtappa kaḷḷaṁ polila kasavaraṁgaḷaniruḷkaḷdu

These include charms to cause the inmates of a house to sleep or yawn (*jhrimbhiṇī*), stupefy the movements of inmates (*Stambhana*), hypnotize them (*Mohinī*), reducing one's size to a mustard seed (*Sarṣapī*) spells for opening locks (*Tālodghāṭanī Vidyā*), magic powder for invisibility (*Mantracūrṇa*), Magic pills, collyrium to be applied on eyes as well as ointments. (*Yogaguṭikā* and *Añjana siddhi*). These were known to thieves and were part of their knowledge or skills in these arts.

The '*Sūyadaṅga*'[58] (also known as '*Sūtrakṛtāṅga*') quotes the arts of '*Jhrimbhiṇī*' and '*Thambhinī*' The text [2.2.15] also mentions *Osvaṇim* (art of casting people to sleep known as *Avasvāpinividyā*). The '*Ambaḍacaritra*'[59] of Amarasūrī mentions a great magician who could

fly in air, change humans to animals and vice versa as stated in literature. The Jain texts also supply rich information on art of stealing. Some texts state that *Sakka* put to magic sleep the mother of *Tīrthaṅkara* Ṛṣabha. Each verse of *Bhaktāmara* stotra of Māṇatuṅga was claimed to break open locked doors[60]. King Harisena received from monk Viśvabhūti the secret of preparing collyrium to render one invisible. Sanatkumāra had a magic shawl that rendered the wearer to become invisible. The '*Pariśiṣṭaparvan*'[61](PP) (known also as '*Sthavirāvalīcaritra*') by Hemachandra (12th CE) refers to *Ākāśagāminīvidyā* (the art of flying). The text also has some interesting narratives of thieves. Robber Cilāya opened the eastern gates of the city of *Rājagṛha* by reciting lock breaking charms. The PP [2.173ff] narrates the story of Jambukumāra, son of a rich merchant Ṛṣabhadatta and his wife Dharaṇīdevī. A thief named Prabhava along with other bandits loot the house of the merchant on the eve of the marriage of Jambukumāra to the daughters of eight wealthy merchants. Jambukumāra's spell stupefies the 500 men of Prabhava who was a prince by birth (son of Vindhyarāja, king of Jaipur) but a thief by profession. Prabhava knew the art of breaking open locks by spells (*Tālugghāḍanīvijjā*) and asked Jambukumāra to teach him the art of stupefying people. However by being influenced by Ārya Sudharmasvāmī's wisdom, Prabhava along with his 500 men (after being pardoned by king Kuṇika of Magadha), Jambukumāra and his eight wives and their parents all got initiated and transformed into monks.

Rauhiṇeya knew several magic herbs, amulets and charms thus saving himself when attacked by several people. He could not be bitten by snakes, burnt of fire, bound by thongs, affected by poison and could make an attacking party turn upon each other. Rūpyakhura could stop and point blade of a sword to an opponent striking a blow at him that made him glued to the spot. The '*Samarāiccakāhā*'[62] (SMK) of Haribhadrasūrī (459-529 CE) is a collection of stories. One story mentions Nārāyaṇa receiving two charms from his teacher that enabled him to fly in air and another to open locks. The SMK mentions that experts of *Dharmaśāstras* were summoned by a king to deliver appropriate penalty to a thief. The text also states that the hands, feet, ears and nose of a man who stole another's property was to be cut off in public spaces and he was put to death. The text also mentions that a thief Chaṇḍarudra had a magic spell named '*Paradiṭṭi Mohaṇī*' which would make one invisible. It was his preceptor Skandarudra who presented Chaṇḍarudra with the magic pill to make himself invisible when it was applied to his eyes. The thief Vijaya is said to have taught various spells to his pupil Cilāya. Such charms are elaborated in the text of '*ṣaṇmukhakalpa*' and some of them are mentioned in early poetical literature and dramas as discussed previously.

The Jain text '*Vāsudevahiṁḍi*'[63] (VH) of Sanghadāsa Gaṇi and Dharmadāsa Gaṇi, a Jaina version of Sanskrit '*Bṛhatkathā*' of Guṇāḍhya gives some interesting features of thieves. It mentions the story of Agaḍadatta, disciple of Dṛḍhapraharī who was successful in catching a thief dressed up as a mendicant holding a trident. The thief was well versed in breaking houses with implements from the backyard, sprinkles sleeping powder on thugs, pulls out a sword from tridents and stores his stolen goods in a underground passage at the end of a crematorium. Agaḍadatta kills the thief who plots his murder while dying and gives his sword asking him to meet his sister who lives at the corner of the crematorium. He asked him to marry her and enjoy the riches of the stolen wealth. Agaḍadatta escapes from the ploy of the thief's sister to kill him by rolling over a huge stone on his sleeping couch. He then leads her to the king who then confiscates all the stolen wealth. Agaḍadatta then marries Śyāmā, daughter of Dṛḍhapraharī's

neighbour and as he was on the way to Ujjain, the party rested under a tree in the jungle. Some versions of the story state that he married the king's daughter Kamalasena. Dhanapūjak, another thief who had come to avenge the killing of his friend also met with the same fate and was killed. The commentator Devendra to the text mentions some interesting features of thieves in the tale of Agaḍadatta. Thieves are said to frequent the houses of courtesans, gambling houses, stalls of bakers, sheds in parks, huts of ascetics, empty temples, markets and forests. Interestingly the thief who was on the verge of death after being wounded by Agaḍadatta asks him to cremate his body with full honours.

The story of thief Lohakhura is elaborated in texts like *'Malayasundarīkathoddhāra'*[64] of Dharmachakra (14th CE), '*Mahābala Malayasundarī Rāsa', 'Malayasundarīcaritra'*[65] of Kesarasurī and *'Mahābala Malayasundarīkathā'* of Māṇikyasundara (15th CE). Lohakhura kidnaps Malayasundarī, the daughter of king Vīradhavala and queen Champakamālā who was married to prince Mahābala. The prince fought the thieves and killed Lohakhura. The '*Mallināthacarita*'[66] refers to a village (*Hallisaka*) turbulent with dances of robber's women. The text [7.804] also refers to a lotus shaped breach. The '*Upamitibhāvaprapañcakathā*'[67] of Siddharṣi Gaṇi (10th CE) describes the barbarous treatment given to robber Abhaggasena before being executed. He was caught and brought before the streets, his offences were proclaimed and he was made to sit in the square. His eight uncles were beaten with thongs and killed before him and he was made to eat their own flesh and drink their blood. Thefts of an ordinary nature or most daring kind were punished capitally.

Police officers besmeared the bodies of criminals with soot, green grass, red earth and ashes, crowning their heads with a garland of shoes, parasol made of old articles was held over them, then mounting them on an ugly white ass, taken in procession amidst the beating of drums, and led in a southerly direction to the execution ground.

Several ancient texts punish the guilty thieves by various ordeals such as by fire, sacred water, a weighing balance, poison or rice. Rauhiṇeya was a master of charms and spells and not allowed to undergo ordeals. He wanted to clear himself from the charges of theft by dragging out a snake from a jar (an ordeal in those times) and also by ordeals of fire, sacred water and poison. Abhayakumāra, the minister administered the *Kośa* ordeal to Rauhiṇeya with some modifications. The *Kośa* ordeal involved the process of putting the idols of some deities into water. Some general rituals were performed to the idols and people used to wait for some weeks. If during that time no mis-happening occurred in the life of the accused or any of his relatives he was declared innocent. Several other procedures of punishment levied to thieves are discussed in literature.

The '*Prabandhacintāmaṇi*'[68] of Merutuṅga (14th CE) describes the story of Vanarāja who is destined to be a king but becomes a thief temporarily. He digs a tunnel into a merchant's house to steal but ends up putting his hands into a bowl of curds. He then gives up the act of stealing stating as to how he could steal from the house where he had eaten food.

The '*Kathākośa*'[69] of unknown origin (unlike other texts of similar titles) being a collection of stories mentions about Mitrānanda who dies innocently as a thief because of a fault in a previous birth. Another story in the same text mentions about a thief adorned for execution who falls at the feet of prince Vīrāṅgada to protect him. The prince does so at the price of being banished by his father.

A Jain tale[70] (found in '*Kathākośa*' of Prabhachandra) also narrates the story of a thief Garaka who was infatuated by the beauty of Vīravatī, the wife of merchant Dutta, the son of

Dhanamitra. He used to visit her often when Dutta was away on a voyage to Ratnadvīpa. While Dutta was returning through a jungle, another thief Sahasrabhaṭṭa follows him and keeps a watch on him. Meanwhile Garaka is caught and hanged on a pole in the outskirts of the city. Unable to disclose the secret love to her husband, Vīravatī steps out of her house with a sword in hand to meet Garaka. She finally ends up wounding Sahasrabhaṭṭa who has been following her but he keeps silent. She then steps over dead bodies and kisses her dying lover and returns back to her house. With blood on her lips she falsely implicates Dutta in a case of cutting her lips and he is also ordered by the king to be hanged. Sahasrabhaṭṭa who has watched the entire happenings intervenes to the court in disguise and narrates the episode to the king. Finally Vīravatī is sentenced to be hanged after she is dragged in the city with her hair cut by the guards.

Jinasena Desavrati's '*Vardhamānapurāṇa*'[71] [Chap. XV] mentions about Vidyutprabha, son of Vidyunnāma and Guṇavatī who leaves the land and joins 500 robbers becoming their chief. He is named as Vidyutchora and was well versed in the art of stealing. The '*Tilakamañjarī*'[72] of Dhanapāla refers to the exclusion of dragging of feet in case of those who committed theft and took to their heels. The '*Triṣaṣṭhiśalākapuruṣacarita*'[73] (TSSPC) is an elaborate narration of lives of 63 great persons in the Jain canons. TSSPC [Chap. V] describes the story of a thief Kāka who was devoted to other men's wives looting several cities.

Several glimpses of theft in *Kāvyas* by other Jain poets have been dealt in literature[74,75]. Thus we find of the art of Stealing in ancient Jain literature.

CONCLUSIONS AND DISCUSSIONS

Ancient Sanskrit and regional literature[76] has rich descriptions of art of stealing. Several aspects of theft in such texts are dealt by scholars such as Maurice Bloomfield and others[77,78]. Similar descriptions are also found in Jain literature[79,80]. Though it may seem that these descriptions are drawn from Sanskrit texts, there are other features that are specially found in Jain sources. The descriptions in some texts make us wonder as to whether '*Cauryakalā*' was to be considered as *Dharma* or *Adharma*. This is evident from discussions in texts like the '*Dharmacauryarasāyaṇa'* of Gopālayogīndra. In Jain literature also several interesting aspects about theft are described and it might be worth mentioning some of them as below. There are descriptions of hideouts of thieves such as *Śālāṭavī* and those around cities like *Rājagṛha*. Several thieves adopt novel methods of stealing as elaborated in some texts. These are evident in the stories of Skandila, Vijaya, Musala, Kharpara, Vasana, Sahasramalla, Rauhiṇeya and Maṇḍiya. Most of the thieves were well versed in various arts and magical spells such as those possessed by Vidyutchora, Lohakhura, Kesari, Prabhava, Skandarudra, Harisena, Rūpyakhura, Nārāyaṇa, Cilāya, Caṇḍarudra, Sanatkumāra and Rauhiṇeya. It is also noted in these texts that several innocent people were falsely implicated in theft cases by other thieves. This is evident in the episodes of Mitrānanda, Vīrāṅgada, Dhana, Dharaṇa, Candrā, Sarga, Vāriṣena and Dutta. Several other people coming from good families go down as a thief due to evil association as seen in episodes of Mahābala, Śrīgupta, Vasanta and Lalita. One also notices instances of one thief depositing loot in another person's place or implicating another thief in the case as seen in the narratives of Vasana and Chatura and also Mṛgavega. Strangely some episodes of thieves catching hold of another thief and producing him before kings is also

noted in Jain literature as evident from episodes of Garaka and Sahasrabhaṭṭa. The association of women in acts of theft or with other thieves acts as a motif in stories of Lakṣmī, Vīravatī and Rūpasena. Various thieves also realized their mistakes, repented for them and transformed into noble citizens as seen in episodes of Sahasramalla, Prabhava, Kesari and Rauhiṇeya. Descriptions of different types of torture, punishments and judicial ordeals and trials are found in texts like '*Vipākasūtra'*, *'Nāyādhammakahāo'*, *'Yaśastilakacampū'*, *'Rauhiṇeyacharitra'*, *'Upamitibhāvaprapañcakathā'* and '*Tilakamañjarī'*. Strangely some episodes show that thieves were appointed as chamberlains based on their cleverness as in the story of Vasana. Thieves generally struck the houses of wealthy merchants or kings and also kidnapped women. Lohakhura, Prabhava and Vijaya were famous in such acts. The theft of idols or its artifacts is mentioned in the episode of thief Sūrya in *Kathākośa* of Prabhācandra. Stealing of temple articles is also evident in some texts as seen in episodes of Vasana stealing a peacock image atop a temple or Kharpara using the oil from a temple lamp. Interestingly, there are some scientific and technical marvels in these narratives such as those noted in episodes of Rauhiṇeya wherein mention is made of a seven storey building and a thief catching puppet that strikes blows. In story of Agaḍadatta we do find mention of huge rolling stones that were made to fall on a sleeping couch. Some thieves also give up their professions as in stories of Sahasramalla, Rauhiṇeya and Vanarāja. There are narratives involving various sections of society such as a gardener, barber, monks, traders, courtesans, kings and ascetics afflicted by thieves or also helping them. Studies in such episodes may throw interesting light on the customs, habits, economy, dress and ornaments and other aspects in Jain literature that will also help in dating some of the texts by suitable archaeological and inscriptional interdisciplinary studies of those periods. There needs to be documentation of various laws, codes of non-stealing or theft as well as philosophical discussions pertaining to thefts from various other Jain sources although some of them are found in some texts such as '*Praśnavyākaraṇa Sūtra'*, Pūjyapādācārya's '*Sarvārthasiddhi*' and *'Rāyapaseniya Sutra'*. Still several stories about theft and its related arts may be found in untapped Jain *Campūs, Kāvyas* and other Jain literary sources that are yet to be researched so as to bring out full details of *Choraśāstra* in ancient Jain texts. These need to be also supplemented by Folk beliefs, customs and Ballads on arts of stealing and brought to light by the scholarly world. This paper is just a humble attempt in that direction as it reveals the art of theft as evident from Jain literature.

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