

ISSN 0021-4043

A QUARTERLY
ON
JAINOLOGY

VOL. XXII

OCTOBER 1987

No. 2

jain journal



॥ जैन भवन ॥

JAIN BHAWAN PUBLICATION



Hansraj Hulaschand & Co. (Pvt.) Ltd.

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a quarterly on Jainology

Jain
JOURNAL



जैन भवान

JAIN BHAWAN
CALCUTTA

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All contributions, which must be type-written, and correspondence regarding contributions and book-reviews should be addressed to the Editor, Jain Journal, P-25 Kalakar Street, Calcutta-7.

For advertisement and subscription please write to the Secretary, Jain Bhawan, P-25 Kalakar Street, Calcutta-7. Subscription for one year : Rs. 10.00 : for three years : Rs. 25.00. Foreign : Rs. 60.00 for one year.

Published by Moti Chand Bhura on behalf of Jain Bhawan from P-25 Kalakar Street, Calcutta-7 and printed by him at The Technical & General Press, 17 Crooked Lane, Calcutta-69.

Editor : Ganesh Lalwani

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Dadabari, Pavapuri

Place of Suicide in Indian Culture and Religions

YAJNESHWAR S. SHASTRI

Suicide, a baffling human phenomenon is common to all civilizations of the world. It prevailed in India and other civilized countries since time immemorial. Almost all the ancient civilizations of the world such as Indian, Greek, Latin and others were familiar with this tragic act.¹ It was also practised in China, Japan, Burma, Russia and other Asiatic countries.² Human nature being the same everywhere, the causes of suicide have been almost identical all over the world. Most of the causes leading to suicide are, disappointment in love affair, jealousy, fear of punishment, shame or wounded pride, anger, extreme poverty, family unhappiness, feeling of inferiority, etc.³ It is seen that frequent repetitions of situations which bring about feelings of disappointment, depression, mental and emotional conflicts, irresistably drive the victim to the extreme step of suicide. It is normally a misfortune of one's own making. A victim of suicide is either a victim of his own mental weakness or of external circumstances which he is not able to circumvent.⁴ Modern social scientists, such as, Henry Morselli, Westermark, Emile Durkheim and others, who have made substantial contribution to the study of suicide, listed various causes and influences which drive a person to end his precious life.^{5a} Even causes of suicide mentioned by Kautilya^{5b} are very much similar to these modern thinkers. This fact reveals that the causes are more or less similar throughout the ages.

The area of this research paper is restricted to the study of place of suicide in Indian culture and religions right from Vedic times down to the present day. Suicide means, destroying one's self by means employed

¹ Henry Morselli, *Suicide*, pp. 2 ff, quoted in *History of Suicide in India* by Upendra Thakur, Pub : Munshi Ram Manoharlal, Delhi, 1963, p. 1.

² *Ibid.*, pp. 186-193.

³ Westermark, *Origin and Development of Moral Ideas*, Vol. II, 1908, pp. 232 ff.

⁴ T. K. Tukol, *Sallekhana is not Suicide*, Pub : L. D. Institute of Indology, Ahmedabad, 1986, p. 71.

⁵ (a) *Suicide* ;
Origin and Development of Moral Ideas, Vols. I-II, 1906 and 1908 ;
Emile Durkheim, *Suicide : a Study in Sociology*.

(b) *Kautilya's Arthashastra*, ed. Shamasastri, Sanskrit Series, IV-7.

by one's self. The corresponding word in Indian religions is *ātmaghāta* or *ātmahanana*. This word *ātmaghāta* (=suicide) is used in two different senses. First of all, it means voluntary self-killing or self-destruction which is committed out of pure melancholy, disappointment in love, unhappiness in one's life and on account of other worldly considerations.⁶ Secondly, it is used by the ancient philosophers in the sense of not caring for realisation of one's own self.⁷

Indian culture and religions viz. Hinduism, Jainism and Buddhism have approved many other kinds of voluntary deaths (either religious or social) in certain circumstances such as *mahāprasthāna* (the great journey); *prāyopaveśana* (fasting unto death); *jalasamādhi* (drowning in sacred river); *agnipraveśa* (entering fire); *bhrigupatana* (falling headlong from a cliff); *sati*; *jauhar* etc., which are not included in the category of suicide or *ātmaghāta*. Thus the word suicide is used in a limited sense. All kinds of voluntary deaths are not called suicides by followers of Indian culture and religions. The reason is that suicide or self-sacrifice for a cause is different from suicide on account of frustration. If one commits suicide for a frustration, he succumbs to weakness which is condemned by society. If a person kills one's self for a noble cause, i.e. lays down one's own life for religious cause or for the benefit of entire society, his act is approved by the religion or society. But the word suicide is loosely used for social and religious sacrifices by certain Western and Indian scholars,⁸ which may not be cent percent true in the context of Indian culture and religions. In fact they are not suicides but self-sacrifices for higher cause. Let us examine the place of suicide and other kinds of voluntary deaths or self-immolations in Hinduism, Jainism and Buddhism to find out the truth of this matter.

Ordinary suicide is denounced by all these three religions of India as an absolutely degrading act. The *Isāvāsyopaniṣat* (1200 B.C. to 600 B.C.) bitterly attacks those who indulge in heinous act like suicide. It is condemned to postmortuary penalties which follow the soul. It

⁶ *vyapadayet vr̥thatmanam svayam yo agnyudakadibhiḥ / avedhenāiva margena at-*
maghata sa ucyate—quoted in Vacaspatyam;

Kautilya's Arthashastra, IV-7;

Amṛtacandra, Purusartha Siddhyupaya, ed. Ajit Prasad, *Sacred Books of the Jainas*, Vol. IV, Pub : Central Jaina Publishing House, Lucknow, 1933, verse 178.

⁷ *Isavasyopanisat, Ten Principal Upanisads with Sankarabhasya*, Pub : Motilal Banarasidass, New Delhi, 1978, 3 ;
Vivekacudamani, Works of Sankaracarya, Vol. XIV, Pub : Vanivilas Press, Sri-rangam, 4.

⁸ See *History of Suicide in India*.

states that those who commit suicide reach after death the sunless regions covered by impenetrable darkness.⁹ They will not be able to see the light of knowledge anymore. In later ancient and mediaeval periods, suicide was considered to be a vicious crime and various punishments are laid down in this direction.

Kautilya, (3rd century B.C.) in his monumental work *Arthashastra* condemns those men and women who, under the infatuation of love, anger, or other sinful passions, commit or cause to commit suicide by means of rope, arms or poison. According to him, such kind of suicider's body be dragged by means of rope along the public road by the hands of an untouchable (*cāndāla*). For such persons neither cremation rites nor any obsequies, usually performed by relatives shall be observed. In fact any relative who performs funeral rites of such self-murderers, shall either himself be deprived of his own funeral or be abandoned by his kith and kin.¹⁰ Kautilya, being a great social thinker, has gone to the root of this problem of suicide and suggested a proper method to investigate the cause of death to decide whether it is a suicide or murder, which is known as *kanṭakakaśodhana*.¹¹ In this method of investigation, the magistrate, dealing with criminal cases, takes hold of the dead body and examines it to ascertain the causes and circumstances of death. If it is a case of suicide, then, the dead man's or woman's body is exposed in the public thoroughfare. The treatment of the bodies of such persons was subjected to insult and indignities.

In the age of *Dharmasūtras* and *Purāṇas* also suicide or an attempt to commit suicide came to be condemned as a great sin. *Vājasaneyasamhitā* states, "Whoever destroy their selves, reach after death demon-world that is shrouded in blinding darkness."¹² *Vāsiṣṭha Dharmasūtra* (3rd century B.C.) ordains that whoever commits suicide becomes guilty of mortal sin (*abhiśapta*) and his relatives have to perform no death rites for him. It also prescribes punishment for merely resolving to kill oneself, even though when no actual attempt is made.¹³ Manu (circa 200 B.C.-A.D. 200), the great ancient Indian Lawgiver, says that no water is to be offered for the benefit of the souls of those who commit

⁹ *asurya nama te loka andhena tamasavrtah / tamste pretyabhibigacchanti ye ke catmahanō janah*—*Isavasyopanisat*, 3.

¹⁰ Kautilya's *Arthashastra*, IV-7.

¹¹ *Ibid.*, IV-7.

¹² *Vājasaneyasamhitā*, ed. Weber, 39-3.

¹³ *Vasiṣṭha Dharmasutra*, ed. Fuher, XXIII-14-16, 18.

suicide.¹⁴ *Brahmapurāṇa* declares that those who commit suicide by poison, hanging, fire, drowning or falling from cliff or a tree, should be considered as great sinners, such persons should not be cremated, nor should useful funeral rites be performed for them.¹⁵ The *Viṣṇusamhitā* (1st-3rd century A.D.) has also nothing but condemnation for such persons.¹⁶ The *Mahābhārata* also states that one who commits suicide does not reach blissful worlds.¹⁷ The *Yamasmr̄ti* (6th-7th century A.D.) prescribes harsh punishment and declares that, when a person tries to do away with himself by such methods as hanging, if he dies, his body should be smeared with impure things and if he survives, he should, along with his friends and relatives be fined.¹⁸ *Parāśara* (7th century A.D.),¹⁹ *Samvarta*²⁰ and *Likhita Smṛtis*²¹ (8th century A.D.) denounce such self-killing outright. Suicides are generally censured with few exceptions. If a Brāhmaṇī is overtaken by disease or great misfortunes, he is permitted to walk straight on in a north-easterly direction subsisting on water and air until his body sinks to rest.²² Atri approves this view of Manu and states that "if, one who is very old, cannot observe the rule of bodily purification (owing to extreme weakness); one who is so ill that no medical help can be given, kills himself by throwing himself from a precipice or into water or fire or by fasting, mourning should be observed for him for three days and death rites should be performed for him."²³

We have seen that in general, suicides were universally condemned throughout the ancient and mediaeval times in Hindu law-books and society. Not only this brutal treatment to the bodies of suiciders were prescribed by ancient and mediaeval law givers to check the cases of suicide in society, ancient and mediaeval Hindu society as a whole, disapproved the suicidal tendency. Brutal treatments to the bodies of suiciders were prescribed to prevent this tendency to commit suicide. In modern Indian society, this ordinary suicide is increasing on a remarkable scale on account of frustration, emotional conflicts and family unhappiness.

¹⁴ *Manusmr̄ti* with *Medhatithibhasya*, ed. and Pub : Gharpure, Bombay, 1920, verses 88-89, pp. 426-28.

¹⁵ *History of Suicide in India*, p. 54.

¹⁶ *Viṣṇusamhitā*, ed. Jolly, Calcutta, 1881, XIX-8-9 ; XX-6-7 ; XXXIII-1-2.

¹⁷ *Mahābhārata*, *Adiparva*, Pub. : Bhandarkar Oriental Institute, Poona, 179-80.

¹⁸ *Yamasmr̄ti*, 20-21, quoted in *History of Suicide in India*, p. 57.

¹⁹ *Parasaramsr̄ti*, ed. Vamanasastri Islam Purkar, Bombay Sanskrit Series, 1898, Vol. II, Part I, IV-1-2, pp. 18-19.

²⁰ P. V. Kane, *History of Dharma Sastra* Pub : Bhandarkar Oriental Research Institute, Poona, 1941, Vol. II, Part-I.

²¹ *Ibid.*

²² *Manusmr̄ti*, VI-31, p. 467.

²³ *Atrismr̄ti*, 218-19, quoted in *History of Suicide in India*, p. 89.

In the eyes of modern Indian Law, suicide is a crime which is punishable under section, 309, of Indian Penal Code. Here again, as in ancient societies, what is actually punished is the unsuccessful attempt to commit suicide but not a successful attempt, because, if the attempt is successful, there is nobody to be punished. If the attempt is unsuccessful and the person survives, he will not be allowed to go unpunished. In suicidal tendency either man punishes himself by successful attempt or is punished by Law. In either case, this tendency is punished. Again, according to Hindu thinkers, the person being a part and parcel of social system, his body naturally belongs to society as a whole. He is not owner of his own body, in real sense. It is the property of the society. Destroying one's own body means destruction of public property which is again a great offence. So, Hindu society has considered suicide as offence and strong law is prescribed to check it. A similar example is found in mediaeval Europe. The self-murderer was deprived of his rights which were granted to all other criminals.²⁴

Jainism also considers suicide to be a great sin. It declares that he who is actuated by passions, puts an end to his life by poison, weapons, by water, fire, or by stopping breath, is certainly guilty of suicide²⁵ and such kind of suicider is reborn as a demon.²⁶ Buddhism, upholds the same view and maintains that generally dire miseries are in store for the suiciders and the society look upon him as one who must have sinned deeply in a former state of existence.²⁷ It declares that a monk who encourages or preaches suicide is no monk at all.²⁸ I-tsing, the Chinese traveller, tells us that, Indian Buddhists abstained from suicide and in general from self-torture.²⁹

From these abovementioned accounts, we can conclude that, all the three religions of India condemned suicide as unethical and opposed to religion. It was disapproved by Indian culture and religions, because, suicide involves self-condemnation or self-hatred. Unless you hate yourself, you cannot kill yourself. This is what is disapproved and prohibited by Indian society. But there are many kinds of self-immolations or voluntary deaths, prevalent in ancient and mediaeval India which were approved by religions and society as a whole. Religiously and socially approved kinds are : death by drowning at the confluence

²⁴ *History of Suicide in India*, pp. 118-121, p. 198.

²⁵ *Purusartha Siddhyupaya*, 178.

²⁶ *History of Suicide in India*, p. 104.

²⁷ *Ibid.*, 106.

²⁸ *Sacred Books of the East*, XIII-4.

²⁹ *History of Suicide in India*, p. 110.

of the Ganga and Yamuna, and at other sacred rivers, self-cremation at one of the places of pilgrimage ; hanging head-downwards over a blazing fire ; cutting upon one's flesh and offering it to birds as prey ; entering self-lit fire at Benaras ; death by fasting, *mahāprasthāna* (the great journey) *sati* (self-immolation of widows), *jauhar* (self-immolation to save the honour of community, culture and land from enemies). These kinds of voluntary deaths are not considered to be suicide, because, these are committed for religious or some noble cause. Laying down one's own life for religious or social cause is whole-heartedly approved by the society because, as we have already pointed out, self-immolation or killing one's own self for a noble cause, is different from suicide on account of frustration. The self-immolation for religious cause involves some spiritual attainment. It is dying for religious value. Similarly, self-immolation for noble social cause, involves self-glorification (instead of self-condemnation in the case of suicide on account of frustration). The moment the person lays down his life for social cause, he becomes a national hero and is worshipped.

On religious grounds, in ancient period in India, people were allowed to commit self-immolation by drowning with the desire of securing release from this mundane world, at extremely holy places like Varanasi and Prayaga. From the very ancient times Varanasi is considered as holiest place and leaving one's body there is considered to be a means of liberation.³⁰ Death at Prayaga is highly commended from the Vedic times downwards. It is said in the *Rgveda* that whoever leaves his body at the confluence of the Ganga and Yamuna, obtains immortality.³¹ During the Vedic period, self-immolation or self-sacrifice was practised, but it was very rare. In the early Upanisadic period, self-immolation was considered irreligious and foolish.³² In the later Upanisadic period, religious sanction was given for self-immolation to only ascetics who acquired full insight. They are allowed to enter upon the great journey (*mahāprasthāna*), or choose death by voluntary starvation, by drowning, by fire or by a hero's fate.³³ We find ample evidences of self-immolations to be committed at the various places of pilgrimage in the *Rāmāyana*³⁴

³⁰ *kasyam tu maranan muktih* ;
History of Suicide in India, p. 81.

³¹ *sitasite sarite yatra samgate tatrapiutaso divamutpatanti, ye vai tanum visrjanti dhiraste janaso amrtatvam bhajante*—*Rgveda*, ed. Maxmuler, X-10, 6, 8.

³² *History of Suicide in India*, pp. 50-51.

³³ *Ibid.*, p. 51.
³⁴ *Valmiki Ramayana*, ed. Chinnasvami Sastri, Pub : Ramaratham, Madras, 1958, *Aranyakanda, Uttarakanda*.

and *Mahābhārata*.³⁵ In the *Rāmāyana* itself, it is said that Rama, along with hundreds of his subjects drowned in the water of Sarayu.³⁶

Self-immolation by fire, or water or by falling headlong from a cliff (*bhrigupatana*) at Amarakantaka is highly extoled. It is said that, he who throws himself down from the peak of Amarakantaka, never returns to mundane world (*samsāra*).³⁷ These methods of self-immolation are considered as means of salvation. *Mahāprasthāna* is another kind of self-immolation approved by ancient authorities as a means of release from the miseries of the world. *Mahābhārata* states that one who has realised the transitoriness of life should end it in the Himalaya.³⁸ It is further said that, "if a man, knowing the *Vedānta* and understanding the ephemeral nature of life, abandons life in the holy Himalaya by fasting, he would reach the world of Brahman."³⁹ According to *Mahābhārata* the Pandava brethren and their wife Draupadi, followed this path of *mahāprasthāna*.⁴⁰

We get many instances of self-immolation from ancient literature and epigraphic records. In the *Mṛcchakaṭīka* (Gupta period, 5th century A.D.) it is said that, king Sudraka entered fire.⁴¹ Kalidasa in his *Raghuvamśa* (5th century A.D.) tells us that king Aja, in his old age, resorted to fasting (*prayopavesana*) and drowned himself at the confluence of the holy rivers—the Ganga and the Sarayu.⁴² Kumaragupta (554 A.D.), the later Gupta Emperor, is also said to have entered fire of dried cowdung cakes.⁴³ This kind of death is regarded as most meritorious in the *Purāṇas*.⁴⁴

In the mediaeval age, the position was more or less the same as in ancient times. From *Ain-e-Akbari* we learn that death by starving,

³⁵ *Mahabharata, Salyaparva*, 39, 33-34.

³⁶ *Ramayana, Uttarakanda, sargas*, 109-110, pp. 1093-4.

³⁷ *Tirthavivecanakanda* of Kṛtyakalpataru (TK), ed. Laksmidhara Bhatta, K. V. Rangasvami Aiyangar, Pub : Anandasrama Press, Poona, 1942, p. 21 ; *Matsyapurana*, Pub : Nandalal Mor, Calcutta, 1954, *adhyaya*-185, verses 28-36.

³⁸ *Mahabharata, Svargarohanaparva*.

³⁹ *Ibid., Anusasanaparva*, 25, 62-64.

⁴⁰ *Ibid., Svargarohanaparva*.

⁴¹ *Mṛcchakatikam*, Pub : Chowkhamba Sanskrit Series, Varanasi, Samvat 2011 I-4, pp. 5-6.

⁴² *Raghuvamsam*, VIII-94-95.

⁴³ *History of Suicide in India*, p. 96.

⁴⁴ *Ibid.*, 91.

entering self-lit fire, burrying one self in snow, and death by drowning in sacred rivers, and cutting one's throat at Prayaga, were prevalent and considered as meritorious by Hindus in the mediaeval period as in the ancient times.⁴⁵ In addition to these, dying under the wheels of Jagannatha's car at Puri and throwing oneself down from certain rocks or tree at Prayaga, etc., are also practised in mediaeval age.⁴⁶ From the Khair plates⁴⁷ of mediaeval period we learn that, Yasahkarandadeva obtained salvation together with his five hundred wives at the famous banyan tree of Prayaga in 1040 A.D. Jayapala, a king of Kabul and Lahore, is also said to have entered fire in 1001 A.D.⁴⁸ Kadambadeva of Vedi (1042 A.D.) had ended his life in the waters.⁴⁹ Calukya king Somesvara Anavamalla drowned himself in the Tungabhadra river in 1068 A.D.⁵⁰ Many such instances are found in mediaeval inscriptions.⁵¹ The statement found in *Rājatarāṅgini* (11th century A.D.), that there were certain officers, appointed by the king to supervise *prāyopavēṣṭana* indicates that, death by fasting was practised on a large scale in mediaeval period.⁵²

It is important to note that, only those who were possessed of high ascetic power and detached to worldly desires were permitted to undertake all these kinds of voluntary acts. The ordinary person lacking in high ascetic power was generally denied resorting to such kinds of methods. Again, there were protests against all these kinds of voluntary deaths from certain corners of ancient, mediaeval and modern Hindu texts. These texts state that, these voluntary deaths are strictly forbidden in Kali-era.⁵³ Banabhatta (6th century A.D.), vehemently condemns these voluntary deaths.⁵⁴ Writers of 16th and 17th centuries denounced it as an inferior way of death.⁵⁵ But history tells us that this prohibition was never strictly followed or enforced. Jainism has

⁴⁵ *History of Suicide in India*, p. 92

⁴⁶ *Ibid.*, pp. 92-93

⁴⁷ *Epigraphia Indica*, II, pp. 1-7 ; XII, p. 211.

⁴⁸ *TK*, p. 259.

⁴⁹ *History of Suicide in India*, p. 101.

⁵⁰ *Epigraphia Carnatica*, Vol. II, verse 136.

⁵¹ *History of Suicide in India*, pp. 98-101.

⁵² *Rājatarangini*, ed. P. R. Shastri, Pub : Pandita Pustakalaya, Kāsi, 1960, VII-1411.

⁵³ *History of Suicide in India*, p. 88.

⁵⁴ *Kadambari*, ed. and Pub : P. V. Kane, Girgaum, Bombay, 1920, *Purvabhagah*, para 177.

⁵⁵ Narayana Bhatta (c. 1560 A.D.), *Trishthalisetu*, Pub : Anandashrama Press, Poona, 1915, pp. 290-316 ;

Mitra Misra (c. 1620 A.D.), *Tirtha-prakasika* in *Viramitrodaya*, Benaras, 1917, p. 354.

also approved the self-immolation by fasting, which is known as *sallekhanā*. This is a religious vow, which is given a very high place in *Ācarāngasūtra*, one of the earliest Jaina *Agamas*.⁵⁶ Umasvati Vacaka (5th century A.D.), also in his monumental work *Tattvārthasūtra*, refers to this vow.⁵⁷ *Sallekhanā* is a vow to be adopted for seeking liberation of the soul from the body as a religious duty during a calamity, severe famine, old age or illness from which there is no remedy.⁵⁸ In this ceremony many kings, men and women alike took part and devoted themselves to contemplation of the divinity for days without food or water. Sravanabelagola inscriptions are full of such instances.⁵⁹ But all are not authorised to follow this path. Only those who have acquired the highest degree of perfection in the spiritual path are allowed to chose this religious vow. Except death by fasting, all other kinds of speedy methods of voluntary deaths are denounced as vulgar and evil by the Jainas.⁶⁰

Even Buddhist literature, notwithstanding the opposition of the Buddha, is full of stories of various kinds of self-immolation. The *Majjhima-nikāya*⁶¹ states that a husband threatened with separation from his beloved wife, kills her and also himself in order that they may be united as husband and wife in their next birth. There are many stories which prove beyond doubt that, Buddhism, in certain cases and in certain circumstances, approved self-immolation. The stories relating to self-immolation attempt of Siha, Sappadasa, Vakkali and Godhika are good examples of this fact.⁶² The stories of a future Sakyamuni who gave his body to feed a starving tigress⁶³ and the legend of Bhaisajyarāja⁶⁴ who filled his body with all sorts of oil and set it on fire are worth noticing. Santidasa in his *Sikṣāsamuccaya*⁶⁵ (a compendium of the rules of the disciple of the Great Vehicle), prohibits only those, from self-immolation, who are just beginners on the path of spirituality, implying that, the spiritually advanced may resort to this method of self-immolation under certain circumstances.

⁵⁶ *Acarangasutra, Sacred Books of the East*-XXII, I-VII, 5-8, pp. 74-78.

⁵⁷ *Tattvarthadigamasutra*, Vol. II, ed. H. R. Kapadia, Pub : J. B. Javeri, Bombay, 1930, VII-32.

⁵⁸ Samantabhadra, *Ratnakarandaka Sravakacara*, Pub : Jivaraja G. Doshi, Sholapur, 1954, verse 122.

⁵⁹ *Sallekhana is not Suicide*, pp. 18-63.

⁶⁰ *Kathakosa*, translated by C. H. Tawney, London., 1895, p. 8.

⁶¹ *Majjhima-nikaya*, II, 109.

⁶² *History of Suicide in India*, pp. 107-109.

⁶³ *A Study of the Jatakamala*, ed. K. K. Misra, Pub : G. N. Jha Kendriya Sanskrit Vidya Peetha, Allahabad, 1977, pp. 230-231.

⁶⁴ *Saddharmapundarika, Sacred Books of the East*-XXI.

⁶⁵ *Bibliotheca Buddhica*, I, Petrogard, 1902.

We have also several examples of men and women, who adopted self-immolation, out of devotion to their masters, mothers and for other sacred causes. Monuments are erected in memories of those brave and devoted persons. Mostly members of royal families resorted to self-immolation, purely from personal affection and devotion, on a mass scale. When there was enough attachment to persons or even to ideas, people lost their interest in life and resorted to this method. *Harṣacarita* of Banabhatta⁶⁶ tells us that, before and after the death of king Prabhakaravardhana, many of the king's friends, ministers, servants and favourites killed themselves. Kumara Laksmana, the general of Vira Ballala, with his wife Suggala Devi and the army-men attached to him, resorted to self-immolation, purely from personal affection towards the king.⁶⁷

Sati or self-immolation of widows was a very important form of voluntary death. It means entering the funeral pyre of ones husband to reunite with him in the next birth or to acquire innumerable religious merits.

As regards this kind of self-immolation or *sati*, there is no explicit reference in the *Vedas*. In fact, remarriage of the widow was allowed in the Vedic period and she was asked to enjoy the bliss of children and wealth.⁶⁸ We do not find any explicit, reference about *sati* in the *Brahmanas* (c. 1500 B.C.-700 B.C.), *Āranyakas* and *Grhya-sūtra*⁶⁹ (600-300 B.C.). Even in oldest Buddhist literature there is no reference to it. Moreover, we do not find any particular reference to this kind of self-immolation either in Kautilya's *Arthaśāstra*, or in the ancient *Dharma-sūtras*, or in the early *Smṛti* literature like *Manusmṛti* and *Yājñavalkya-smṛti* though these deal with an elaborate discussion of the duties of women and widows as well as suicide in general. During the 4th century B.C. and earlier, few cases of *sati* are recorded and the widows of king Kantirras and Varisyanta are stated to have ascended the funeral pyre.⁷⁰ We have, the earliest, historical instance of *sati* in the wife of the Hindu general Keteus who died in 316 B.C., while fighting against Antigones. The Greek historians tell us that one of his two wives was led to the pyre by her brother and that she was all gleeful even when the flames

⁶⁶ *Harsacarita*, V, Pub : Vidyabhavan Sanskrit Granthamala, Varanasi, 1958, pp. 250 etc.

⁶⁷ *Indian Antiquary*, XXXV, p. 130.

⁶⁸ *History of Suicide in India*, pp. 128-130.

⁶⁹ A. S. Altekar, *Position of Women in Hindu Civilisation*, Benaras, 1938, p. 137 ff.

⁷⁰ *History of Suicide in India*, p. 137.

enveloped her person.⁷¹ But this was a rare occurrence in the ancient times. It is only in the early Christian era that this practice gradually started gaining popularity and the *Viṣṇusmṛti*⁷² (c. 100 A.D.), contains reference to it. References are also found in the works of Bhasa,⁷³ Kalidasa,⁷⁴ Sudraka,⁷⁵ Bana⁷⁶ and in *Agnipurāṇa*⁷⁷ and *Āngirasmṛti*.⁷⁸ After 700 A.D., this practice was defended by some law-givers delcaring that innumerable merits flow from the performance of *sati*.⁷⁹ This practice became very popular among the *kṣatriya* caste from 4th century A.D. onwards and after 1000 A.D., became common to *brāhmaṇas*, *kṣatriyas* and *vaiśyas*.⁸⁰

In the 11th century A.D., this practice of *sati* was extended to relations (besides widow of the dead) such as mothers, sisters, servants and nurses. The *Rājatarangini* and the *Kathāsaritsāgara* (1100 A.D.) are full of such instances.⁸¹

We have also numerous epigraphic records referring to the practice of *sati* in ancient and mediaeval times. The earliest one is 191 of the Gupta era (510 A.D.) in the Gupta inscription.⁸² Nepal inscriptions of *saka* 979 of the time of Rajendra Coladeva⁸³ and several other inscriptions⁸⁴ clearly point out that this practice was in general use, at least among the ruling class, in India, under the Guptas, the Vardhamanas and their successors.

⁷¹ *History of Suicide in India*, pp. 139-40.

⁷² *Ibid.*, 140.

⁷³ *Dutaghatotkaca*, Pub : Chowkhamba Vidyabhawan, Varanasi, 1960 ; *Urubhangā*, Pub : C. V. Bhavan, Varanasi, 1962.

⁷⁴ *Kumarasambhavam*, IV, ed. S. R. Sehgal, Pub : Munshi Ram Manoharlal, Delhi, 1959, pp. 35-36.

⁷⁵ *Mṛcchakatikam*, X.

⁷⁶ *Kadambari*, *Purvabhadra*, Para 177.

⁷⁷ *History of Suicide in India*, p. 140.

⁷⁸ *Āngirasmṛti*, Medhatithi on Manu, V. 157.

⁷⁹ *History of Suicide in India*, pp. 140-141.

⁸⁰ *Ibid.*, pp. 140-159.

⁸¹ *Rājatarangini*, VI, 107, 195 ; VII, 103, 478 ; VIII ; V.

⁸² *Indian Antiquary*, IX, 164;

Fleet, *Corpus Inscriptions Indicarum*, Vol. III, p. 91.

⁸³ *Indian Antiquary*, IX, p. 163 ff. (Nepal Inscriptions) ;

Epigraphia Indica, VI, p. 213.

⁸⁴ *History of Suicide in India*, pp. 96-103.

Some stone monuments, called *Mahāsatikal*,⁸⁵ erected in memory of *satis*, indicate that this kind of self-sacrifice was highly honoured by the society and some *sati* memorial stones were worshipped as goddesses. In modern Indian history, we find few instances of this practice in the history of Rajputs, Marathas and Peshwas.⁸⁶

It became highly respected and held in high esteem by the Hindus in the mediaeval age. But it was a purely voluntary affair and whenever it took shape of purely a social custom and widows were compelled to practice *sati*, strong protests were made, declaring it as non-religious and not in accordance with the *śāstras* throughout the ancient and mediaeval periods.⁸⁷ But unfortunately, in later times, this practice took different shape and became purely cruel social custom and British rulers have stopped it.

Jauhar is another kind of self-immolation prevalent in the mediaeval period among the brave Rajputs of Rajasthan. It is a story of a glorious chapter of heroism and splendid sacrifice of Rajputs. *Jauhar* was in a sense, a spontaneous out-burst of violent reaction against the barbarous atrocities perpetrated by the brute conquerors who felt no scruples in molesting even womenfolk.⁸⁸ It is a heroic type of sacrifice, resorted to, to avoid intolerable shame and dishonour to culture and community at the hands of victorious enemies.

In India its origin can be traced as far back as the 4th century B.C. At the time of Alexander's invasion of India, many defeated kings along with their wives and subjects, resorted to this method of self-immolation to avoid dishonour at the hands of foreigners. It is said that in one city alone, some twenty thousand males, females and children embraced flames to escape captivity and dishonour.⁸⁹ In the early centuries of the Christian era, when the Sakas and the Hunas invaded India, created terror and played havoc with lives of the people, the royal families

⁸⁵ *Indian Antiquary*, XXXV, pp. 129-30.

⁸⁶ *History of Suicide in India*, pp. 141, 157, 160, 170, 171.

⁸⁷ *Manusmṛti* with Medhatithi commentary, V-157;

Brahmandapurana, quoted in *Parasara Samhita*, Vol. II, Pt. I, p. 58 etc.;

History of Dharmashastra, Vol. II, pp. 632-33;

Jaimini Sutra with *Sabarabhāṣya*, I-I-2.

⁸⁸ *History of Suicide in India*, pp. 168-69.

⁸⁹ *Ibid.*, p. 162.

resorted to this method to save the honour of their womenfolk.⁹⁰ In classical literature, it is found that, Daksayani (daughter of Daksa), or Sati insulted by her own father, resorted to self-immolation.⁹¹ The Rajput history is a living example of this great sacrifice in the mediaeval period.⁹² Thousands of the Rajput ladies, when they came to know that their kings were defeated or captured or killed on the battle-field by the enemies, they willingly and gladly embraced the rising flames to avoid captivity, sexual dishonour, and to save the honour of their royal blood, community, and culture from the hands of the victorious enemies, specially the Muslims. In memory of these glorious sacrifices, stone-monuments were erected, the performers of *jauhar* being duly honoured, as gods and goddesses and worshipped in their households or in temples and shrines.⁹³

In the west also, such kinds of voluntary deaths have taken place in order to "procure martyrdom or to avoid apostacy or to retain the crown of virginity". These are allowed or approved by the earlier Christian fathers, though ordinary suicide was denounced by them.⁹⁴ We have, again several instances of Christian women putting an end to their lives when their chastity was in danger and their acts are spoken of with tenderness and even admiration. Some of them were admitted into the calender of Saints.⁹⁵ Self-immolation for a noble cause has always been hailed by all nations.

We have seen that all the major religions of India and Indian society as a whole, denounced the ordinary suicide but, self-immolations for noble cause, either religious or social, were approved or highly praised. Indian people believed that man is the architect of his own future, the master of his destiny. Self-immolations were considered to be a means of release from the fetters of suffering, gate-way to *nirvāna*. For this great religious cause thousands of people sacrificed their lives. In religious self-immolation, contrary to the suicidal intention, there is no desire to put an end to life, due to escaping from any difficult problem, frustration or emotional excitement. The person adopting the religious death wants

⁹⁰ *History of Suicide in India*, pp. 161-168.

⁹¹ *Kumarasambhavam*, I, 21-22.

⁹² Todd, *Annals and Antiquities of Rajasthan*, Vol. II, Madras, 1880, pp. 29, 370-73, 393-94.

⁹³ *Ibid.*, II, p. 609-610.

⁹⁴ *Divine Institutions*, VI, quoted in *History of Suicide in India*, p. 197.

⁹⁵ *Origin and Development of Moral Ideas*, II, p. 251, fn. 6.

to be liberated from the bondage of *karma* which has been responsible for all his ills in the world. Again, religious self-immolation is a conscious and planned act for self-realisation. A person committing suicide is weighed down wholly by mundane considerations. It is a circumstantially forced act rather than of free will. It is committed in a fit of emotional stress, mental imbalance or sense of frustration. Again, this act of suicide is due to a cause, rather than, death for a cause. Thus, in Indian religions and culture voluntary deaths or self-immolations for religious faith, patriotic fervour or other lofty motives, are not considered as suicide in the real sense. In it, facing death in war is also applauded as an act of heroism (*vīramaraṇa*). Dying for one's own nation, culture, community is called martyrdom (or *ātmāhuti*). The moment the person lays down his life for a noble cause, he becomes a national hero and worshipped with great reverence. These kinds of voluntary deaths are not called suicides, but self-sacrifice (*ātmatyāga*). Is it therefore proper to call (even loosely) all kinds of voluntary deaths as suicide ?

Jaina View of Soul : An Introduction

DILIP KUMAR MOHANTA

The problem of soul and its liberation is said to be the crux of Indian philosophy. Much ink has been spilled in discussing this perennial issue in the religio-philosophical literature of India. Serious students of Indian philosophy are well aware of the brilliant role played by the Jaina philosophers in advocating a theory of right conduct which is closely connected with their views of right knowledge and right faith. But all these presuppose the Jaina conception of soul. If there are no souls whose liberation is meant by the Jainas ? Who will follow these codes of life ? The liberated *jivas* are those who conquered passions and desires—karmic dispositions and attained emancipation. This is evident from the very word '*Jina*' which etymologically means conqueror—'one who has conquered his passions and desires'. Right faith (*śraddhā*), right knowledge and right conduct—these three constitute the necessary and sufficient condition for the attainment of the state of *kevala-jñāna*. Thus a proper understanding of these codes of life requires a faithful exposition of Jaina conception of soul. And in philosophy the understanding of a problem as *problem* (which needs a faithful exposition) is more important than that of a solution which is derived from an half hearted understanding of the problem itself and then the conclusion of the whole discussion would appear to be leading nowhere but only in producing more muddle and misunderstanding. The purpose of this discourse is to present an expository survey and not a critical appraisal of the Jaina view of soul and its liberation.

The Jainas advocate a realistic and pluralistic metaphysics. According to Jainism a thing has 'non-one-sided' (*anekānta*) aspects and these aspects can be viewed from seven possible modes. Jaina metaphysics classifies the whole universe into two everlasting, uncreated, eternal and co-existing *padārthas* (what is there) i.e. *jīva* and *ajīva*. The former stands for conscious spirit or soul whereas the latter stands for unconscious non-spirit. *Jīva* (soul) is of two categories, pure and impure. The impure soul is bound by *pudgala* (matter). In Jainism *pudgala* means that which is liable to integration and disintegration (*pūrayanti galayanti ca*) while in Buddhism it stands for a soul. Consciousness is the essence of soul (*cetanālakṣmaṇo jīvah*). Souls like the monads of Leibniz, are qualitatively non-different but they differ according to the degrees of consciousness which varies due to the quantitative variations of *karma* obstacles.

Non-spirit (*ajīva*) besides matter, includes, space, motion, rest, and time. Time has no extension in space (*nāstikāya dravya*). The impure soul, the soul bounded by matter assumes the physical body. As a matter of fact, the soul in its pure nature is not bound although a little less than infinite, *Jīva*'s own *karma* gives it a determinate form and makes it bound. On account of the consequences of willed activities (*karmaphala*) soul occupies different bodies in different births. Soul is co-extensive with the body. It is like the light which fills the space where it is burning. The relation between body and soul is one of identity cum difference. It is identical with the body in so far as it suffers the injuries of the body but it is different from the body in so far as it is not destroyed with the destruction of the body. *Karma*, according to Jainism, is not only subjective but also objective. As *karma* makes man bound, the destruction of *karma* leads to liberation. But the destruction of *karma* follows from the code of discipline. This discipline which removes ignorance and thus consequently leads to liberation consists of right view or faith, right knowledge and right conduct.¹

The theory of right conduct is one of the fundamental and unique themes of Jainism. This school of Indian philosophy primarily deals with ethics and the chief goal, according to it, is the perfection of human being. *Asrava* or the union of soul with matter is the casual condition of bondage and *saṃvara* or the dissolution of that union of soul with matter leads to liberation. Bondage is due to ignorance of the right knowledge, that is, due to ignorance (*avidyā*) of soul's pure nature as dissociated from matter. This right knowledge arises from the faith in the teachings of the omniscient Tirthankaras. It is the right conduct which purifies the soul. Right knowledge consists in the knowing of a thing in its pure nature. Unless there is right conduct, right knowledge and no less the right views, become mere abstractions. Perpetual self-control, and not perpetual self-exaggeration, is the way which leads to liberation.

Jainism further explains that vibration of matter (*yoga*) and passions (*kasāya*) stand for the bondage of soul. The Jainas classify the human beings into six classes according to their classification of *leśyās* (emotions) which are in fact, the consequences of *yoga* and *kasāya*. The six classes of human beings represent the ethical gradation or ascending levels of ethical perfection. "The soul affected by the first is ruthlessly

¹ Umāsvāmi, *Tattvarthasutra*, 1.1.

destructive and relentlessly misanthropic. Such a soul is compared to a man who wants to eat mangoes, but who coming to the mango tree will forthwith uproot the whole tree. The second kind of *leśyā* would affect the soul in a less harmful manner and though it would make a man greedy and indolent, yet some amount of patient consideration would be found in him. He is like a man who spares the roots but cuts trunk of the mango tree to get at the mangoes. The third kind of *leśyā* would make a man envious and wanting in discrimination but soften his instinct of destruction.”² The another set of *leśyās* consists of three different kinds of emotions which focus on a “rising scale of merit and purification”. Of these the fourth type of *leśyā* makes a man good but can not free a man from carelessness. This type of person, considered by the Jainas, is like one “who breaks the twigs of the mango tree to secure the mangoes”. Again “the fifth kind of *leśyā* will prompt a man to be forebearing and to inflict the least injury to the mango tree, as when mangoes are only plucked without affecting the branches in any way”. The sixth one “presents the soul with purity, compassion and perfect equanimity, causing injury is avoided altogether”.³ Such a person does not want anything injuring others but receives things which are offered to him just like “the ripe fruits that have fallen to the ground”. When the soul becomes dissociated from the contamination with matter and shiness in its true nature, it is described in Jainism as the state of *kevalajñāna* which is perhaps nearest in meaning with the word ‘*mokṣa*’ (liberation) of most other schools of Indian philosophy.⁴

It can not be denied that there are many subtle polemics in Jaina conception of soul which may raise doubt among the academic philosophers in Jaina logic and metaphysics, but the value of Jaina ethics is beyond doubt. Primarily Jainism presents a way of life ; logical and metaphysical questions occupy secondary importance in the teachings of Tirthankaras. In our inner life emotion is greater than reason, life is greater than mere theory. In this war-oriented world where “hatred, violence, suspicion are getting the upper-hand, it is only non-violence (*ahimsā*) in conduct which can save the present humanity, which is standing on the verge of annihilation”. Jainism crystalises the inward looking

² H. M. Bhattacharyya, ‘Types of Human Nature’, *The Cultural Heritage of India*, Vol. II, R. K. Mission, Calcutta, 1953, p. 618.

³ *Ibid.*, p. 619.

⁴ *Uttaradhyayana Sutra*, XXXIV ; *Gommatasara*, *Jivakhanda*.

tendency and the sense of moral need. It is said to be an admitted fact that "much of the disbalance and disorder of our public life can be done away with if the problems of inner life are properly attended to". Jainism in this respect prescribes fivefold vows for its followers to attain the spiritual inwardness. And 'non-violence' in the ethical code of their religious dogmas influenced their view of philosophy in general and thus they would not bother to carry the concept of 'non-violence' (*ahimsā*) to intellectual level (i.e. *syādvāda*). Here Jainism is not an exception from many other systems of Indian philosophy where unlike the West, the line of demarcation between religion and philosophy is so thin that very often than not, one influences the other ; makes its religion philosophical as well as philosophy religious. In short, here philosophy is treated as a way of life, religion as a light of life.

Cave Dedication by the Mauryan Kings

BINOD KUMAR TIWARY

The Jaina and Buddhist monks, during the time of Tirthankara Mahavira and Gautama Buddha, lived a secluded life in the natural caves in remote forests, but later on artificial caves were carved out from the hills for them. The caves not only served as suitable places for meditation of the recluses, but were really the means of protection against heat and cold, wind and sun-light, showers of rain and ferocious animals as well.

Asoka, like his grandfather Candragupta Maurya, was not only a great warrior and administrator, but protector of the contemporary religious ideas and cults also. He is said to have dedicated four caves to the Ajivikas in the Barabar hills¹ at Gaya. Three of them contain his inscriptions. These three caves were named as Sudama,² Visva Jhopari³ and Karna Chaupar.⁴ Of the three Barabar caves with dedicatory inscriptions, the first two were given to the Ajivikas in the twelfth year of Asoka's consecration⁵ and the third one in the nineteenth year,⁶ which shows that the caves were excavated and donated by the king around 258 B.C. and 251 B.C. respectively.⁷ The Sudama cave seems to be the earliest of the series. According to Cunningham the cave having no inscription on it, belonged to the Asokan times and it can be proved on the basis of its similarity in size and arrangement to the other Barabar caves.⁸

¹ This hill is 31 kilometers north of Gaya. It was called Khalatika and later on became Gorathagiri. It was named as Pravaragiri in post-Mauryan period and the present name Barabar is its distortion.

² P. C. Roychoudhary (ed.), *Gaya District Gazetteer*, 1957, p. 55.

³ *Ibid.*

⁴ *Ibid.*

⁵ *I.A.*, Vol. XX. p. 364.

⁶ *Ibid.*

⁷ *C.I.I.*, Vol. I, pp. 181 ff ; *I.A.*, Vol. XX, pp. 168ff.

⁸ Cf. *Journal of Bihar Puravid Parisad*, Vol. I, 1978, p. 33.

Dasaratha, the other king of the Mauryan period, dedicated three caves to the Ajivikas⁹ also in the year of his consecration at Nagarjuni hills¹⁰ in Gaya district.¹¹ These three caves containing the dedicatory inscriptions of Dasarath have been named as Vahiyika, Gopika and Vadathika. All these caves have been dated by Cunningham around 214 B.C. on the basis of Puranic evidences. The Nagarjuni caves were regarded in more precise terms as about thirtyone years later than that of the Karna Chaupar cave and thirtyeight years later than that of the Sudama cave of Barabar hills.

In all the three inscriptions dedicated by Dasaratha '*Devānāmapiya*' is inscribed in Asokan Brahmi and the general tone of the inscriptions is similar to that of Asoka. The Vahiyika cave inscription reads like this, 'The Vahiyika cave has been given by Dasaratha, dear to the gods, to the venerable Ajivikas, immediately on his accession, to be a place of abode during the rainy season as long as the moon and the sun (shall endure).¹² The remaining two caves also bear similar inscriptions. The wish that the 'abode may exist as long as the moon and the sun endure' is reminiscent of the 7th Pillar Edict of Asoka, where he also wishes men and women to confirm to the principles of *dharma* as long as the sun and the moon endure.

Now a natural question arises that if Asoka and Dasaratha dedicated caves to the Munis of the Ajivika sect, how can one claim that those were given to the Jaina saints ? On this controversy, if we consult the various contemporary literary texts and the traditions and compare the principles and customs of both the cults, it becomes very much clear that there was a good similarity in both the cults. Besides, if in the pre-Mauryan period, they maintained two separate entity, during the Maurya period, the Ajivikas were not too much separate from the Jainas. This hypothesis is accepted by a large number of scholars including Hoernle, Smith Rice, C. J. Shah. These scholars have quoted several Hindu, Jaina and Buddhist texts in support of their evidences.

Silanka, who flourished in the 9th century A.D., says that the Ajivikas and Digambaras were the same.¹³ No doubt Mankhaliputra Gosala,

⁹ This is perhaps the last mention of the Ajivikas in the North Indian epigraphs.

¹⁰ The Nagarjuni hill is about one and a half kilometer off the Barabar hills.

¹¹ Inscriptions of the later date, state that the caves were occupied by Brahmanical ascetics also. cf. *Gaya District Gazetteer*, p. 38.

¹² *Select Inscriptions*, Vol. 1, pp. 79ff ; *I.A.*, Vol. XX, pp. 364ff.

¹³ *Sutra Krtanga Commentary*, I, 3.3.14 ff 92.

who was the follower of the principles of Tirthankara Mahavira during his earlier days, separated from him later on and formed his own cult. But this cult, called the 'Ajivikas' merged in the big fold of Jainism by the time the Mauryas came in power in north Indian horizon. Hoernle, after seeing all the aspects of the two religious faiths, opines that the later Ajivikas merged in the Digambara branch of the Jainas.¹⁴

The *Abhidhāna Ratnamālā*¹⁵ of Halayudha mentions the two divisions of the Jainas—the Svetambaras and the Digambaras and states that the latter was known as the Ajivikas also. To him the terms Nigantha or Nirgrantha and Ajivika denote the two Jaina orders which are known to us as Svetambaras and Digambaras.¹⁶ Due to the close association of Jainism with the Ajivikism, even the Pali literature could not make a clear distinction between the Niganthas and the Ajivikas. The *Majjhima Nikāya* puts all the heretical teachers in the general category of Ajivikas. The *Divyāvadāna* calls Ajivikas as Nirgranthas, a term generally used for the followers of Mahavira.¹⁷ The Chinese and Japanese Buddhist literatures also show the closeness of the Ajivikas with the Nirgranthas.¹⁸ The tradition recorded in the *Manimekhalai* states that the Ajivikas were a sect of the Jainas.¹⁹ C. J. Shah²⁰ supports the above view and opines that the Ajivika sect merged in the Jaina fold in the pre-Christian era at least in northern India and in many a place, the term Ajivika is used for the Digambara sect of the Jainas. The learned Jaina scholar Balbhadra Jain²¹ is of the view that though Mankhaliputra Gosala succeeded in forming his own cult during the life time of Lord Mahavira, it lasted for two or three centuries only and finally merged in the Jaina Samgha.

On the basis of the above facts, the dedication of the Barabar and Nagarjuni caves to the Ajivikas can be put in the Jaina historical tradition as well.

¹⁴ *Encyclopaedia of Religion and Ethics*, Vol. I, p. 226.

¹⁵ *Ibid.*, Part II, pp. 189-90.

¹⁶ *Ibid.*, Vol. I, pp. 226-67.

¹⁷ *Divyāvadāna*, p. 247.

¹⁸ *E.R.E.*, Vol. I, pp. 226-67.

¹⁹ S. K. Aiyangar (ed.), *Manimekhalai*, p. 9.

²⁰ *Jainism in Northern India*, p. 67.

²¹ *Bharat ke Digambara Jain Tirth*, pt. II, p. 9.

Some Secret Formulae of Jaina Alchemy as Revealed in the *Suvarna-Raupya- Siddhi-Sastra*

J. C. SIKDAR

Some secret formulae of Jaina alchemy as revealed in the *Suvarna-Raupya-Siddhi-Sastra*, written in code names, symbolical letters or names of chemical substances are noted below with explanations for the understanding of their hidden meanings to make gold, silver etc.

The first verse of the first chapter of the *Suvarna-Raupya-Siddhi-Sastra* States :

*dhammo maingalamukkittham ahimsa samjamo tavo
deva vi tam namamtsanti jassa dhamme sayā mano* 1.1

Translation : *Dharma* (virtue) (based on) non-violence, self control and austerity is best bliss or auspicious. Gods even salute him whose mind is always absorbed in virtue.

The real meaning of the secret formula embodied in this verse is as follows :

‘*dhammo*’ is called *pāradah*=mercury *vāla* 5 ; ‘*maingala*’ is gold *vāla* 3 ; ‘*ukkittham*’ means Nepalese copper *vāla* 13 ; ‘*ahimsā*’ is *karṇ-theri* (*capparis sepiaria*), a kind of thorny plant ; ‘*samjamo*’ means *rakta agastya* (red-flowered agasta, *sesbania glandiflora*) ; ‘*tavo*’ is *krṣṇakanaka* (black thorn apple or *dhaturā*) ; ‘*deva vi*’ is *pili devāli* (yellow *andropogon serratus*).

The meaning of the verse containing a secret formula to kill mercury, gold, Nepalese copper and finally to make gold is this that mercury is killed (calcinated) with the juice of thorny apple, gold is killed with the juice of red *sesbania glandiflora*, and Nepalese copper is killed with the juice of *capparis sepiaria*. Having rubbed the three—mercury, gold and Nepalese copper with the juice of yellow *andropogon serratus*, the essence of these measuring (weighing) one *gunjā* should be given into copper, measuring one *tolā*. There will be an accomplishment of gold.

The second verse of the first chapter of the *Suvarṇa-Raupya-Siddhi-Sastra* says :

*dhyānājjīneśa bhavato bhavinah kṣaṇena
deham bihāya paramātmadaśāṁ brajanti
tīvrānalādūpalabhbāvamapāsyā loke
cāmīkaratvamacirādiva dhātubhedāh 1.2*

Translation : Oh Jinesa ! The Bhavinas (who are capable to attain liberation) attain instantly the state of the supreme soul by giving up (or renouncing) bodies, just as some classes of metal attain brightness soon after throwing away the state of stone due to the intense fire in the world.

This verse contains the secret alchemical formula to convert pure copper, iron and lead into gold by the chemical process as noted below :

‘*dhyānāditi*’ means here *sampradāya* (category), as for example, ‘*jinah*’ = *krṣṇah*, *iśah*, *iśvarah*, i.e. *haritāla-pāradau* (orpiment and mercury), born of (or generated from) them *krṣṇa*=*hari*=*haritāla* (orpiment), component-*iśah*=*iśvara*=*pāradh* (mercury). Thus *O Jinesa ! bhavataḥ* means mercury ; ‘*tas*’ *pratyaya* is applicable everywhere; ‘*tayordhyānāt*’ means *niścalikaraṇāt* (unmoving) by fixation of them (orpiment and mercury); ‘*tīvram*’ is cinnabar and a class of poison; now ‘*anala*’ means fire, by the contact of which the classes of metals (*dhātubhedhā*) pure copper, iron and lead get converted into gold or goldness (‘*cāmīkaratvam*’). By doing what ? By removing the blackness of ‘*bhavinah*’ (mercury). By what moment (‘*kena kṣaṇeṇa*’)=with the juice of black *dhaturā* (black thorny apple); ‘*paramiti*’ (in the sense of) again. Then, again, again by doing what ? ‘*vihāya=prāpayitvā* (causing attainment), *ātma-deśāntaram deham* (body). Again, by doing what ? By saturation of the juice of medicine called *pāthari* (*upalabhbāva*)—a kind of *vanaspatti*.

The seventh verse of the first chapter of the *Suvarṇa-Raupya-Siddhi-Sastra* contains secret formula to make gold as it says :

*do rattā do piyalā caṇḍā varāṇā cāra
khappari rāndho khīcaḍī cela bhukha na māra 1.7*

Translation : Two are red, two are yellow, four are moon-coloured cook them together, O pupil ! Do not die of starvation or hunger.

The meaning of the verse containing the secret of formula to make gold is this :

'do ratteti' means bring borax and calamine and brinjal, put 4-4 pieces of (each of) borax and calamine into the brinjal on all sides, give it 7 *cavalamvati bhāvanās* (saturations) with $\frac{1}{2}$ maund of urine of a buffalo heifer, bring afresh (new brinjals seven times and give saturations in this way with $\frac{1}{2}$ maund of urine of a buffalo heifer. Then take out the calamine from inside of the brinjal. Do it in such a way that the pieces of the calamine do not break into the brinjal. They should be taken out as unbroken (pieces). After seven saturations, calamine is to be crushed (or grounded.) This (is) the accomplishment of the essence (*kalankasiddhi*).

After that, all these copper-2 parts (or *bhā*), silver-2 parts (*bhā*), *dvādaśa suvarṇa* (12 carate gold)-4 parts (*bhā*)—all together 8 *vālas* are melted together. After melting them all—*bālas* 8, they make the essence. These become gold. It is certainly experienced.

In the verse No. 10 of the first chapter the author speaks of another secret formula of alchemy in code language :

*āra tāra samāṁ kṛtvā mṛtavaṅgam niyojayet
eṣā rājavatī vidyā pitā putram na kathyate* 1.10

Translation : Apply killed tin by taking (or making) equal portion of mercury and orpiment. This is *rājavatī vidyā* (art) which is not to be told by the father to the son.

The inner meaning of the secret alchemical formula contained in the verse is explained below :

'āra-tāreti'. First is the process of killing tin '*mṛtavaṅgam*'. Take mercury *ṭā* 5, orpiment *ṭā* 5, borax *ṭā* 3 and well purified realgar *ṭā* 3, make their fine powder. Take tin weighing $\frac{1}{2}$ of these medicines. Make the leaves of tin. Make them dry twice or thrice. Next place them into *śarāva sampuṭa* (lid), one above the other. Give (put) 3 layers of clay-cloth covering over it. Later it is to be heated (roasted) in the fire of *gajapuṭa* (1 cubic foot-pit) for 2 *praharas*. When it cools down, take it out from the pit. Tin is killed.

After that, take brass (*rīrī*) *vāla* 8. By combining together all, melt them. Make *guṇikā* (pill) of *vāla* 12 and release them. Later on, it is to be poured into oil. If it is not found beautiful, it is to be poured into oil again. The remaining process is to be known from the Guru.

The sixteenth verse of the first chapter contains a secret formula for making gold which is the support of the traveller as stated below :

*tālam tāpyam kūnātīkūnātī sātakasyārdhahbhāgām
khālve kṛtvā tridinamathitām kācamācīrasena
lohe bhāṇḍā prahārātīyam pācanīyam ca lepyam
śrutvātītām bhatati kanakām sambalām panthakānām* 1.16

Translation : Take orpiment, golden pyrite, sulphide of mercury and realgar—all equal to the quantity of half the part of mercury. Grinding them all in a stone vessel or mortar (*khala*), the whole thing is to be mixed up with the juice of *kācamācī* (solanum). (The whole thing) is to be cooked in an iron vessel for 3 *praharas* and smeared on the metal leaf of copper. Heard in the past, (it) becomes gold, the support of the traveller.

The true meaning of the verse containing the secret formula to make gold is as follows :

Take ‘*tālam*’ (*haritālam*), orpiment *ta* $\frac{1}{2}$, ‘*tāpyam*’ (*sovanamukhi*)=golden pyrite *ta* $\frac{1}{2}$, *kunāta* (*hiṅgulo*)=sulphide of mercury *ta* $\frac{1}{2}$, ‘*kūnātī*’ (*manahśilā*)=realgar *ta* $\frac{1}{2}$, ‘*sūta*’ (*pāro*)=mercury *ta* $\frac{1}{2}$, ‘*tāmbā*’=copper *ta* $1\frac{1}{2}$ and silver *māsā* $\frac{1}{2}$. Melt them together by putting them into a pot on fire.

Make *kanṭakabhedhi patra* (thorn-piercing leaf) of copper. Rub the medicines with the juice of *makaṇaka* (yellow *bhāṅgrā*)=trailing eclipta, for three days in a mortar. Later on, smear the metal leaf with the essence by putting the medicine on it. After its getting dried up, melt it in a closed crucible. It is to be heated for a *prahara*. It becomes gold.

The twenty-sixth verse of the first chapter of the *Suvarṇa-Raupya-Siddhi-Sāstra* contains a secret alchemical formula to make silver by the chemical process as noted below :

*kharamaṭaha sama (na) tulyam vajrīkṣireṇa bhāvitam bahuso (se)
agni upari pakkām havai kōndujalam saccām* 1.26

Translation : (It) is to be saturated equally with the milk of euphorbia *tragonia* (*vajrī*), calamine (*kha*=*karparī*), mercury (*ra*=*rasa*=*pārada*), realgar (*ma*=*manahśilā*), borax (*ta*=*taikāṇa*) and orpiment (*ha*=*haritāla*). It is to be cooked on fire many times. (It) becomes bright like *kondula* (*moragapuṣpa*). It is true (*saccām*).

The true explanation of the verse containing the secret formula to make silver is as follows :

'*kharamaṭaha*' means 'kha' iti=calamine (*kharpario*), 'ra'=rasa=mercury, 'ma'=manahśīlā=realgar, 'ṭa'=ṭaṅkāṇa=borax, 'ha'=haritālā=orpiment.

By taking equal portions of each of these things and grinding them, they are to be saturated with the milk (*sup*) of *vajrī* (euphorbia tragonia or antiquorim). Next cast the whole thing into the womb of *vāramstārana* (a kind of vessel ?) with a copper leaf. It is to be melted by heating it into the fire of the dung of buffalo, having made a pit. It becomes silver.

The thirty-third verse of the first chapter of the *Suvarṇa-Raupya-Siddhi-Sāstra* contains a secret formula to make gold from lead :

nāginiphāni āmula nāgiṇitoyeṇa
gabbhanāgeṇa nāgam hoi suvaṇṇam gabbhathāṁ tabāyeyenā 1.33

Translation : Mix the juice of the leaf of plant-*nāgiṇiphāṇi* with its root with the urine of she- (*Sundari*) elephant (*nāgiṇitoyeṇa*). Lead becomes gold by *garbhanāga* (when put into the essence of medicine) after heating it.

The true explanation of the verse containing the secret formula to make gold by the chemical process is noted below :

On its getting dried up, give it *gajapuṭāgni* (roasting in fire made in a pit—1 square yard) in the earth for 1 or 2 *praharas*. After the whole thing becomes cool, give the essence (*kalka*) into 1 *tola* of copper. It becomes gold.

The forty-fifth verse of the first chapter of the *Suvarṇa-Raupya-Siddhi-Sāstra* contains a secret formula how to make gold by a chemical process as noted below :

dasa rattā dasasa (maṇi)ttā paṇḍavaraṇā cāri
khappara rāṇdhahu khicāri celā bhukha na māri 1.45

Translation : Combine copper *ṭā* 10 and mineral calamine *ṭā* 10 and gold, *ṭā* 4 and melt them together in a closed crucible, (there will be) gold. O pupil ! Do not die of hunger (or starvation).

The true explanation of this verse containing a secret alchemical formula to make gold is as follows :

‘dasa ratteti’. Take pure copper $\frac{tā}{2}$ 10, mineral calamine $\frac{tā}{2}$ 10. Take the plant of *nāgaphaṇi* (serpentina) thorn=*phaṇimanasā*=sleepers’ thorn) with its roots and dip it into the urine of a (she)Sundari elephant, lead becomes gold by the process of *garbhanāga* (when dipped into the essence of medicine) after heating it. How ?

Take out the juice of the leaf of *nāgaphaṇi*, mix it with the urine of Sundari elephant. By heating lead and *rāṅg* (*kalaī-tin*), put them into the essence of this prepared medicine of the juice of *nāgaphaṇi* and the urine of Sundari Elephant. Lead becomes gold, when it is dipped into the essence after heating.

The verse No. 34 of the first chapter of the *Suvarna-Raupya-Siddhi-Sāstra* contains the secret alchemical formula to make silver by the alchemical process as given below :

*asthibhakṣamalamāritavāṅgam tālakābhraviṣasūtaṭaṅkaṇam
bhānuvajrapayasāvīmaritam bho narendra kuru tāraparvatam* 1.34

Translation : First kill tin (*vāṅgam*) with the stool of a dog, (put that into a plate) and (rub) orpiment (*haritāla*), mica (*abhra*), poison (*viṣa*), mercury (*sūta*) and borax (*taṅkaṇa*) with the milk of calotropis gigantea (*bhānuvajrapayasā*). O King (*bho narendra*) make the hill of silver (*kuru tāraparvatam*).

The true explanation of this verse containing the secret formula for making silver is embodied in its analysis as given below :

asthibhakṣeti=dog, *malamāritam* *vāṅgam*=kill tin with the stool of a dog (the bone eater), put that tin into a plate, i.e. $\frac{tā}{2}$ 2 of killed tin into the plate, put $\frac{tā}{2}$ 2 of copper and $\frac{tā}{2}$ 2 of silver into it, combine them together (*gaṇhi pāḍije*), put pieces or tablets (*tīkaḍi*) of tin over that, again put *tīkaḍi* (piece) of tin, again (*bali*) $\frac{tā}{2}$ 2. Close the *samputa* (*śarā* =lid), give a covering of cloth-clay (*kāpaḍa-māṭi*) over it, and gold $\frac{tā}{2}$ 4, melt them together in a closed crucible. It (the essence of the whole thing) becomes *pīta guṭikā* (piece of gold).

The verse forty-six of the first chapter of the *Suvarna-Raupya-Siddhi-Sāstra* deals with an alchemical process of making gold as given below :

*śukrasorūtātabhyām bhāgadvitrikapāñcakaih
kālikārahitam śuvameśā vidyā narairbudhai* 1.46

Translation : Take white (i.e. silver) *ta* 2, red (i.e. copper) *ta* 3 and yellow (i.e. gold or mineral calamine) *ta* 5 and put them together into a closed crucible. Melt them with pure copper without blackness(*kālikārahitamśulbām*). It becomes gold. This is the art of the intelligent men.

The true meaning of this verse containing an alchemical formula to make gold is clarified in the commentary as given below :

‘*sukreti*’=silver *ta* 2, ‘*śorita tāmra*’=copper *ta* 3 and ‘*pīta*’=*khar-parasatva*=essence of mineral calamine *ta* 5 or 2.

Melt them together in a closed crucible. Later on, melt them in an open crucible. The whole thing becomes *pīta joṭaka* (gold piece).

Lastly, the four verses of the second chapter of the *Suvarna-Raupya-Siddhi-śāstra* deal with the secret alchemical processes of *jāraṇa* (purification of mercury of its 3 impurities by burning), *vedhana* (mixing mercury with *vyavayi* medicines i.e. opium, etc.) and *rocana* (processing) of mercury and making gold in the form of an eulogy, written by Padalipta Suri, to Mahavira, the Jaina Tirthankara.

gāhā julenāṁ jīnāṁ
māyāṁ mohavivajjiya jiakasayāṁ
thosāṁi tisadhāraṇāṁ nisāṁgāṁ mahāvīraṁ 1
sukumāla dhīra soma rattakasiṇa paṇḍurāśirinikeyā
sīyakusagahbhīru jalathalanahamāṇḍanā tīṇī 2
na cayaṇī vīralīlam hāum je surahimattapāḍipuṇṇā
paṇkaya gaīndacāṇḍā loaṇacāṇkammiāmuhāṇāṁ 3
evāṁ vīra jiniṇdo accharaganasāṅghasaṇṭhuobhayavāṁ
pālittaya maḍ (ya) mahio disāda khayaṇ sabbaduriyāṇāṁ 4

Translation : Eulogy to the Jina with the couplet of verses:

- (1) I eulogise that Aparigrahin, (possessionless) Mahavira, who is devoid of pride and delusion and conqueror of passions by the combination (unity) of mind, speech and body. He is very tender, resolute and quiet.
- (2-3) Red lotus, black elephant and bright (white) moon which are the abodes of Laksmi (goddess of wealth), (which are) afraid of cold, goad and Rahugraha (the planet Rahu) (respectively), the three decorating water, land and sky and which are fragrant, and full-round cannot attain the same beauty of the eyes, motion and face of Mahavira (respectively).

(4) Such is Vira Jinendra, the Lord eulogised by the heavenly gods and goddesses and Caturvidha Samgha and worshipped by the three lords of Urddha-loka (Upper world), Tiryak-loka (Horizontal world) and Adhah-loka (Lower world) respectively with joy. O Lord ! Show (order) the destruction of poverty, diseases and old age (all these).

Scientific explanation of these four verses throws much light upon Jaina alchemy, about different alchemical processes embodied in secret formula for their accomplishment as noted below :

‘*gā*’=abhrakam=mica, ‘*hā*’=haritāla=orpiment, ‘*jualena tāra-mucyate*’, silver is meant by *jualena*, ‘*jinam*’=pāradam=mercury, which is free from dirt, fire and poison (*tri doṣas*=3 defects).

‘*māyāmohavivajjiam jīa-kasāyam*’=void of three impurities—dirt (*mala*=dregs), fire (*sikhi*) and poison (*viṣam*).

I fix it (mercury) by the process of burning (heating) it with the combination of three—white mica, orpiment and silver (*kantāra*).

‘*jiyakasāyam*’ means that the impurity in mercury is purified by *triphalā*—āmalakī (phyllatus emblica), *haritaki* (terminalia chebula) and *vahedā* (terminalia belerica), *kathambhūtarā* (how) ?

‘*jinam tam nisaṅgam*’ means : ‘*jinam*’=pāradam=mercury, ‘*tam nisaṅgam*’ is *mṛtasaptaguṇa*—*vaṅgottīrṇam*=killed impurities, free from artificial defects, alloys—tin and lead (*vaṅgottīrṇam*) by means of distillation.

Upto this time the process of making silver has been demonstrated.

Now the process of making gold is explained.

Mahavira means what ?

‘*ma*’=hemamāksikam=golden pyrite, ‘*ha*’ means hāṭakam=gold, ‘*vi*’=black mica (*krṣṇābhra*), ‘*ra*’=rasam=paradam=mercury. The remaining medicines are equal in quantity.

‘*sukumāla*’ *iti*=nāini=nāgadantī=croton obingifolia, ‘*dhīra*’=nāi=aristolochiabrateata, ‘*soma*’ *iti*=Somavallī=sarostemao brevustugama, ‘*ratta*’=raktadugdhikā=red euphorbia piluifera.

‘*kasina*’ *iti=kṛṣṇa bahuphalī*=cutichorus=*kāñcanikā=māsaparṇi*=wild *adād* (a kind of pulse).

‘*panḍura*’=*devadāla*=luffa echinato, andropogon serratus.

‘*si*’ *iti=sṛngaverakam=sringikaviṣam*=aconite chasmantham.

‘*ri*’ *iti=laghurigani*=small brinjal.

‘*nikeyā*’ *iti=ketaki*=agave.

Their essence is to be taken out.

‘*sīya*’ *iti=lāngalikā*=gloriosa superba.

‘*kusagaha*’ *iti=ahikharībījam*=seed of *ahikharī*.

‘*bhīru*’ *iti=lājjālu=lajjāvatī*=mimosa.

‘*jalathalanahamandāṇa*’ *iti=jalamandikā=jalam ca tādṛṣī nava-maṇḍanikā, thala=aṅgavatī*.

jala maṇḍanikā=maṇḍukaparṇi=hydrocotyle asciatica.

sthalamandanikā=ambavani.

nabhamandanikā=sunali (akāsavallī=amarakī=cuscuta reflexa.)

Now the process of *rocana=krāmaṇadghatanavidhi*.

‘*na cayāṇī vīro*’ *agnistaṣya* (fire-its) ‘*līlam*’=*agnirūpatām* (form of fire=brightness), ‘*hātum*’=*tyaktum*=to give up, *na śaknuvamiti* (fire cannot give up its form of fire=(brightness), because of *bhāṣ-varakārttasvarūpatvāt* (due to its brightness like gold).

That is to say, mica-killed lead and gold cannot give up fire-form (brightness) due to their brightness.

What are *pañkayam-gaiṇda-caṇḍa*?

‘*pañkayam*’ means *gaganāṁ=abhrakaṁ*, mica, *ityartha*.

‘*gaiṇdam*’ means=*mṛtanāga*=killed lead.

‘*caṇḍa*’ *iti tāram*=silver or *hemam vā*=gold.

ete pañkajādayah kīḍśā saṁto vīralīlam na tyajati ityāh.

‘*surahimatta-paṭipūṇā*’ means=*suribhimātra pratipūṇāh samagrā yathoktamātrollaghanehi na siddhirataste surabhi mātra pratipūṇā iti. keśām kāryāṇam sampādayitri.*

ya matta ata āhu, ‘loaṇa cañkammiya muhāṇamti’ means, ‘*loyaṇāṁ =rocanaṁ=vedha* *ityartha*.

‘*caṅkammiyaiṁ*’ *iti krāmaṇam*.

That is, *locanam*=*rocanam*=*vedha* is intensification or purging process.

The process by which mercury is mixed with *vyavayi* medicines (i.e. opium etc.) and cast into any *mitral* is called *vedha*.

‘*caṅkammiya iti*’ *krāmaṇa*. It is the process of alchemy which is made by taking equal portion of each of the dirt of the car of buffalo, woman’s milk and borax to rub them together throughout the day.

Then make the essence of poison, cinnabar, calamine, red *kaṇṭaka* —a class of (red iron), *indragopa* (a kind of insect born in the rainy season, wax and stool of crow and put mercury in the middle, alum and the essence (*kalkam*) above and below respectively.

Having given glass-powder into it, heat the same in a closed crucible. If it is done, mercury becomes *krāmaṇa* accomplished by this process.

‘*muha iti*’ means *udghāṭanam*. The process by which clear (transparent) colour is brought about into a purified thing (metal) by removing its impurities (dirts or dregs) with mercury is called *udghāṭanam*.

‘*svete nāgottaranam, pitedānam*’ means : In the case of silver lead is to be taken out, while in the case of gold lead is to be given for *udghāṭanam*.

By doing thus, ‘*vīrajiṇinda*’ means *rasendra*=mercury ‘*accharagāṇa iti*’ means *amalavargah* (group of acids). *vargaṇa iti, cha* (six)=*kṣāra-vargah* group of salts, i.e. urine and salts, etc.

‘*ra*’=*rasavargah*=group of minerals.

‘*gāṇa*’ means combination of these three groups of articles.

‘*samgha*’=its assembly by which mercury (*bhavinah*) is fixed (*saṅthuo*=*stambhitam*). That is, Lord (mercury) is worshipped ‘*pāli-ttaya-mai*’ (or *madya*)—‘*matio*’ means mercury purified (worshipped) by the intellect of Padalipta Suri, an alchemist ‘O Lord (mercury) show the process of destruction of all sins—poverty, disease and old age (*sarvaduritas*).

Mathematical Aspects of Jambudvipa

S. S. LISHK

Abstract

Jambudvipa forms nucleus of the system of alternate landmasses and ocean rings. Mathematical consistency of the dimensions of the mount Meru placed at the centre of Jambudvipa is not a matter of mere coincidence. The Sun and the Moon tread upon their respective *mandalas* (diurnal circles) stretched over Jambudvipa. The relative heights of the astral bodies above *samatala bhumi* (literally, the earth having plane surface) imply the astro-mathematical notion of the belt of lunar zodiac. Here an attempt has been made to present a mathematical analysis of the various data concerning the complex structure of Jambudvipa. The boundaries of Jambudvipa have been mathematically ascertained. *Yojana*, the disputed unit of length, has been critically evaluated. In the end, it may be envisaged that Jambudvipa does not represent a hypothetical strand of land but its description stands the test of mathematical screening.

Theory

First we learn about the units of length employed for measuring certain dimensions in Jambudvipa. In fact there existed a diversity of units varying from time to time and place to place. Presently it would be worthwhile to have a brief account of relationship between different types of *yojana*, a prominent unit of length. According to *Anuyogadvāra Sūtra*, there were three systems of measurement, viz., *ātma*, *utsedha*, and *pramāṇa*. In *Tiloya Paṇṇatti* (=TP), there occurs a different system which would hereafter be referred to as *TP* system. In Buddhistic texts, a separate system being called as Buddhistic system has been found to be used. All these systems are related to each other as given below :¹

1 <i>pramāṇa yojana</i>	= 500 <i>ātma yojanas</i>
	= 1000 <i>utsedha yojanas</i>
	= 8 <i>TP yojanas</i>
1 Buddhistic <i>yojana</i>	= 7 <i>TP yojanas</i>

¹ Lishk, S. S. and Sharma, S. D. (1979), 'Length-units in Jaina Astronomy', *Jain Journal*, Vol. 13, No. 4, pp. 143-154.

See also Lishk and Sharma, 'Evolution of Measures in Jaina Astronomy', *Tirthankara*, Vol. 1, Nos. 7-12, pp. 83-92.

Now it is interesting to note the radius of Jambudvipa and the radius of the mount Meru on flat earth are respectively given to be 50000 and 5000 *ātma yojanas*. On the other hand, the Sun is said to be treading upon 65 solar *mandalas* stretched over 180 *TP yojanas* in Jambudvipa. Besides the height of the Sun above *samatala bhūmi* is given as 800 *TP yojanas*. The Moon moves 80 *TP yojanas* higher than the Sun.

It is quite interesting to note the relevance of data in question :

Radius of Jambudvipa	=	50000 <i>ātma yojanas</i>
	=	100 <i>pramāṇa yojanas</i>
	=	800 <i>TP yojanas</i>
And radius of the mount Meru	=	5000 <i>ātma yojanas</i>
	=	10 <i>pramāṇa yojanas</i>
	=	80 <i>TP yojanas</i>
	=	Height of the Sun above <i>samatala bhūmi</i>

Apparently it may be contemplated that Jainas had tried to develop a mathematically consistent model for deeply understanding the world around. It is more evident from the fact that the annual angular journey of the Sun in the north-south direction was measured in earth distances of 510 *yojanas*, i.e., 510 *TP yojanas* = 47×69.09 miles

$$(\therefore 1^\circ = 6080 \text{ ft. and} \\ 1^\circ = 69.09 \text{ miles})$$

thus 1 *TP yojana* = 6.37 miles.

Cunningham has compared various distances recorded by the Chinese pilgrims between prominent places with the actual British road distances and found out that a *yojana* is equivalent to 6.7 miles.²

According to our findings, if

1 <i>TP yojana</i>	=	6.37 miles, then
1 <i>pramāṇa yojana</i>	=	51 miles approximately
1 <i>ātma yojana</i>	=	.102 miles
and 1 <i>utsedha yojana</i>	=	.051 miles

Besides, according to Fleet's estimate $9\frac{1}{11}$ miles make a *yojana* which appears to be *ātma yojana*, thus making a *pramāṇa yojana* equal to 4545.45 miles.

² Cunningham, A. (1963), *The Ancient Geography of India*, Indological Book House, Varanasi, p. 483.

Besides, the arcual distances were measured in time-degrees also, e.g., the zodiacal circumference whereupon the heavenly bodies embrace the 28 *nakṣatras* was graduated in $819\frac{2}{7}$ *muhūrtas*, 54900 *gagana khandas* and finally leading to the development of the concept of 360 degrees.³ Such an evolutionary development of the graduation of the zodiacal circumference with reference to Jambudvipa has not been unearthed in any other civilization so far.

Again we come to analyse the concept of the mount Meru located at the centre of Jambudvipa, the central island of the earth made up of a series of concentric rings of land masses surrounded by concentric ocean rings.⁴ A mathematical analysis of the dimensions of the mount Meru shows that the concept of Meru implies the notion of obliquity of ecliptic. Earth's true axis passes along the hypotenuse of an approximate cone of Meru and not along the axis of Meru. So true radius of Jambudvipa is equal to apparent radius of Jambudvipa less radius of Meru's base on earth, i.e.,

$$\begin{aligned}
 \text{True radius of Jambudvipa} &= \text{Apparent radius of Jambudvipa} - \\
 &\quad \text{radius of Meru} \\
 &= 50000 - 5000 = 45000 \text{ } \textit{ātma yojanas} \\
 &= 90 \text{ } \textit{pramāṇa yojanas} \\
 &= 720 \text{ } \textit{TP yojanas}
 \end{aligned}$$

With this concept, the circumference of Jambudvipa coincides with the parallel of maximum declination of the Sun, i.e., $23^{\circ}.5$ North.

Now as regards the concept of *samatala bhūmi*, *Surya Prajñapti*, the seventh *Upāṅga* (sub-limb) of Jaina canon of sacred literature, states that from the *samatala bhūmi*, the Sun moves at a height of 800 (TP) *yojanas*. A mathematical analysis of these data shows that *samatala bhūmi* represents the plane parallel to the plane of ecliptic and bounded by the parallel of celestial latitude of $73^{\circ}.7$ North. The centre of *samatala bhūmi* is coincident with the projection (on earth) of pole of ecliptic. Radius of *samatala bhūmi* is 90° minus $73^{\circ}.7$, i.e., $16^{\circ}.3$. Obviously with this concept of *samatala bhūmi*, the Jaina notion that the Moon is 80 (TP) *yojanas* higher than the Sun becomes easily discernible. A notion of celestial latitude of the Moon is implied therein.

³ Lishk, S. S. and Sharma, S. D. (1979), 'Zodiacal Circumference as Graduated in Jaina Astronomy', *Indian Journal of History of Science*, Vol. 14, No. 4, pp. 1-15.

⁴ Lishk, S. S. and Sharma, S. D. (1978), 'Notion of Obliquity of Ecliptic Implied in the Concept of Mount Meru in *Jambudvipa Prajñapti*', *Jain Journal*, Vol. 12, No. 3, pp. 79-92.

The only characteristic of *samatala bhūmi* is that the Sun remains above it always at a height (celestial co-latitudinal distance) of 800 (TP) *yojanas*.⁵ On the other hand, the Sun covers 510 (TP) *yojanas* on its southward journey from *sarvābhyantra mandala* to *sarvabāhya mandala* and vice-versa. The consistency of figures 800 (TP) *yojanas* and 510 (TP) *yojanas* support our views regarding the concept of Meru and the concept of *samatala bhūmi*. Even in the case of Meru, consistency of figures throughout gives a good criterion. It is also worth mentioning that although the apparent geometry confirms the Jaina notion about the shape of flat earth, yet the actual observation and determinations do fit the real geometry of earth. In the foregoing exposition, it has been observed that the boundary of Jambudvipa coincides with the parallel of maximum declination of the Sun.

As regards dimensions of Jambudvipa, there is another view also. In *Jambūdvīpa Prajñapti* 7.2, it is stated that there are 65 solar *mandalas* stretched over 180 (TP) *yojanas* in Jambudvipa and then the area of Lavana Samudra (Salt Ocean) begins therefrom.

$$\begin{aligned} \text{Since } 510 \text{ (TP) } & \text{yojanas} = 47^\circ \\ \therefore 180 \text{ (TP) } & \text{yojanas} = 16^\circ.6 \\ & = 23^\circ.5 - 6^\circ.9 \end{aligned}$$

This suggests that north-south stretch of *mandalas* in Jambudvipa is extended southward upto terrestrial latitude of $6^\circ.9$ in the northern hemisphere as we understand it these days, verisimilarly coinciding with the southern limit of ancient India including modern 'Sri Lanka'. This leads us to conclude that the concept of solar *mandalas* implies that the outermost limit of Jambudvipa coincides with the parallel of terrestrial latitude of $6^\circ.9$ wherefrom Lavana Samudra starts.

The dimensions of circumference of Jambudvipa have been already dealt with by Dr. R. C. Gupta as how they were generated mathematically.⁶

Conclusion

A mathematical analysis of the consistent dimensions of the mount Meru coupled with the study of the concept of *samatala bhūmi* shows

- ⁵ Lishk, S. S. (1987), *Jaina Astronomy*, Sumati Sahitaya Sadan, Delhi. See Chapter on Jaina Cosmography.
- ⁶ Gupta, R. C. (1974), 'Circumference of Jambudvipa in Jaina Cosmography', *Journal of History of Science*, Vol. 10, No. 1, pp. 38-46.

that the outermost limit of Jambudvipa coincides with the parallel of terrestrial latitude of $23^{\circ}.5$ North. This conclusion implies that the true radius of Jambudvipa with Meru at its centre is 5000 *ātma yojanas* ($=80\ TP\ yojanas$) less than its apparent radius. Probably at some later stage the apparent radius of Jambudvipa might have been taken for its true radius, as a result of which the outer limit of Jambudvipa might have been shifted $80\ TP\ yojanas$ southward parallel to the latitude of $23^{\circ}.5$ North. But the development of the concept of *mandala* with the help of gnomonic experiments, the outer limit of Jambudvipa had been shifted to $180\ TP\ yojanas$ southward to the parallel of latitude of $23^{\circ}.5$ North. Probably to cover up the gap between the sequential shifts from $80\ TP\ yojanas$ to $180\ TP\ yojanas$ or to account for any error in the gnomonic experiments the concept of *jagatī* might have been evolved which the author is yet investigating. Finally it may be envisaged that Jambudvipa as implied in the recent model of the concept of solar *mandalas* (Sun's diurnal circles) is stretched over northern hemisphere of the earth with its periphery coinciding almost with the parallel of terrestrial latitude of $6^{\circ}.9$ North. This study opens many new vistas of research on certain physical theories in Hindu astronomy and the role of Jainacaryas will be further highlighted.⁷

⁷ Jain, L. C., 'On Certain Physical Theories in Hindu Astronomy', *Pracya Pratibha*, Vol. 5, No. 1, pp. 75-86.
See also Jain, Anupam, *Survey of the Work Done on Jaina Mathematics* (Manuscript).

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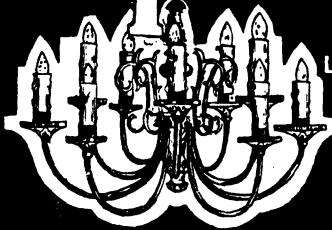
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