Scientific Contents of Jaina Canons : Aṣṭapāhuḍa by Kundakunda

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Introduction

Jainas form a small community in India professing pluralistic philosophy propagated by Lord Mahāvīra and his predecessors in pre-Christian era. They have specific contributions to the various branches of Indian science like Mathematics, astronomy, chemistry and philosophy. However, this field remains unexplored for quite long and it is only recently that academicians all over the world have taken great interest in assessing this contribution in proper perspective. Several authors have shown that Jaina canons have a large amount of material, which if it would have been known, the progress of science would have been definitely much accelerated. Attempts are, therefore, being made to study these canons for their scientific contents and their critical and comparative evaluation. This paper is also an attempt in this direction.

Definition and specification of Canonical literature

Indologists including non-sectarian Jainologists have to face great difficulty in defining and specifying the word Canon or *Āgama*. Normally, this word came later than *Śruta* (heard),[1] i. e. knowledge gained by hearing from the great tradition of seers. Once these words became synonymous but now *Āgama* has dethroned *Śruta* as it is defined as containing consistent[2] and non-controversial[3] knowledge while the *Śruta* may be otherwise also. *Āgama* is said to be more weighty than *Śruta* as it is said to be older. However, this author feels them to be equally positioned in the sense that both of them contain records of the knowledge of the past.[4] Their authenticity is based on the specific qualities after Mahāvīra. It is said that his teachings were in short which were developed by his disciples.

Besides definition, specification of *Āgama* or Canon poses more complexity. Different opinions are available in literature about the loss, preservation or modification of the teachings during the first one

thouand years after his *Nirvāṇa* (527 B. C.).[5] Available accounts confirm that they could not be preserved in ditto as neither parental nor proper teacher-taught-based memorisation could exist in Jaina tradition in periods when writing process was not common.[6] The modern scholar of east and west is, therefore at a fix to decide whether the current *Āgamas* exist in original. It is, however, agreed by scholars of all camps that the present *Āgamas* are quite modified versions of the original ones[7] and it is now very difficult to tell the original parts in them. These have been prepared during 527 BC to 600 AD. The Digambara sect does not authenticate the available *Ardhamāgadhī Āgamas*. They have what they call Āgamalike books—the two most important ones were written by scholars of 100-200 AD[8]. They have some more āgama like books written at about the same period by Kundakunda, Umāswamī and others. Thus, one has to assume that the literature compiled or produced between 527 BC and about 600 AD may safely be called Agamic literature, the commentaries being excluded.

Scientific Contents of Agamic Literature

Agamic literature has a variety of contents including this world and its inhabitants despite its spiritual bias. Akalaṅka[9] has described its contents in 6-7th century. Sādhwī Kanakashri[10] has lately elaborated them. Assuming to be the records of knowledge of the period it was composed, its study agewise may give us an idea how much we have gained or lost in our knowledge within and without. This expectation seems little too much in view of the remarks of Pt. Sukhlal[11] Sanghavī that the Jainas have been mainly believers and therefore, timebound newness or progress in their canonical contents is not visible as in other systems of Indian philosophy. This may be partially true for which there are reasons which have not been elaborated though it requires basic studies.

Many authors[12] have shown that the scientific contents of number of *Āgamas* are quite ahead of their times pointing out the acute observational and keen intutional power of the seers. This paper presents the scientific contents of one more āgama like book *Aṣṭapāhuḍa* by Kundakunda of early Christian era It has not been reported so far and therefore, it will be interesting.

Aṣṭapāhuda : an Introduction

Aṣṭapāhuda[13] is a Prakrit work containing eight independent chapters or treatises named after important religious principles. It contains five hundred *gāthās* describing why and how to achieve self-realisation and what are its merits. The composition has all the characteristics Bhatt[14] has mentioned. Here, one finds similarities with *Gītā* and vedantic concepts. As self-realisation connotes the idea to move away from this temporary body and world, there is sufficient material about them in it. Many of the subtle religious points are explained through physical similies and contrasts a literary beauty about Kumar[15] and Sahityacharya have drawn attention. All this certainly reflects an all-round scholarship of its author Kundakunda whose biography is subject to much speculation. Scholars agree to his long age during 1-3rd century A. D. before Umāswāti–his disciple.[16] He has authored many more valuable granthas and perchance one of the first great scholars who holds profound influence on scholars and common man even today.

This work has a Sanskrit commentary (on 6 chapters) by Śrutasāgara Sūri of 16th. century and a Hindi one by Pt. Jaichand of 19th. century. *Ṣatpāhudas* with Sanskrit commentry were published by Manikchand Granthmālā, Bombay. *Aṣtapāhudas* with a Hindi Tikā by Pannalal Jain, Sahityacharya have been published by Shantivir Jain Sansthan, Shrimahavirji, in 1967. This edition forms the basis of the Present paper. Its scientific facts and statements cover many disciplines of science.

Knowledge and methods of obtaining it

In literature,[9] knowledge has been defined in three ways–actively, passively and abstractively. It is the agent, instrument as well as act of perceiving the self and non-self which may be material, non-material, conscious, non-conscious, present, past or future. It illuminates all and pervades all types of knowables. Kundakunda describes it in an active voice in CP,[15] NS[2] and PS.[17] As the knower is the conscious self, all the above three definitions lead to the synonymity of the self and knowledge like that of saying hotness and fire being the same, the instrument being inseparable from the agent-self. Akalaṅka has elaborated this point logically very well. Samantabhadra of 4th century seems to give a better definition in *Ratnakarandaka*[18] describing it as a medium

through which neither more, nor less but accurate about an object is known. This, I think, is the most up-to-date definition of the word Science of today, thus equating knowledge and science together. This inference may not be digestible to the traditionalists, as the word Science has many unpalatable connotations. This definition is just an elaboration of Kundakunda but better fitted for modernists to have their faith stabilised in *Āgamas*. However, this knowledge should be taken of right or *samyaka* type which does not have uncertainty, doubt and error. This knowledge is said to be the pervasive cause of the right faith in the knower (BP. 14) and their words-*Āgamas*. Many common substances have been used to illustrate its various physical and spiritual qualities as shown in Table 1.

Table 1 : *Similies for knowledge*

S.No.	Simily	Quality	Example	Ref.
1.	Water	cleaning property	wiping out bad thoughts	CP. 41
			wiping diseases	BP. 91
2.	Needle	small, pinpointed	no salvation without *Jnāna*	SP. 3-4
3.	Fragrance	pervasiveness	knowledge pervades faith	BP. 14
4.	Controlrod	controlling power	knowledge controls mind	BP. 78
5.	Hand	swimming power	cross the sea of lust	BP. 155
6.	Weapon	cutting /killing capacity	cutting lepers of *Māyā*	BP. 156
7.	Sun	illumination	*Jnāna* illuminates self and others	
8.	Chariot	vehicle for movement	chariot of knowledge for salvation	
9.	Gem	status symbol	importance of knowledge	DP-20

The knowledge is useful in deciding good or bad. It is the essence of human life (DP-31). It leads us to learn about living and non-living. There are two types of knowledge importance for common man–the first one being sensory while the other one being scriptural (BP. 23). The latter is known as *Śruta* or *Āgama* in the form of *Śutras* which must be understood properly. It is said that the sensory knowledge is inferior

one hence secondary and should not be pursued (PS-53). This topic has been dealt with elsewhere.

There are nine ways to obtain knowledge about an object which involve four ways of verbal statement by name, representation, potentiality and present state (BP-28). After the nomenclature, the gross internal and external properties could be learnt followed by structure, preparation, properties and uses of the object. If the object is a living one, it should be studied under the following heads depicting its physical and spiritual aspects (BP. 31) :

(i) 14 *guṇasthānas* or spiritual steps,
(ii) 14 mārgaṇās or quests,
(iii) 6 paryāptīs or builders,
(iv) 10 prāṇas or effects,
(v) 14 Jīvsamāsas or soul classes,

Details about them are available in Kundakunda and other *granthas*.

The Physical world

There is a large amount of description of the physical world in various chapters. It has a volume of 343 *rajjus*[19] (1 *rajju* = 10^{21}c. miles)[20] with a definite shape. It consists of 5 astikāyas (bodies) 6, dravyas (substances) 7 *tattvas* (realities) and 9 *padārthas* as below in Table 2-the different terms having the same meaning. A man knows about them with his instrument of knowledge through nine or five heads as the case may be.

Table 2. Constituents of the World[21]

2 Substances	5 bodies	6 substances	7 realities	9 padārthas
Living	Living	Living	Living	Living
Non-living	Motion medium	Motion medium	Non-living	non-living
	Rest medium	Rest medium	Āsrava	Āsrava
	Space	Space	Bandha	Puṇya
	Matter	Matter	Saṁvara	Pāpa
		Time	Nirjarā	Bandha
			Nirvāṇa	Saṁvara
				Nirjarā
				Nirvāṇa

These constituents seem to be differing in number, but substantially, they are just modifications of the two basic realities. Kundakunda has described all the classifications prevalent in his period—different schools preferring their own views depending their object of composition. With spiritual aspect, 7 or 9 were accepted while with physical aspect, 2, 5 or six constituents were given. The difference is only in classifying non-living with time or without it. The current following goes with 6 or 7 constituents. Looking to the spiritual object of the book, the details about them are not found here. But during normal treatments, some prevalent practices and concepts regarding chemical and biological sciences are observed therein. An attempt has been made here to put them collectively so that the future scholars may use them for further critical and comparative studies.

Chemical Sciences

Normally chemistry deals with sense perceptible substances and phenomena associated with them. Following chemical facts find mention in this book :

(i) Parmāṇu or atom has been mentioned in many ways showing the prevalence of atomic theory in those days. This has been described by the author in his other treatises. (NS, PS)

(ii) Metals like gold, silver, lead and some others find mention. Not only this, method of obtaining and purification of gold has also been described. Gold is obtained by fusing it with borax and purified by blowing it with a mixture of borax and salt. Similarly, gold can also be obtained when a lead ore is heated with the root of *Nāgafanī* tree and urine of an animal, per chance lead volatalises leavig gold. It is tested by rubbing, beating, heating and drilling. These methods are explicable from today's chemical principles. Metals other than gold are termed as *Hiraṇya*. It seems that the household in south had a very much charm for gold which is still in vogue. (SP, MF)

(iii) Two types of poisons have been mentioned : plant poisons and animal poisons. Both of them are harmful leading even to death. (SP)

(iv) It is mentioned that air is necessary for burning of wood or fuel, though the winds have different effects on the process. The lamp

also burns in air. (SP, BH)

(v) Water is not only purifier but it is also purified by alum–a practice used even today.

(vi) There are five types of fabrics : Natural silk, cotton, woolen, jute and skin. These are still in use with details. (MP. 79)

(vii) Various types of gems have been mentioned as metaphors. Out of them, the diamond has been shown to be the best. The gems form a refracting surface and rays appear to come from them. *Māṇikya, Bajra, Sphaṭika* and ruby red also find mention. They are all natural ones.

(viii) A traditional statement also occurs that the sea contains gems.

(ix) The isotropic nature of salt crystal has been pointed out.

(x) Pervasiveness of oil in til, butter in milk and fragrance in flowers are established facts even of today.

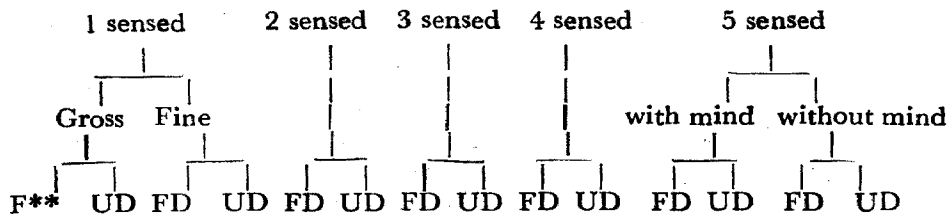
(xi) Insolublity or inertness of stones to water has also been mentioned. (BhP. 93)

Biological Sciences

The biological sciences deal with living substances of all kinds from fine to gross and from one sensed to five sensed. Kundakunda has described them to be in the form of six *kāyas* or fourteen *jīvasamāsas*, as shown in Table 3 elaborated later to 98 varieties, on sense basis–a better way of classification based on other factors.[22] If the one-sensed variety is subclassified in five and development is taken in three forms rather than two, then by addition of all the forms, one gets 98 varieties as shown in Table 4 (BhP. 95, Commentary).

Table 3 Classification of Living Substances

Living Substances



* FD—Fully developable ; UD—Undevelopable.

Table 4. 98 *Varieties of Living Substances*

Type	Varieties	no. development types	Total	Yonis (lacs)
1 sensed fine earth-air	4	3	12	7×4
1 sensed gross earth-air	4	3	12	
1 sensed plants				
general : gross/fine	2×2=4	3	12	14
special	2	3	6	10
2 sensed	1	3	3	2
3 sensed	1	3	3	2
4 sensed	1	3	3	2
5 sensed animals with/without mind				
(a) Uterine	2×3	2	12	4
(b) Spontaneous	2×3	3	18	–
5 sensed (c) Lands of paradise	2	2	4	–
5 sensed human beings				
Lands of paradise, hell and mlecchas	3	2	6	14
(ii) Āryas	1	3	3	
Gods	1	2	2	4
Hellish	1	2	2	4
Total			98	84

All these take their birth in 84 lac nucleii (*yonīs*) (Bh P. 47) and 1975×10^{11} physique (*kulas*) by sexual, asexual or spontaneous and special methods. The basic living substance has been defined in *Bhāva-prābhrita* (64) as being tasteless, odourless, soundless, colourless, sexless, invisible and conscious. SS and NS add qualities of touchless and skeltonless to it. It cannot be recognised by any outward sign. This definition is based on realistic approach rather than practical and is far too short of other description with 23 qualities discussed elsewhere.[22] All this did not connote any meaning to, the modern scientists. Still as the time went on and his conceptual and practical technics developed, he could see and realise many things defined in a similar way in the past. He could surmise these adjectives were given to entities too small to be seen or experienced by the physical senses. He has gone upto

the DNA and RNA as the basic chemical unit of life[24] but is has been impossible to think of such a formless entity as described in Āgamas. Now-a-days, however, many indescribable particles like photos, neutrinos and others have come to stay to resolve problems relating to some basic physical phenomena.[25] At present, nobody is in a position to equate these with the Āgamic soul despite $1 million dollar outstanding award for such an eventuality.

Many details of 1, 2, 3 and 4 sensed beings are available in other literature[9] but Kundakunda has narrated only the basic ones without exemplifying them. His followers have also not elaborated them in a desired way in comparison to human beings, though some animals and plants find mention.

Plant Kingdom

It is described that a tree grows through root, shoot stem, branches, flowers and fruits. Its growth is hampered if the root is cut, dug, dried or destroyed. There are various types mentioned such as those (i) growing from root (ii) shoot (iii) leaves (iv) seeds (v) flowers and (vi) stems. The names of grass, sugar cane, seasame, māltī flower candana tree, asafoetida, food crops, keśara and others appear-supposed to be in common use in those days.

Animal Kingdom

The animal kingdom (except human beings) starts with 2 sensed beings and they are called oblique movers. There is not much description about them but some names like the worms, micro-organisms, tortoise, fourfooted animals (cows etc.), various fishes, crow, serpents, *śeṣhnāga* and some others appear which must be known at that period. They are mentioned only indirectly.

Human Kingdom

It has been pointed out that men generally have a uterine birth with his body developing in the womb during 9-10 months by taking necessary food. The food causes them to take body, senses, language, mind and breathing and supplies energy to keep him alive through metabolic changes. In order to have a better life, one must have his

food devoid of 46 disqualifications. His physical body consists *eight* visible parts : 2 feet, 2 hands, head, breast, chord and hips. It has bones, blood, liver, spleen, biles, bacterias, semen and other things. It has been stated that the body should be hated because it contains the above dirty things inside and outside. The womb is the dirtiest. However, the body of the *tīrthaṅkaras* has many special properties contrary to this notion. Their body is symmetrical with hard joints and fragrance. Beard and moustaches do not grow to them. Their blood and flesh is white. They do neither sweat nor excrete. They do neither grow old nor become patients. It seems these are all wonders associated with them for their glory (Bh P). They lack scientificity.

The body may die 66336 time in about 2500 seconds. It has been stated that it could contain 96 diseases in an *aṅgula* (i. e. 1.5 cms.) and there could be a total of 56899584 diseases in the whole body. This leads to the size of the body as 592704 *aṅguls*, i. e. the size and area of the body could be about 5000 times the current body size–an incredible statement. However, internal and external burns, dehydration, thirst and old age have been mentioned as common diseases. Perchance, the hatred to the body has been so much that this excessive language and figures have been used rather than reality. Similarly, it has been stated that the women have micro-organisms in almost all important parts of their body and innumerable cells die during coitus and menses. Because of this, they do not qualify for salvation direct (SP) while men do despite the fact that they also have a little less but still innumerable micro-organisms (not mentioned). Perchance the hatred to the body has been shown by this excessive language and figures. In addition, the body can suffer four kinds of sufferings : accidental, mental, natural and physical. Death may occur due to poisoning, blood haemorrage, fear, arms, absence of food, obstruction of breathing, mental torture, acute cold and heat, fall from trees and mountains, injury to body parts and erroneous medication. (Bh P-25-26).

Men have been classified as in Table 4. They may follow different professions in the service of the community. Fourteen are mentioned which show that alcohol shops and prostitution must be there. Nurses were also there. The scholarly sadhus had their duty to guide the community to the right path.

Conclusion

From the above description, it is observed that *Aṣṭapāhuda* contains only general observations and traditions and does not contain even as much information and concepts of scientific nature as are contained in some other works of the Jainas. It seems that Kundakunda did not peep deep into these matters in view of his attitude of denouncing the physical world. Later scholars of his school followed him without much addition, thus causing stagnation in intellectual field. Some āchāryas, however, have tried to add to the definitions and clarification of some contents like classification of *Pratykṣa* by Aklaṅka and bond formation by Vīrsena. However, there exists a wide gap between older *Śruta* and Kundakunda school which should not be taken as a reflection on their scholarship as they were spiritualists and they played best through their literature to boost up the moral character of the people.

During the last 1800 years, much advance has been made in the scientific contents about the physical world and the gap is further increased. It is the duty of present generation to crack off the above stagnation and close the gap so that the catastrophic religious attitude of the current generation may be improved.

Abreviations

SS : Samayasāra; NS : Niyamsāra; PS; Pravacanasāra

BP : Bodhaprābhṛta; DP : Darshana Prābhṛta; CP : Caritra-prābhṛta

SP : Sheela Prābhṛta; BhP : Bhāvaprābhṛta.

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