

*Philosophical
and
Scientific
Study of
a Jain
Canonical
Text
Bhagavati
Sutra*

**Scientific Vision of
Lord Mahāvira**

Dr. Samani Chaitanya Pragya



About The Book

The influence of science is all encompassing affecting our thoughts as well as actions. The old is no longer gold; it is the new that fascinates. It is becoming out of fashion to study the ancient scriptures and fathom their depths by self-experience. In order to overcome this apathy it is now being realized that spiritual truths contained in the ancient literature (scriptures) have to be studied and interpreted in modern scientific idioms without subjecting them to any distortions. To make the scriptural study more interesting it is also necessary to present how philosophy has tackled the fundamental questions of life, which are considered inexplicable in the domain of science.

The Jain Scripture *Bhagavatī sūtra* (Bh.S.) occupies probably the foremost position if we set out to enlist books with ample possibilities of the study of philosophy and science. Though the basic object of the Bh.S. is to explore the subtle mysteries of philosophy and spirituality, yet at many places there are significant scientific discourses. For example, the Bh.S. describes cosmology, matter, space, time, the medium of motion and the medium of rest, velocity, energy black hole etc. All these pertain to Physics and have been treated quite at length.

The Bh.S., therefore, qualifies as a text for purposes of the study of philosophy and science. This study, it is expected, will not only enrich knowledge but may enhance the welfare of mankind by eliminating the detrimental aspects of science.

Scientific Vision of Lord Mahāvīra

(With Special Reference to Bhagavatī Sūtra)



Jain Vishva Bharati Publication

Scientific Vision of Lord Mahāvīra

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Publishers :
Jain Vishva Bharati
Ladnun - 341 306 (Raj.)

© Jain Vishva Bharati, Ladnun

Sponsored by : Friends Oil & Chemical Terminal PVT. LTD
Gandhi Dham (Kutch) INDIA, 370 201

First Edition : September 2005

Price : 150/-

Type Setting : Sarvottam Print & Art

Printed by : Kala Bharti
Naveen Shahdara, Delhi-110 032 (INDIA)

Foreword

The canonical literature of the Jains is a valuable repository of various of learnings, in which copious discussion on diverse subjects is available. Especially, the Bhagavatī Sūtra originally titled as 'Viahāpaṇṇatti' which is one of the most important Jain canonical texts contains multitudinous variety of fields of knowledge which, if studied critical and comparatively with other disciplines, can yield numerous new facts. Unfortunately a little work has been done in this direction of Indological studies. Those who are doing research in the field of Jainology can not do justice to the subject unless they study deeply the Jain canonical texts.

It is a matter of delight that some scholars doing research in Jain Vishva Bharati and Jain Vishva Bharati Institute at Ladnun are undertaking studies in this little explored field. Among them are some monks, nuns and samanīs Dr. Samanī Chaitnya Pragma is one of them, who has not only critically evaluated the doctrines described in the Bhagavatī Sūtra from philosophical standpoint but also from scientific standpoint, in her thesis entitled "Scientific Vision of Lord Mahāvīra" (With Special Reference to Bhagavatī Sūtra). Definitely it is a commendable effort. The scholars who are fond of exploration in unknown field of knowledge will get such topics in this thesis, which are important both for philosophical as well as scientific contemplation and research.

I express my auspicious feelings for Samanīji that she would make deeper studies in Jainology and present more useful material for the scholarly world so that this almost unknown field would become more explicit.

25/9/2004
Siriyaṛī, Pālī (Raj.)

Acharya Mahapragya

प्राक्कथन

जैन आगमों में "अध्यात्म विद्या" के रहस्यों के साथ अनेक विद्या-शाखाओं के विषय में विशद विवेचन उपलब्ध है। विशेषतः भगवती सूत्र एक ऐसा आगम है जिसका समीक्षात्मक एवं तुलनात्मक अध्ययन किए जाने पर अनेक तथ्यों की जानकारी हो सकती है। अभी तक भी भारतीय विद्याओं के अध्ययन-क्षेत्र में इस दिशा में अधिक कार्य नहीं हुआ है। जैन विद्या के क्षेत्र में अनुसंधान करने वाले तब तक विषय के साथ सम्पूर्ण न्याय नहीं कर सकते जब तक जैन आगमों का गहराई से अध्ययन नहीं कर पाते।

जैन विश्व भारती एवं जैन विश्व भारती संस्थान (मान्य विश्वविद्यालय) के अन्तर्गत कुछ शोध-विद्वान् इस दिशा में प्रयत्न कर रहे हैं। हमारे धर्म-संघ के कुछ साधु-साध्वियां एवं समण-समणियां इस दृष्टि से अनुसंधान-कार्य में संलग्न हैं। इनमें से एक समणी चैतन्यप्रज्ञाजी ने अपने शोध-प्रबन्ध "Philosophical and Scientific Evaluation of Bhagavatī Sūtra" वर्तमान रूप "Scientific Vision of Lord Mahāvīra" (*With Special Reference to Bhagavatī Sūtra*) में भगवती के सिद्धांतों का न केवल दार्शनिक दृष्टिकोण से मूल्यांकन किया है अपितु वैज्ञानिक दृष्टि से भी उनकी मीमांसा की है। यह प्रयास स्तुत्य है। इस शोध-प्रबन्ध से जिज्ञासु विद्वानों को चिन्तन एवं अनुसंधान के लिए कुछ ऐसे विषय प्राप्त हो सकते हैं जिनका महत्त्व दर्शन और विज्ञान दोनों क्षेत्रों में है।

मैं समणीजी के प्रति शुभाशंसा करता हूँ कि वह अपने अध्ययन को और गहरा बनाएं तथा जैन विद्या के इस अल्पज्ञात क्षेत्र का अवगाहन कर विद्वत्जगत् के सामने और अधिक उपयोगी सामग्री प्रस्तुत करें।

25/9/2004

सिरियारी, पाली (राज.)

लोकमान्य महर्षि आचार्य श्री महाप्रज्ञ

Preface

I feel highly privileged to be invited to write this preface to the book “Scientific Vision of Lord Mahāvīra (*With Special Reference to Bhagavatī Sūtra*)” which I regard as the greatest philosophical work that has come out of Jain Vishva Bharati Institute (Deemed University). Samani Chaitanya Pragma has been awarded the degree of doctor of philosophy on this remarkable thesis which has all the boldness and brilliance of thought characteristic of Jain Scientific mind. This thesis seeks to communicate and revitalize in relevance to modern science. It is well known that Bhagavatī Sūtra is the encyclopedic work on Jainism. The author has very widely and rightly selected the issues which are philosophical and scientific both from the voluminous Bhagavatī Sūtra. The vital issues are on the universe, space and time, the theory of pudgala, the theory of atom and the biological elements discussed in the Bhagavatī Sūtra. i.e. the focus remained on the scientific topics related mainly to Physics, Cosmology and Biology.

During nineteenth and twentieth century science became too technical and mathematical that the philosophers reduced the scope of inquiries so much that Wittgenstein, the most famous philosopher of this century said, “The sole remaining task for the philosophy is the analysis of language.” But, we find that the author of this book has brought this idea in the forefront that the Jainism has still to give a lot of theoretical concepts in the field of science. Though the subject of the thesis is not a new one but with the advent of science this subject has gained tremendous importance in present time. Earlier writers on Jain philosophy and science tried to discover scientific properties of Jain Concepts but the author’s work is unprecedented in magnitude and complexity in the sense that it has interpreted the Jain technical terms in modern

phraseology. The author has claimed it to be the main contribution of this thesis.

It is interesting to find that the illustrations and the pictures of the universe described in *Bhagavatī Sūtra*, has relevance with the Einstein's famous question about whether God had any choice in creating the universe? A living physicist of our time, the Lucasian Professor, Stephen Hawking attempts to write that a universe may be finite but with no boundaries, no edge in space, no beginning or no end in time and therefore nothing for a creator to do. It is true that Jainism is the only religion that has propounded for the universe to be eternal, working by its inherent laws and not created by any God or Supreme Being. In the Jain metaphysical system, there is no place for any such God, who creates and regulates the universe. According to the Jain philosophy, *Jīva* (Living) and *Ajīva* (Non-living) are the two realities which are responsible for the existence of the universe, which has no beginning or end in time. Jain canonical literature contains many universal laws. To my mind, one of the universal laws is the 'law of opposites' i.e. the universe exists with the realities which have opposite characteristic properties or behavior. The 'opposites' exist simultaneously. For example, *Jīva* and *Ajīva*, *Loka* (cosmos) and *Aloka* (transcosmos), *Dharmāstikāya* (the medium of motion) and *Adharmāstikāya* (the medium of rest), massless matter and matter with mass and so on. We also observe the opposite properties in the eight forms of tactility of *pudgala* i.e. cold and hot, oily and dry, soft and coarse, light and heavy.

Samani Chaitanya Pragna has done a commendable work by unfolding the hidden realities of the Universe, described in *Bhagavati Sutra*. She has indeed done a Herculean task in bringing the religion and science closer. I heartily welcome the publication of this book.

Dr. Mahavir Raj Gelara

Former V. C., J.V.B.I.

Introduction

The main and also the unique doctrine of Jainism is non-absolutism. Through this comprehensive doctrine we realize the various aspects of reality. According to the doctrine, both partial and whole truths are significant. Values of both the intrinsic and the extrinsic aspects of an object are preserved in relative and contextual assessment. In the universality of non-absolutism, temporal or contextual exigencies and contingent speculation find their proper places. This doctrine does not uphold the limited monistic or absolutistic approach to reality. It accepts the transcendental as well as the empirical. It leads the cogniser to the relative evaluation of variously oriented thoughts obtaining in the world of ideology. Thanks to this doctrine we find in Jain philosophy and canons, a synthetic trend right from the canonical age to the present day.

Disciplines, apparently different, but emanating from the same source are easy to reconcile, whereas those emanating from different sources are not. Spirituality and science are but different modes of apprehending reality—one is subjective and experiential whereas the other is objective and experimental. On account of the different means employed by them and different aspects of life covered, it becomes comparatively difficult to synthesise them.

The influence of science is all encompassing affecting our thoughts as well as actions. The old is no longer gold; it is the new that fascinates. It is becoming out of fashion to study the ancient scriptures and fathom their depths by self-experience. In order to overcome this apathy it is now being realized that spiritual truths contained in the scriptures have to be studied and interpreted in modern scientific idioms without subjecting them to any distortions. To make the scriptural study more interesting it is also necessary to present how philosophy has tackled the fundamental questions of life, which are considered inexplicable in the domain of science.

Though there is a general assertion that ancient Indian thought has ample scientific undertones without solid proof based on scientific research this statement remains at best an egotistic projection. It is, therefore, essential that in depth studies be undertaken of scriptures on scientific lines with a view to identifying intuitive insights that lie scattered in plenty in ancient literature and bear close resemblance to modern scientific findings. Such a study would also highlight those thoughts and ideas that do not fall in line with modern scientific thinking but which are no doubt of momentous significance.

However, this scientific study of the ancient scriptures in all probability will present a formidable difficulty in describing the authentic meaning scriptural statements which have been presented in obscure, archaic, mystical and aphoristic style. It is not untrue to aver that many a commentator has failed to comprehend fully the correct meaning of scriptural statements simply because the reason that he/she was not conversant with recent advancements made in modern science. The study of the Jain scriptures in the context of modern science is, therefore, a new adventure in the domain of research that opens before us a new panorama of a deeper and true understanding of those ancient texts.

The *Bhagavatī sūtra* (Bh.S.) occupies probably the foremost position if we set out to enlist books with ample possibilities of the study of philosophy and science. Though the basic object of the Bh.S. is to explore the subtle mysteries of philosophy and spirituality, yet at many places there are significant scientific discourses. For example, the Bh.S. describes a phenomenon called *Tamaskāyā* and *Kriṣṇarāji*. The phenomenon comes quite close to the Black Hole recently discovered by science. Not only this, at many places such mathematical methods have been employed as are currently in use in modern science.

The *Bhagavatī Sūtra*, in its metaphysics, deals with several subjects which are highly scientific in nature. Subjects such as matter, space, time, the medium of motion and the medium of rest, velocity, energy etc. all pertain to Physics and have been treated quite at length. The Bh.S., therefore, qualifies as a text for purposes of the study of philosophy and science. This study, it is expected, will not only enrich knowledge but may enhance the welfare of mankind by eliminating the detrimental aspects of science.

Among the modern scientists there are several who unequivocally accept the scientific depths of Indian philosophical systems. They opine that the insights gained into the nature of reality by the ancient seers through spiritual meditation are corroborated by the latest discoveries of science accomplished through deep intellectual theorizing and sophisticated observation and experimentation.

Evaluation of Lord Mahāvīra's philosophy is certainly a significant venture of investigation. This much has been accepted by scholars like

Schubring who mentions that Lord Mahāvīra emerged as a superbly versatile thinker among the ascetics of the bygone ages. He writes in his book 'Doctrine of the Jains' as follows—

“Mahāvīra.....above all, however, the most versatile thinker we know of in ancient India, had a liking for figures and arithmetic, that characterizes his speeches as most extra-ordinary.”

Philosophy of Lord Mahāvīra has been expressed in the Bh.S in a scientific and mathematical style. Scholars working in the field of comparative study of science and philosophy face the problem of proper comprehension of technical terms. We shall have to interpret such terms in modern phraseology and this is going to be the main contribution of this thesis. Generally the scholars of oriental languages are not well versed in modern scientific concepts. Similarly the expert of science are unable to grasp with precision the meanings of ancient doctrines because of their total unfamiliarity with scriptural languages. It is, therefore, imperative that in order to grasp the true meaning of scriptural doctrines one must have a satisfactory knowledge of ancient languages as well as of modern scientific concepts. In the present dissertation, efforts have been made to fulfill these requirements as far as possible.

The Bh.S. is a voluminous work and it can not be studied properly for the purposes of our dissertation unless we define clearly our angles of approach.

1. To start with, one has to be acquainted with the philosophical beliefs prevalent in ancient India. In the Bh.S., at several places, the contemporary heretical doctrines have been elaborately dealt with. Yet, it is necessary that the contemporary doctrines are studied from their original sources and references to them in the Bh.S. are evaluated accordingly. For example, the dai-atomic and the trio-atomic in the Bh.S. have a bearing upon the Vaisesika philosophy. It will be, therefore, necessary to analyze and assess the presentation of the atomic theory in the Bh.S. with direct reference to the Vaisesika philosophy.
2. Again, the subjects occurring in the Bh.S. should be studied with such occurrence in other Jain texts; particularly the Digambara fundamental works, as *Ṣaṭkhaṇḍāgama* and *Gommaṭasāra*. The other Svetambara canons too will have to be looked into, in which corresponding subjects have been elaborated or touched. For example, several topics of the Bh.S. have been presented in the canons like *Rājapraśnīya*, *Prajñāpanā* or *Sthānāṅga Sūtra*, sometime exhaustively and sometimes just in passing.
3. As this research project will primarily focus on scientific concepts, it will be necessary to investigate those ancient texts which mainly deal with science and technology. For example, Caraka and Sushurta in

Ayurveda are important for details of human physiology.

The primary sources related with the proposed text, such as different editions of the Bh.S. and commentaries will have to be properly used. Besides, use of scientific treatises will be necessary for the purposes of this work. Study of secondary sources, such as Jain Metaphysics, books written on and about the Bh.S. and other Indian systems of philosophy, will be necessary for comparison and analysis of the subjects proper. Besides these, developments in modern Biology, Physics, Chemistry and Psychology etc. too will have wide and comprehensive view for doing justice to the subject matter.

By now, several Indian and foreign scholars have made comparative study of science and philosophy. Some scholars have studied Jain philosophical literature and history etc. in general and the Bh.S. in particular. It will be necessary to take stock of all these studies. Besides, researches in ancient literature will have to be consulted whenever necessary. We are not aware if any study on the Bh.S. has been carried out with special emphasis on its scientific philosophical aspects though some studies are there—Jaina Darśana aurā Ādhanika Vijñāna (in Hindi), Cosmology: Old and New, Atom in Jain Philosophy & Modern Science, Jaina Darśana aurā Vijñāna (In Hindi). These studies, however, exhibit certain shortcomings:

- i) Though these studies refer to the Bh.S., the scientific contents of the text have not been brought out extensively much less exhaustively.
- ii) Moreover, these studies do not take into account the latest concepts of science which have been developed during the last one or two decades. Some of the concepts they have taken up for purposes of comparison are no longer considered tenable or valid. The present study, therefore, has a wider conceptual range in so far as it includes the new vistas which recent scientific advancements have opened.

Hitherto, most of the scholar have just presented and enlisted the parallel topics of philosophy and science. They have tried to discover scientific props for Jain concepts. But our effort in the present study has been directed towards presenting the Jain concepts as they are examining their scientific potentiality.

This research work spans over seven chapters besides the introduction. The first chapter covers a brief outline of the form and contents of the Bh.S and general discussion on philosophy and science. Thereafter in separate chapters we have treated different metaphysical and biological issues from philosophical as well as scientific point of view.

Findings of the Work

The Study of philosophy and science based on the Jain canon Viahāpannatti i.e. Bhagavatī Sūtra throws light on the issues which are both

philosophical and scientific. Scientific does not mean they are scientifically proved but can be subject to scientific research or study. Bh.S is really a voluminous and largest text to study almost all the unique doctrines proposed by Jain Seers technically recognized as 'Tirthaṅkar'. As we go deeper and deeper into the study of the text we find many more new things in it. The first chapter of the work deals with such innovative ideas in very brief. Not only this, the chapter intends to make the reader acquainted with the similarity and dissimilarity of the contents of the text with other Jain canonical literature. Thereby the importance and weightage of Bh.S can easily be gauged. As far as my knowledge goes, such type of introduction of the text is not found anywhere else.

The second chapter of my work mainly deals with the cosmic conceptions found in Jainism in general and in Bh.S. in particular. The longstanding queries related to the origin and fate of the universe have been dealt with in the text in a non-absolute way which in itself is scientific. The answer shows that universe is an ongoing phenomenon. The natural universal laws govern the universe. Modern science also accepts that there are certain laws which are working behind the world. Besides, the Bh.S. deals with the center of the universe which is a new discovery. The discussion of the configuration of the universe is also unique. The expanse of the universe, computed through the illustrations of the speed of gods and goddesses, proves the fact that some truths are such which cannot be explained even in the mathematical language. The most striking finding of this chapter is to bring out the concept of curvature of the universe to knowledge. Science has proved and latter on rejected curvature in space. But according to the Bh.S. curvature is not in space; it is in cosmos. In the ends of the cosmos we can find curvature because of the occupation of the medium of motion and the medium of rest in a particular geometrical shape. Another finding of the chapter is, it deals with a systematic order of the universe under the concept of stratification. The concept indicates to the systematic structure of the universe and shows interdependency of the constituents of it. The basic elements in the form of the medium of motion and that of rest described in the second chapter are really very scientific and unique postulations. These two fundamental principles play a very important role in determining the demarcation line of the cosmos and supra-cosmos and preventing the world to be chaos.

The third chapter mainly deals with space and time. The Bh.S. mentions time in various forms which are quite practical. Along with this, time as a substance in atomic form, which is extensively dealt with in the Digamber tradition, can be seen in its formative stage in the text. The postulation of the supra-cosmos or trans-cosmos of Bh.S. discussed in the chapter is also amazing. The expanse of supra-cosmos is shown as immeasurable even by the fastest speed of the gods. The configuration of it has been compared with a sphere of infinite radius, having a hole in center.

The concept of supra-cosmos, according to Acharya Mahapragya, endorses the fact that every existent has its anti-thesis or binary; nothing can exist without its anti-thesis.

The fourth chapter is mainly concerned with the theory of pudgala—physical reality or matter. The principle of immutability of pudgala as substance in the Bh.S. and the principles of Conservation of Matter and Energy in science are coming closer to each other. Different modifications of pudgala, such as, light, darkness, sound and rays etc. have also been scientifically well established. It proves that the approach of Jain seers is more or less scientific in comparison to other philosophical systems related to these phenomena.

The fifth chapter describes something beyond imagination related to atomic or sub-atomic world. The various kinds of motion of atom show extraordinary perception of the Jain seers. The concept of spinning of atom had appeared more than 2500 years ago into the experience of the Jain seers in comparison to the observation of scientists of today. Till the time of Einstein, it was accepted that nothing can move faster than light. Recently, it has been accepted that there are some sub-atomic particles which are massless and which move faster than even light. But according to the Bh.S., the speed of not only living beings but also atom itself is the fastest one. In one instant (samaya), it can go from one end to the other end of the universe. Besides, the laws of motion of atom, mentioned in the Bh.S., are also significant. It also refers to the fact that atom is also governed by uncertainty principle.

The sixth chapter deals with the biological factors which are quite knowledgeable. It also deals with the problem of soul-body relationship and cloning system etc.

The corresponding figures given in the appendix help the reader to comprehend the shape of universe, the place of heaven etc. mentioned in the text of Bh.S.

Thus, the thesis on the Bhagavatī Sūtra would provide the modern thinkers and scientists some innovative ideas with the little known facts and theories of Jain philosophy and inspire them to think over the scientific vision of the Jain Seers. The work would help deepen the scope for the study of Jainism in general and Jain canonical literature in particular. The thing worth to notice in the context of the Work is thesis is that the text Bh.S. mentioned throughout the work connotes the text Bhagavaī contained in Aṅgasūttāni Vol. II edited by Muni Nathmal.

Samani Chaitanya Pragya

Acknowledgement

I express my deep sense of reverence and gratitude to the greatest saint of modern times Anuvrat Anushasta, Acharya Shree Tulsi, who has made unparalleled efforts to revolutionize the Jain precepts and concepts and reformed the Jain society. His Holiness Acharya shree has been not only a stalwart of the Jain society but a bulwark too and has established Institutions, like Jain Vishva Bharati Institute (Deemed University) which is unique of its kind in India and the world. He was an institution in himself and one of the greatest personalities of modern India who made invaluable and endeavoring contribution to contemporary religious thought and social advancement.

I also express my humble sentiments to Acharya Mahapragya, the able successor of His Holiness Acharya Shree Tulsi and a philosopher of an international stature who has enriched the world of Jainism enormously with his creative contributions. It is the lives of these two great men who provided me the needed inspiration and encouragement to embark upon this rather arduous and uncharted course of study.

I have had the fortune of enjoying the blessings of these two revered Acharys in my research work in Jainology specially their commentary on the Bh.S which helped me a great deal to interpret this encyclopedic work in the light of modern scientific discoveries.

I am equally indebted to the Mahasramani Shree Kanakprabhaji, Head of all the nuns of Terapantha sect for inspiration and blessings which can not be expressed in words.

During the writing of this thesis, my own understanding of Jain mystical thoughts in particular and other philosophical systems in general and of the science like Physics, Chemistry, Mathematics, Biology, Psychology and Parapsychology was deepened considerably. For this I feel highly indebted to Prof.

Muni Mahendra Kumarji, my informal guide and the academic mentor Prof. B.B Raynade, the formal guide. Muni shree Mahendra Kumarji opened my eyes to many aspects of science and philosophy, which I was not familiar with before. He brought to my understanding many facts of Jain Philosophy that were quite abstruse and beyond my comprehension and also those discoveries in modern science, which had a comparative relevance. His book "Microcosmology: Atom in Jain Philosophy & Modern science" has been the main source for presenting the concept of Matter and Atom in the light of science. Prof. Raynade not only enlightened me in the methodology of my research study but also provided me the necessary guidance as to what and where I could get relevant materials and how I could utilize them. I am equally grateful to Prof. Musafir Singh, HOD of Social Work, who has reviewed the whole thesis and suggested additions of some important scientific issues which had been left out unknowingly.

In the same way I would express my grateful thanks to Muni Shree Amrit Kumarji, the elder brother and Samani Nirvan Pragya, the elder sister who have always been helpful in my work.

I also express my profound thanks to all the saints, samanīs (nuns) who directly or indirectly helped me in this research work. I would specially like to regard my thanks to the Niyojika Mangal Pragyaaji who everstrived to remove all the obstacles which came in my way. I would also express my indebtedness to other elder and younger samanīs namely Madhur Pragya, Malli Pragya, Amit Pragya, Ruchi Pragya, Mukti Pragya, Manjula Pragya, Karuna Pragya, Punya Pragya and Dr. Anil Dhar, Nirmal Choradiya and Sashi Chajjer for their kind co-operation and timely assistance.

I also express my thanks to the former Vice-chancellor and eminent scientist Prof. B.C. Lodha and the Registrar Dr. Baccharaj Dugar for their unstinted support for the computerizing of this work. I express my heartily thanks to the present V.C. Ms. Sudhamahi Regunathan who assisted for editing and publication of this work.

I owe my special thanks to Nimai Charan Tripathy who computerised the work so gladly and painstakingly.

Finally, I am also very much grateful to Sukharaj, Babulal, Tribhuvan, Ashok Kumar and Ramesh Kumar Singhi, Gandhidham (Gujarat) who are kind enough to provide economic-assistance in the memory of their father Amarchandji Singhi.

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The scriptures of Lord Mahāvīra are compiled in the “*dvādaśāṅgī*” (the twelve canonical texts of the Inner Corpus). The fifth “*aṅga*” is titled as “*Vīāhapaṇṇatti*” or *Bhagavatī Sūtra*.

The Scripture *Bhagavatī Sūtra* is an exhaustive treatise on metaphysics. It contains an elaborate comprehension of both the realities — the sentient and the non-sentient. Hence, it is unlikely that any branch of learning would have remained undiscussed, directly or indirectly, in this encyclopedic work. Such a voluminous treatise on the metaphysics is difficult to find elsewhere. It is indeed a tough job even to make a total assessment of all the topics propounded therein. The doctrine of *Anekānta* is applied to every metaphysical issues in the Jain philosophy in general and in *Bhagavatī* in particular.

In Mahāvīra’s time, there were a number of schools of religious philosophy belonging to both the traditions — the *śramaṇa* and the Vedic. All of them used to preach their own views. Mahāvīra, however, independently expounded those subtle truths, which are not only philosophical but scientific in nature, by him through a long course of austerity (including meditation). For instance, the theories of *śaḍjīvanikāya*, *loka-aloka*, *pañcāstikāya*, *paramāṇu*, *tamaskāya*, *kṛṣṇarājī*, etc., propounded by Mahāvīra and discussed in the present scripture are the indicators of independent identity of the Jain philosophy.

Samani Chaitanya Pragyā

1

Bhagavatī Sūtra: As an Encyclopedic Work

Man is essentially a thinking or rational being. He has not only enunciated a view of life, but also inculcated a way of life. The happy combination of the view and way of life has been the distinctive characteristic of the Jain philosophy. The Jain thinkers were extra-ordinarily meticulous in evolving a system of thought which was so rigorous and logical in its attempt as not even allow by implication of any illogical entry of onesidedness. Jainism, of course, is a philosophy of Anekanta. The Jains have presented not only a consistent and comprehensive philosophical system, but also propounded a number of theories in the field of science; particularly in the fields of Astronomy, Mathematics, Cosmology, Cosmogony, Physics, Botany, Chemistry, Psychology, Para-psychology and *Puṣpāyurveda*, a very rare branch of knowledge.

All the philosophical and scientific tenets of Jainism in their original form have been discussed in some way or the other in the canonical literature in general and *Bhagavatī Sūtra* in particular. The whole canonical literature is mainly divided into two categories namely *Āṅgapraviṣṭa* (*āṅga*) and *Āṅgabāhya*. The division of *Āṅgapraviṣṭa* and *Āṅgabāhya* is a latter development. The most ancient division available in *Samvāyāṅga* is as *Dvādaśāṅgī* (*Gaṇipiṭaka*) and *Caturdaśapūrva*. By the time of *Nandī*, a canon, the canonical literature has been divided into three categories—1. *Pūrva* 2. *Āṅgapraviṣṭa* 3. *Āṅgabāhya*. Today only the latter two divisions are available in writing, while the former is not traceable. *Āṅgabāhya* is further sub-divided into two e.g. *Āvaśyaka* and *Āvaśyakavyatirikta*¹

The *Āṅgapraviṣṭa* canons are considered to be the nearest to the original and most authentic of all as they are composed by the principal disciples of Lord Mahāvīra. They are twelve in number: 1. *Ācārāṅga*, 2. *Sūtrakṛtāṅga*, 3. *Sthānāṅga*, 4. *Samavāyāṅga*, 5. *Vyākhyā-prajñapti*, 6. *Jñātā-Dharma-kathā*,

7. *Upāsaka-Doṣā*, 8. *Anta-kṛta-Doṣā*, 9. *Anuttaropapātika-Doṣā*, 10. *Praśna-Vyākaraṇa*, 11. *Vipāka-Sūtra*, 12. *Drṣṭivāda*.

The thesis is based on the fifth aṅga known as '*Vyākhyā-prajñapti*'. The work written in a dialogue style is called '*Vyākhyā-prajñapti*'.

Besides, it is also known as *Bhagavatī Vivāhapannatti*, *Vivāhapannatti* or simply *Pañnatti*. This work is more voluminous than other aṅgas. It is multifarious in its contents. Probably, there is no branch of Metaphysics, which has not been discussed in it, directly or indirectly. From the aforesaid point of view, this canon was held in high esteem. The adjective '*Bhagavatī*' was, therefore, added to its original title '*Vyākhyā-prajñapti*'. Many centuries before, the adjective '*Bhagavatī*' became a part and parcel of the title. Now a day, the title '*Bhagavatī*' is more in vogue than '*Vyākhyā-prajñapti*'. It is the most important work of the *Ardha-māgadhi* language. It is also the largest in size. It is not only a work of encyclopedic range but it is a veritable mine of the gems of knowledge, whose magnitude and depth, extension and intension are simply mind-boggling. This text contains questions and answers, between Mahāvīra and his disciples, particularly Indrabhuti Gautama. According to '*Samavāyāṅga*'² and '*Nandī Sūtra*',³ the present canon has an exposition of thirty six thousand queries whereas according to *Tattvārthavārtika*,⁴ *Saṅkhaṇḍāgama*⁵ and Kaṣāya-Pāhuḍa⁶ it has sixty thousand queries. It also contains material in the form of dialogue-legend. The Fifteenth chapter of the text contains legendary or semi-historical material relating to Mahāvīra's life and his relation with some of his predecessors and contemporaries. The text makes frequent references and cross-references to the aṅgas like the *Prajñāpanā*, the *Jīvābhigama*, the *Aupapātika*, the *Rājaprasānīya*, the *Nandī* and the *Anuyogadvāra Sūtras*.

An Encyclopedic Work in General

There are a lot of subjects dealt with in the Bh.S. All of them can be studied in the light of different sciences. Along with the metaphysical and spiritual talk we can find philosophical, scientific, historical and cultural discussions as given below at every step. This is why the Bh.S is rightly recognized as an encyclopedia.

Philosophical, Historical and Cultural View-point

The Bh.S discusses many philosophical, historical and cultural things. From philosophical point of view it describes five principal substances as fundamental realities. They are known as *Pañcāstikāya*.⁷ Of these the medium of motion (*Dharmāstikāya*), the medium of rest (*Adharmāstikāya*) and space (*Ākāśāstikāya*) are one, formless and invisible. Of the rest two, the soul (*Jīvāstikāya*) is infinite in number, formless, invisible, while matter (*Pudgalāstikāya*), being infinite, is visible. The multiformity of our world

results from two substances i.e. soul and Matter (*jiva* and *pudgala*).⁸ A clear ascertainment of the soul and Matter is found in this canon to an extent which is not available in any other religious or philosophical works. The full text of the canon is not available today, but whatever is available discusses thousands of queries. From the historical point of view, the chapters⁹ on *Mankhalī Gośala*, *Jamāli*, *Śivarajarṣi*, *Skanda Sanyāsi* etc., are of great importance. In reference to philosophy discussion with Jayanti, *Mudduka*, *Roha* ascetic, *Somila Brahmana*, Lord Parsva's disciple, *Kalisyā-vesiya-putta*, lay follower of Tungiya city etc.,¹⁰ are of seminal significance. From the view point of Mathematics, discussions with *Parśvapatyīya Gāṅgeya* ascetic are of great value.¹¹ Various aspects of history and culture, different systems of religion, political history, cosmology, cosmography, geography, mathematics and evolution of the Jain philosophical thoughts are embodied here in such a consolidated manner as nowhere else.

In the age of Lord Mahāvīra, there were different religious cults in vogue but bigotry was almost un-heard of. Ascetics and Parivrajākas, one class of ascetics, of one religious body went to engage themselves in philosophical discussions with those of other religious bodies and whatever was found to be acceptable, was accepted freely. There are many contexts in this scripture, which throw light on the open-mindedness of religion prevailing in that age.¹² In this respect this canon embodying different viewpoints is thus really a work of encyclopedic dimension. In the context of the thesis, the scientific approach of the Bh.S is enough to prove it to be of an encyclopedic character. Advances in different branches of Modern Science have recently brought to light many mysteries which find a direct or indirect mention in this canon composed 2600 years before.

Scientific Approach

According to the Jain tradition, Lord Mahāvīra was an omniscient being, and therefore his knowledge about everything was vast, exact and real. He dealt with any subject presented to him in a question and answer form or even otherwise. That is why in the Bh.S, we come across hundreds of topics about which there was a query from Indrabhuti Gautama (one of his disciples) and other curious disciples; and Mahāvīra would instantaneously explain the mysteries involved. The modern scholars¹³ have all accepted the fact that Mahāvīra was one of the most versatile thinkers of ancient India, and he was even more accomplished than Gautama Buddha.¹⁴

Thus, it is easy to see that in Mahāvīra's philosophy there are so many topics that clearly reflect the scientific approach required understanding of the mysteries of nature. Although it is beyond the scope of this thesis to deal in detail with each and every of such topics, yet an attempt is made to state and explain the relevancy of his thought in the context of the present scientific discoveries.

First of all, when we speak of scientific temperament, we mean by it a systematic approach to understand truth in a rational and verifiable manner. Let us not forget that although the main object of Mahāvīra's philosophical deliberations was to elucidate the practice of spiritualism that leads one ultimately to emancipation, there are a large number of passages which have a bearing on subjects having a scientific import. For example; the whole theory of karmic particles is a systematic analysis of micro-cosmological phenomenon. The theory of karma is so thorough in its consistency that it provides a full scope for a truly scientific investigation.*

The scientific approach generally involves mathematics and logic. In the Bh.S, wherever it was found necessary to go into detail to understand certain phenomena, Mahāvīra did not hesitate to use mathematical calculations and logical arguments. For example; in the case of souls charged with anger, pride, deceit and greed, the total number of their permutations and combinations is provided.¹⁵ Similarly, in the case of ascetic Gāṅgeya's death, Mahāvīra explained the permutations and combinations of soul's entering into the infernal life, the sub-human life; the human life and the celestial life.¹⁶ Here, a very complex mathematical computation has been given to understand the whole phenomena, which unambiguously demonstrates the scientific temperament of Mahāvīra. In another interesting episode of the Chamara, the head of devils, Shakra, the head of gods, and the Vajra, an instrument used by Shakra, the relative velocity of the three has also been mentioned.¹⁷ Such descriptions are again a direct evidence of highly scientific temperament of the Bh.S which can be understood in the context of the gravitational laws prevailing at various places in the universe.

The scientific investigation does involve the subtle objects that are not commonly perceived or known. In his philosophy, Mahāvīra is always speaking of subtle phenomena and giving definite laws governing their behaviour. For example; the theories of atom and subtle aggregates of matter, such as, light, darkness etc. have been dealt with in a perfectly scientific manner giving in detail the fundamental properties of matter. The motion of the ultimate atom¹⁸ and the laws governing it are surprisingly similar to those treated in modern Physics. For example¹⁹—

- Unless acted upon by external forces, atom (*Paramāṇu*) moves in a straight line (*anusreṇigatī*).
- When acted upon by external forces, atom may change direction and speed.
- Jiva (worldly existent soul) has no direct influence on the motion of atom.

* *Note*: Recently some research is being undertaken, which definitely proves that this topic is worthy of scientific investigation. The book, 'Neuroscience and Karma' authored by Muni Mahendra Kumar & J.S. Zaveri is an example of it.

- Minimum and maximum distances traveled by atom in one time-unit (*samaya*) are space between two adjacent points and the entire length of the universe (*Loka*) respectively.²⁰
- Maximum period of inactivity (rest) of the atom is innumerable time-units and maximum period of activity is innumerable (*asaṅkhyātamaśa*) of fraction of an 'āvalikā'.*
- Besides, the principle of uncertainty governs the following:²¹
- It is uncertain, after what interval of time the atom at rest, will become dynamic (release energy). This time-interval may range from one time-unit to innumerable time-units. However, after an interval of innumerable time-units it is certain to become active.²²

Similarly, it is uncertain, for what duration of time will a dynamic atom continue to be active? It (the duration) could be from one time-unit to an innumerable portion of an *āvalikā*. But it will surely cease to be active after this maximum interval.

It is uncertain which direction an atom will take at the commencement of motion. it can move in any possible direction.

It is uncertain what type of dynamic activity an inactive atom will commence. It may just vibrate or rotate or migrate or do all these things simultaneously.

It is uncertain again that what would be the intensity of an atom's dynamic activity—its velocity, minimum or maximum or intermediate?

The classification of ultimate atoms is based on four properties i.e. colour, smell, taste and touch. Out of these there exist in an atom at least one type of colour, smell and taste and two types of touches.²³ There are five colors, two smells, five tastes and four touches. Thus, there are minimum $5 \times 2 \times 5 \times 4 = 200$ types of fundamental atoms.²⁴

Similarly, the different proportions of these qualities make different kinds of atoms. If one atom is having only one-unit of colour and the second one is having two-units of colour, in spite of being similar in respect of all other properties, they will be of two kinds.

This kind of classification based on mathematics and logic is a glaring example of the scientific temperament of the Bh.S. Similarly the detailed description of aggregates of atoms from two to infinite atoms is full of mathematical calculation.²⁵ So are the phenomena of Physics involving positive and negative electricity technically called *snigdha* and *rukṣa* touch.

Mahāvīra's scientific knowledge is not confined only to the field of Physics but relates also to the biological phenomena. The classification of

* *Āvalikā*: An *āvalikā* is equal to innumerable time-units. A time-unit is equal to that part of time which an atom, in its state of super-subtle minimum possible movement, takes to cross the space occupied by itself.

creatures on the basis of sense-organs,²⁶ the detailed account of bio-potentials (*pariyāpti*), vital energy (*Prāṇa*) and the classification of birth-places (*Yoni*)²⁷ etc., show that the Bh.S is a treatise not only of philosophical doctrines but also of Biology and other sciences. The uniqueness of Mahāvīra's view is that it is altogether different from the prevailing beliefs of the time.

Along with Biology, Mahāvīra is also concerned with the subtle aspects of consciousness such as psychic colour (*leśyā*),²⁸ emotions (*bhāva*),²⁹ instincts (*saṃjñā*),³⁰ etc. it is not exaggerating to say that in ancient works of philosophy no text gives such scientific picture of the world as the Bh.S.

This text seems to be the representative work of doctrines and theories propounded by Lord Mahāvīra who is believed to be a *kevalī* or *Sarvajñā* (omniscient) in Jain tradition. This may appear to a rational mind a difficult concept to accept, but the vast variety of subjects dealt with in the Bh.S is enough to prove that Lord Mahāvīra was a supra-mental personality. It is for this reason that the great scholar Schubring called Mahāvīra—"the most versatile thinker we know of in ancient India."³¹ Another great scholar of Jainism, Jozef Dcleu corroborates the statement of Schubring when he says: "In conclusion, I would like to state, that the great diversity of topics discussed in the *anyatīrthika* texts is illustrative both of Mahāvīra's personality as a thinker and a teacher, and of that wonderful time of creative ferment in religion and philosophy. It would seem that Mahāvīra, more than anyone around him, even more than the Buddha, was inspired by the spiritual unrest and eagerness of his day."³² Speaking of Buddha, and probably comparing him with the Jaina, Frauwellner in his 'History of Indian Philosophy' expressed the view that "his (the Buddha's) contribution to the enlargement of the range of philosophical ideas in his time was rather smaller."³³ A severe verdict indeed, which seems to be based on the Buddha's steadfast refusal to consider a great many question that occupied his contemporaries. Because of his systematic approach to all these questions, Mahāvīra has rightly been called "the most versatile thinker we know of in ancient India".

An Encyclopedic Work in Particular

The Bh.S in itself is a concrete proof of Mahāvīra's versatile knowledge of things. The contents of the Bh.S cover nearly all-important topics discussed in other Jain scriptures. Thus, it can be regarded as an encyclopedic and the most representative work of all the Jain scriptures including the *aṅgas*, *upāṅgas*, *mūla*, *cheda* and the *prakīrnakas*. Dr. J. C. Sikdar, a noted Jain scholar, has tried his best to compare the contents of the Bh.S with those of other scriptures referred to above in a lucid manner. But this comparison is not all-encompassing.

The eleven available *aṅgas* are considered to be the most authentic canons of Jains containing the original ideas and expositions as given by Lord

Mahāvīra. While other *aṅgas* deal only with a particular theme, each in their own way the two *aṅgas*—*Sthānaṅga* and the Bh.S contain hundreds of topics which are diverse in nature. Though *Sthānaṅga* also deals with a number of topics, it is not more than a mere collection of different ideas and theories on the basis of numerology; unlike the Bh.S which contains original and fundamental ideas without any manipulations or compiler's inference.

[1] The Bh.S and the Aṅga Literature

The Bh.S and the Ācārāṅga

In the comparison of the Bh.S with the *aṅgas* made by Dr. J. C. Sikdar only a few subjects are selected,³⁴ while many others are left out which are very important from the point of view of scientific study of the Bh.S e.g.; the doctrine of reincarnation and the memory of the past births.³⁵ Again the classification of the six kinds of living beings is only brief in *Ācārāṅga* but the Bh.S gives a detailed description of the characteristics of these living beings.³⁶

The Bh.S and the Sūtrakṛtāṅga

Though *Sūtrakṛtāṅga*³⁷ does describe the wretched life of infernal beings, the Bh.S furnishes a much larger description of these beings. The second chapter of the second part of *Sūtrakṛtāṅga* deals with *kriyās* (the instinctive actions responsible for the influx of karma) without their specifics. The Bh.S fills the gap by providing details that may be regarded as the complementary information on the subject concerned.

The Bh.S and Sthānaṅga

As far as the *Sthānaṅga Sūtra* is concerned, there are hundreds of topics common between it and the Bh.S e.g., classification of *pudgala* (matter),³⁸ the duration of *Yoni* (the capacity to reproduce) of the food grains like rice, wheat etc.,³⁹ the description of the *Lokapāla*⁴⁰ (a special category of gods), the five *astikāyas* (the extended substances),⁴¹ six *leśyās* (psychic colors),⁴² ten kinds of *Lokasthiti*⁴³ (the universal order) etc.

The Bh.S and the Samavāyāṅga

Like the *Sthānaṅga Sūtra*, the *Samavāyāṅga* based on numerical classification of various topics has also many common subjects with the Bh.S.

The Bh.S and the Jñātadharmakathā

Dr. Sikdar has compared the stories of Mahabala, Jamāli and others with those of *Jñātadharmkathā*, but there is a world of difference in the stories given in the *Jñāta* and the true life-events described in the Bh.S.⁴⁴ Whereas

Jñāta, the sixth *aṅga*, has the purport of instructing disciples and giving them moral teachings, the true life-events of the Bh.S are historical description of living human beings, who were influential persons during the time of Mahāvīra. Though some of the stories given in the *Jñātā*, relate to some pre-historical personages like Malli,⁴⁵ the 19th tirthaṅkara, the five Kauravas and Draupadi⁴⁶ etc. Thus we may conclude that whereas the sixth *aṅga* is more mythological and legendary; the Bh.S is more historical and real as far as the stories given therein are concerned.

The Bh.S and the Upāsakadaśā

The seventh *aṅga*, *Upāsakadaśā* besides giving biographies of the ten leading lay followers of Lord Mahāvīra, incidentally throws light only on the ethical aspect of observance of the vows (*vrataś*) prescribed for a lay follower. But the Bh.S,⁴⁷ throws light on the subtle aspect of 'Pratyākhyāna' in the context of its impact on the soul with regard to the inhibition of the influx of karma. In the seventh chapter of the *aṅga*, the doctrine of fatalism of the Maṅkhalī Gośāla is criticized through the story of *Sakadalaputra*. The Bh.S, in its 15th chapter, elaborately presents the fatalistic belief of *Ājivikas* and at the same time strongly refutes it through examples.

The Bh.S and the Antakṛddaśā and the Anuttaropapātikadaśā

The biographies of the great souls given in the eighth and ninth *aṅgas* have not only parallels in the Bh.S but also explanations are given for attainment of emancipation in the same life and taking birth in the highest category of gods. For example; in the description of the events of Atimuktaka kumara, in spite of his severe breach of monastic conduct, Lord Mahāvīra explains his attainment of emancipation because of Atimuktaka's spiritual purity.⁴⁸

The Bh.S and the Praśnavyākaraṇa

The tenth *aṅga*, a later exposition of the doctrine of *āśrava* (influx) and *saṁvara* (stoppage of influx), gives in detail the various aspects of *himsa* (violence) etc. The Bh.S,⁴⁹ on other hand, being an earlier exposition treats the subject only briefly. But in the Bh.S we find at many places the explanation of the subtle aspects of the causes of influx. E.g., in sūtra 9.246-252 there is the dialogue on the topic such as 'killing of one is equivalent to killing of many'. This dialogue elucidates the fine nature of the Bh.S's exposition in comparison with the later works like *Praśnavyākaraṇa Sūtra*.

The Bh.S and the Vipākasūtra

Like *Vipākasūtra* the Bh.S has given some striking examples which explain how the soul which practices self-restraint can attain rebirth in heaven and that which indulges in sinful activities is reborn in hell and has to undergo

various types of sufferings. It describes the example of Gaṅgadatta who was inspired by the 20th tirthankara Munisuvrata and who attained rebirth in the *mahasukrakalpa*, one of the heavens. On the other hand⁵⁰, the warriors who fight battles and indulge in killing human beings with deep feeling of enmity, generally take rebirth in hell. This is illustrated by the description of the *Mahaśīlakaṅṭaka saṅgrāma* and the *Rathamusala saṅgrāma* (battle) that took place between the king Konika and the Vajji republic headed by the King Ceṭaka.⁵¹

[2] The Bh.S and the Aṅgabāhya Literature

In the following pages, the Bh.S has been compared with some selected works of the *Aṅga-bāhya* literature known as *Āvaśaka*, *Upāṅga*, *Mūla*, *Cheda* and *Prakirṇaka*.

(A) The Bh.S and the Āvaśyaka Sūtra

Āvaśyaka Sūtra is a treatise on the essential duty of the ascetics to perform expiation for any fault done by him during the day or night period. In the Bh.S⁵² we find references to the undertaking of vows for the ascetics as well as the laity. In the light of this description, one can understand the expiations referred to in the *Āvaśyaka Sūtra*.

Another very important dialogue of the Bh.S⁵³ on the topic of *Kāṅkṣamohanīya* (the faith-debunking with a view to join the heretical faith) has a very interesting counterpart in the *Āvaśyaka Sūtra*⁵⁴ which describes the main faith as a unchallengeable truth, the unique, the unparalleled, the perfect, leading to salvation, pure par excellence. The Bh.S emphasizes on remaining causes about the rise of the *Kāṅkṣamohanīya* karma and the Jain faith as a truth beyond doubt that can be properly understood in the context of the *Āvaśyaka Sūtra*. There are many more passages in these two canonical texts, which are to be interpreted with mutual understanding.

(B) The Bh.S and the Upāṅga Literature

The Bh.S and the Aupapātika

The twelve *Upāṅgas*, which are definitely later works than the *aṅgas*, deal with many subjects that are common with the Bh.S. In the first *Upāṅga* '*Aupapātika Sūtra*' the detailed description of the *caitya* and the gardens is given and reference to this description is found at many places in the Bh.S also. It seems that these descriptive passages were collected in the first *Upāṅga Sūtra* in order to make the text of the Bh.S free from unnecessary elaboration.

The chapter on Gautama in the first *Upāṅga Aupapātika Sūtra* seems to be a short copy of the dialogues held between Gautama and Mahāvīra in the

Bh.S on hundreds of topics of Jain philosophy. Many phrases and usages are given in both—Bh.S and *Aupapātika Sūtra* in the same form. This also supports the belief that the *Upāṅga Sūtra* has borrowed a good deal of matter from the Bh.S. For example: the description of Ambaḍa Parivrājaka given in the *Aupapātika, Sūtra*⁵⁵ is the exact copy of that of Skandaka parivrājaka in the Bh.S.⁵⁶

The Bh.S and the Rājaprasnīya

The second *Upāṅga Rājaprasnīya Sūtra* is historically important because it is related to the king Pradesi and the ascetic Kesi Kumara Śramana. Many of the questions⁵⁷ put up by king Pradesi and answered by Kesi can be fully understood in the light of the Bh.S which has discussed the same topics with better logical reasoning.

The Bh.S and the Jīvābhigama

The third *Upāṅga Jīvābhigama* is mentioned at some places in the Bh.S;⁵⁸ which means that the content of the Bh.S has been transformed into *Jīvābhigama* at the time of the canonical council and so it is clear that this *Upāṅga* has directly borrowed from the Bh.S. On the whole, the detailed description of the various species of living beings given in *Jīvābhigama* should be coupled with the important information available in the Bh.S to understand the subject matter completely. In the same way, the very brief description of non-living (*ajīva*) substances in the very beginning of the *Jīvābhigama Sūtra* shows that as this subject is elaborately given in the Bh.S, there was no need to repeat it. Many subjects like the description of gods, the continents and oceans etc. given in extensive style in *Jīvābhigama Sūtra* and only briefly dealt with in the Bh.S,⁵⁹ indicate that these topics were probably given much importance in the later period. Still, their allusions in the Bh.S definitely show that the discussion on those subjects was in vogue, even at the time of Lord Mahāvīra. The importance of the Bh.S as compared to *Jīvābhigama* is much greater as the former represents the original ideas of Lord Mahāvīra himself.

The Bh.S and the Prajñāpanā

The fourth *Upāṅga Prajñāpanā* is probably the most important later work. It gives us the best information about the contents of the Bh.S. As a matter of fact, the Bh.S in its text itself refers to the *Prajñāpanā Sūtra* more frequently than any other sūtra. This is viewed most probably as the transference of many topics as dealt with in the *Prajñāpanā Sūtra* at the time of canonical council conducted by Acharya Devardhigani. Dr. Jozef Deleu, in his '*Viyāhapaṇṇatti*' has strongly said that the Bh.S and the *Prajñāpanā Sūtra* are to be considered almost as a single scripture. According to him, Pannavana is the text which is most frequently referred to in the Bh.S and

he believes that practically the whole of *Prajñāpanā* has been incorporated into the Bh.S.⁶⁰ Dr. Deleu has made exhaustive efforts to compare both these aṅgas and given a long list of subjects common in both of them.

We can definitely say that in order to understand the *Prajñāpanā Sūtra* one has to comprehend its corresponding counterpart in the Bh.S and also the elaborate explanations given by *Prajñāpanā Sūtra* at some places. It has to be used as a complementary source to fully understand the significance of the Bh.S. For example, we can refer to the doctrine of karma. There are more than hundred places where this very important doctrine is dealt with, but the *Prajñāpanā Sūtra*⁶¹ gives us in a very systematic way. There are many aspects of this doctrine which make very clear the original discussion given in the Bh.S.

In the same way, the difficult concepts of *Leśyā* (psychic colour), *Kriyā* (impulsive urges) etc. are given in the Bh.S in parts at many places, whereas the *Prajñāpanā Sūtra*⁶² by giving them systematically at one place makes it easier for the student to comprehend the purport of such discussions in the Bh.S. But it should be remembered at the same time, that without the knowledge of the Bh.S, one would fail to grasp the complete idea of such concepts only by reading *Prajñāpanā Sūtra*.

The Bh.S and the Three Prajñaptis

The next three Upāṅgas—*Jambudvīpa-Prajñapti*, *Sūrya-Prajñapti* and *Candra-Prajñapti* are the treatises of Jain astronomy and geography and as such they give in detail all the aspects of these scientific disciplines. There is also a good deal of mathematical material in them. But, again here the Bh.S must be referred to for getting the original idea. The Bh.S has, however, dealt with these subjects but briefly.⁶³ As far as the concept of whole cosmos is concerned, we get the original information in the Bh.S with sufficient details. But the information about Jambudvīpa and other continents and oceans as well as the motion of the sun and the moon etc. are not exhaustively dealt with in the Bh.S. Still, because of the importance of some mathematical computations given in the Bh.S, it becomes very important scripture to get the first hand knowledge of Lord Mahāvīra's concepts of cosmology and cosmography.

The Bh.S and the rest of Upāṅgas

The remaining five *Upāṅgas* including the *Nirayāvalikā* and the others give historical facts about the fierce battles of the age, fought between king Koṅika (Ajātaśātru) and the Republic of Vajji's headed by the king Ceṭaka. The information given in the Bh.S⁶⁴ about the battle of Mahaśilākāṅṭaka and Rathamusala saṅgrāma is important for furnishing us with the details of wonderful weapons used in those times. The informations about these battles give us a clue as to the exact dates of Lord Mahāvīra's important events as

well as the chronological sequence of historical events. For example, the battles, which took place in the times of Lord Mahāvīra, make a categorical remark, from which it can be concluded that the Nirvana of Lord Mahāvīra did not take place at least sixteen years after these battles. Such information is definitely very important to fix the dates of Lord Mahāvīra. These events are also very helpful in fixing of the times of the other historical events of ancient India. Thus, the studies of the Bh.S combined with those of *Nirayāvalikā* and other texts can prove to be a great asset to the students of ancient Indian history.

(C) The Bh.S and the Mūla Sūtras

The Bh.S and the Daśāvaikālika

Now we come to the comparison of the Bh.S with the *Daśāvaikālika Sūtra* which is one of the *Mūla Sūtras*. Historically Acharya Sayyambhāva compiled it in the second century after Lord Mahāvīra's Nirvana. *Daśāvaikālika* is essentially a scripture depicting the rules and regulations about the monastic discipline. Mainly, it contains the code of conduct pertaining to collecting alms and consuming it. Interestingly, in the Bh.S we find some important light thrown on such subjects too; e.g. it prescribes in detail the instructions regarding the method of consuming food.⁶⁵ It suggests to a monk or a nun to avoid attachment to delicious food and aversion to stale food. Again, he or she has been suggested to avoid the mixing of other ingredients in order to make the food tasteful.

Thus, the Bh.S has mentioned explicitly as to how ascetics should be very cautious about the blemishes connected with food collection (*eṣaṇā samīti*) which is the third condition prescribed for a Jain monk. Similar treatment is found in the *Daśāvaikālika* which directs a monk to eat the food without evoking in his mind any kind of like or dislike for the food which he consumes.⁶⁶

Daśā. gives an elaborate description of six kinds of *jīvanikāya*, namely, *prthivikāya*, *apkāya*, *tejaskāya*, *vāyukāya*, *vanaspatikāya* and *trasakāya*.⁶⁷ This classification is done with a view to highlight the gravity of the slightest violence committed to any living being. Of these six, first five are immobile and the sixth is mobile living being. The Bh.S has given in detail at many places the description of the subtle activities of the five kinds of immobile living beings.⁶⁸ A novice learns from the *Daśā* simply that these beings are endowed with life whereas an advanced ascetic also learns in detail about the subtle activities of these beings. Such knowledge helps strengthen his faith in the imperatives of the Jain monastic disciplinary rules.

The Bh.S and the Uttarādhyayana

The second *Mūla Sūtra Uttarādhyayana* is also a scripture dealing with hundreds of topics including the monastic conduct,⁶⁹ the metaphysical

doctrines,⁷⁰ the historical episodes⁷¹ and the psychological things such as, karma, *Leśyā*, *Bhāva* etc.⁷² As the Bh.S also throws light on all these subjects, there is ample scope for comparison between the *Uttarādhyayana* and the Bh.S e.g. a subject like *samacāri*, the code of conduct, which includes the routine activities of day and night and the time for performing *pratikramaṇa*, *pratīlekhanā*.

The Bh.S⁷³ gives in detail how to measure the time periods relating to the division of day and night. Another interesting commonality of the two is the description of the monks who undertake contemplations (*bhāvanās*), such as *kāndarpikī* (regarding the amorous thinking), the *kilbiśikī* (regarding the definition of the omniscient, the preceptors, the ascetics etc.) *Ābhiyogikī* (regarding the practice of forecasting, witchcraft) though the *Uttarādhyayana* focuses more on the malpractice of the ascetics given to such contemplation.⁷⁴ It is, thus, clear that a student interested in comprehending *Uttarādhyayana* cannot succeed in his purpose unless he acquaints himself with the corresponding information given in the Bh.S.

The Bh.S and the Nandī Sūtra

The *Nandī Sūtra* is essentially a treatise on Jain epistemology. The Bh.S⁷⁵ also refers to the important features of Jain epistemology at various places, sometimes giving us the clue to resolve the mystery that may not be removed by the study of *Nandī Sūtra*⁷⁶. Thus, though *Nandī Sūtra* mentions that a clairvoyant can perceive infinite kinds of material substances, it is the Bh.S⁷⁷ which declares that only a clairvoyant of the highest category (*Parmāvadhika*) can know or see the ultimate atom and not others. Very important information about the successive occurrences of *kevalajñāna* and *kevaladarśana** is given in the Bh.S⁷⁸ but the *Nandī Sūtra* does not explicitly mention whether or not the *kevalajñāna* and *kevaladarśana* occur simultaneously. In the Bh.S, it is said that the *kevalajñāna* knows and sees all the substances occupied in all the space, all the time and in all the modes. But we do not find such particular information in the *Nandī Sūtra*. Thus, the Bh.S must be taken into account while treating the subject of Jain epistemology.

The Bh.S and the Anuyogadvāra

The *Anuyogadvāra* like the *Nandī Sūtra* is also an important treatise on Jain logic and epistemology. Besides, it is a valuable work on Jain mathematics. The Bh.S too is a repository of important facts regarding these disciplines. It is, therefore, inevitable that one has to study simultaneously both these texts in order to grasp the essence of Jain doctrines. The Bh.S

* *Note*: The problem of simultaneous occurrences of *kevalajñāna* and *kevaladarśana* is a bone of contention among the Jain logicians including Siddhasena, Jinabhadra etc. Upādhyāya Yaśovijayaji, however, tries to resolve the conflict through the application of *Anekāntavāda*.

and the *Anuyogadvāra*⁸⁰ both discuss the units of measurement of space but there is a slight difference between the texts. In the Bh.S the name of one unit, i.e. the Bālāgra⁸¹ of *aparavedeha* people are not mentioned, whereas it is found in the *Anuyogadvāra*. The description of the unit of space, namely, the innumerability part of standard finger-breadth (*utsedha āṅgula*) referred to in the sūtras 401 and 402 of the *Anuyogadvāra*, cannot be understood properly without the study of the description of the same unit in the Bh.S⁸², the unit being described with respect to the length of body of earth-bodied living being (*pr̥thvikāya*). It is, thus, evident that in the absence of the knowledge of the Bh.S, one will misunderstand the meaning of the *Anuyogadvāra*.

In the same way, there are so many other topics discussed in the *Anuyogadvāra*, such as, the shape and size of the universe, the types of various living beings, the standpoints of substance, space, time and modes which should be studied in the light of the description of the same given Bh.S in order to have a correct comprehension of the text. Conversely, the detailed mathematical computations furnished by the *Anuyogadvāra* are helpful to grasp the topics of the Bh.S, which are not dealt with in mathematical details.

(D) The Bh.S and the Cheda Literature

Like the *Cheda* literature, the Bh.S prescribes some disciplinary rules for the monks to observe which have been referred to before.⁸³

(E) The Bh.S and the Prakīrṇaka Literature

In support of the ten *Prakīrṇakas*, the Bh.S discusses the subjects on moral discipline, rituals and mythology⁸⁴ in brief and like the *Causarana* it deals with some rules and regulations, observances leading to a life devoid of sin, confession, renunciation (*Pratyākhyāna*), praise of Tirthankaras and paying homage to their virtues.⁸⁵

The Bh.S emphasizes more on the total renunciation and Saṅkhanā i.e. a graded course of penance preceding the final fasting unto death like the *Prakīrṇaka Aurapaccakkhāna* and teaches the monks in what way they should prepare themselves for the death like the *Prakīrṇaka Bhattapariṇṇā*. For example while describing Skandaka the Bh.S mentions in detail a peculiar way of death, how the ascetic spread, himself on a bed of grass or straws meditating on the doctrine taught by Lord Māhāvīra.⁸⁶

Like the *Tandula-veyaliya*, another *prakīrṇaka*, the Bh.S briefly explains the gradual development of the embryo of a child and its birth, different organs inherited from mother and father, states of existence, the functions, and etc.⁸⁷

Like the Prakīrṇaka *Candavijjhaya*, the Bh.S treats the general discipline showing the qualities that should be possessed by the preceptors and disciples and the rules of conduct to be followed. It also describes the manner in which one should prepare him for the pious death. Lastly, it also enumerates a host of gods and goddesses and classifies and describes them in details.⁸⁸

In agreement with the Gaṇavijjhā, the Bh.S makes short treatises on aspects of Astronomy, such as, time, hours, and days and contains some rules of confession, of renunciation as prescribed in the Prakīrṇaka *Mahāpaccakkhāna*.

In its stray references, the Bh.S refers to the different names⁸⁹ of Lord Mahāvīra, such as, Vardhamāna, Nāyaputta, and Kāsava as they are found in the *Vīrastava* Prakīrṇaka.

Arrangement of the work

As regards its composition the Bh.S has been casted into 41 *Satakas*, each comprising 10 *Uddeśaka*, which may be designated as Books and Chapters respectively. According to Abhayadevasūri,⁹⁰ a commentator of the Bh.S, the work consists of 10,000 *Uddeśaka*, 36,000 questions and 2,88,000 *padas*, while the *Samavāyāṅga*⁹¹ and *Nandī* canons⁹² furnish the number of *padas* as 84,000 and 2,88,000 respectively. The text, according to K.C. Lalwani, follows the *uddeśa* and *niddeśa* methods, the first implying the presentation of thesis and the second their elucidation.⁹³ A *Sataka* begins with a couplet which gives in a precise form the contents of the following ten chapters, takes note of the time, place and occasion of the dialogue/discourse and mentions participants and points out to their inner cohesion so that it would seem that a single thread runs not only through the *Uddeśaka* but also through *Śatakas* themselves. Apart from Lord Mahāvīra, the most dominant personality in the text is Indrabhūti Gautama, the first Gaṇadhara, a profound scholar and master of four types of knowledge. Indrabhūti asks questions in all humility and curiosity, while the Lord provides answers with extreme patience, affectionately addressing him as “Goyamā”. At times, other personalities also appear like Ārya Roha, Kālāsavesiyaputra, a follower of 23rd Lord Parshva, the celebrated Skandaka and the lay followers in the city Tungikā, etc.

Language of the Work

As regards language the Bh.S is written in *Ardha-Māgadhi Prākṛta*; which is stated to be the language of the gods as well as of the human beings of that time.⁹⁴ According to Acharya Tulsi,⁹⁵ there is scattered use of *Śauraseni* dialect also. In some places the use of Desi words (vernacular) is also seen, like *Khatta*, *Dongar* (7/117), *tola* (7/119), *Maggao* (7/152), *Bondi* (3/112), *Cikkhalla* (8/357).

Style

The Bh.S has been written down in prose style. Somewhere, there is a

mention of an independent discussion and somewhere just an offshoot of some incident. There is also a verse part available mainly in the form of verses (*gāthās*). It contains, besides, some literary flourishes in the form of legends, parables, similes, metaphors, analogies, descriptions of persons and things, emotive prose, etc.

The Bh.S is a plethora of characters using different phrases and addressing with different words. The style used by the author of the work presenting different contents varies in character from place to place as reflected by its massive coverage.

The precautions taken by Devardhi Gaṇi, the last compiler, could not save the unity of the text from interpolations, insertions, abbreviations and omissions. Besides, there are repetitions, stereotyped descriptions and incorporation of extraneous materials into it, e.g. “*Namo Bhbhiē Līvie*”,⁹⁶ “*Namo Suyassa*”, “*Vaṇṇaao*”⁹⁷ and the like. In sum total, the main style of the Bh.S offers a grand picture of continuity and thoroughness that makes us feel that we, the readers, are also the interlocutors.

The purpose is to explain the doctrinal concepts to the learned as well as the laity in a most natural style and certainly not in an artificial manner.

In conclusion, it can be said that the Bh.S is of enormous significance for the understanding of the general and specific tenor of the Jain philosophical doctrines. Among the *aṅgas* and *Upāṅgas* it has a unique place. The beauty of the doctrinal discussions is their being without polemic. The super-structure is simply staggering in its extension and equally inspiring in its contents. The analytical and sublime doctrines found in it are the proud possessions of the Jain community. The Bh.S with its enormous size is equally profound and incisive in the presentation of Jain theories. All the theories have earned acceptability and credibility. It is massive without being tedious. A very precise and concise study of the Bh.S will be done within the compass of this thesis. However, as per conditions governing the thesis, I restrict myself to the investigation of such doctrines as are philosophical with scientific import.

The Bh.S is a veritable mine of precious theories explicit and implicit and of a huge number of suggestions in various branches of science. One cannot do justice to all the problems in the limited scope of this thesis. However, a humble and honest attempt has been made to elucidate these ideas.

References

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3. Nandī Sūtra; 85—chattisam vāgaranasahassāim.
4. Tattvārtha Rājavārtika; 1.20—vyākhyāprajñāptaustastivyakaranasahasrani.
5. Śaṭkhaṇḍāgama, 1, p.101.
6. Kaṣāya-Pāhuḍa—1, p.125.

7. Bhagavatī Sūtra (Bh.S); 2.10.124—kati ṇam 'bhante' atthikāyā pannattā. Goyamā! panca atthikāyā pannattā.
8. Illuminator of Jaina Tenets; 1/9—jīvapudgalayorvividhasaṅyogaih sa vividharūpah?
9. Bh.S; 15, 9, 2 sataka (ch.)
10. *Ibid.*, 12, 18, 5, 18, 1, 2 sataka (ch.)
11. *Ibid.*, 9/32/77-119.
12. *Ibid.*, 1/9/423-433; 7/10/217-233; 2/1/20-55; 14/18/110-111; 18/8/163-173.
13. The Doctrine of the Jainas; p.40.
14. History of Indian Philosophy; I, p.194
15. Bh.S; 1/5/216-255—savve vi tāva hojjā 1. khovauttā, 2. ahavā kohovauttāya, māṇovatteya, 3. ahavā kohovauttā ya, māṇovatta ya, māyovauttā ya.
16. *Ibid.*, 9/32/85-136—cauvvihe paveṣaṇāe paṇṇatte, taṃ jahā—neraiyapaveṣaṇāe tirikkhajoniyapaveṣaṇāe, māṇussapaveṣaṇāe, devapaveṣaṇāe.
17. *Ibid.*, 3/2/106-132.
18. *Ibid.*, 25/4/193-204; 5/7/150—siya eyati veyati jāva taṃ taṃ bhāvaṃ pariṇamati, siya no eyati jāva no taṃ taṃ bhāvaṃ pariṇamati.
19. Microcosmology: Atom in Jain Philosophy and Modern Science; p.129-130.
20. Bh.S; 16/8/116—parmāṇupoggale ṇam logassa puratthimillaṃ taṃ ceva jāva uvarillaṃ carimantaṃ egasamaeṇaṃ gacchati.
21. Tattvārtha Rājavārtika;—parmāṇorgati aniyatā.
22. *Ibid.*, 5/7/169-171—jahāṇṇe ṇaṃ ?egaṃ samayaṃ, ukkoseṇaṃ asaṃkkhejja kālaṃ.
23. *Ibid.*, 8/10/467; 20/5/26—paramāṇu poggale egavaṇṇe, egarase, duphase paṇṇatte.
24. *Ibid.*, 8/10/446; 20/5/26— siya kālae, siya nīlae, siya lohīyae siya hālidāe, siya sukkilāe siya subbhigandhe, siya dubbigandhe siya titte, siya kaḍue, siya kasae siya ambile, siya sie mahure siya sie ya niddhe ya, siya sie ya lukkhe ya, siya usiṇe ya niddhe ya, siya usiṇe ya lukkhe ya.
25. *Ibid.*, 20/5/27-36; 12/10/218-226; 12/4/169-180.
26. *Ibid.*, 2/1/2; 19/8/76-79; 20/1/1-4—pañcavihā jīvanivvattī paṇṇattā, taṃ jahā—egindiyajīvanivvattī jāva pañcavihā jīvanivvattī.
27. *Ibid.*, 10/2/15—tivihā joni paṇṇattā, taṃ jahā—sīyā, usiṇā, sitosiṇā.
28. *Ibid.*, 1/2/102; 19/8/95; 20/1/2-4—chavvihā lessānivvattī paṇṇattā; taṃ jahā—kaṇhalessānivvattī jāva sukkalessānivvattī.
29. *Ibid.*, 17/2/16—chavvihe bhāve paṇṇatte, taṃ jahā—odie, ovasamie, khaie, khaovasamie, parinamie, saṇṇivaie.
30. *Ibid.*, 19/8/94; 7/8/161—dasa saṇṇāo paṇṇattāo, taṃ jahā—āhārasaṇṇā, bhayasaṇṇā, mehuṇasaṇṇā, pariggahasanaṇṇā, kohasanaṇṇā māṇasaṇṇā, māyāsanaṇṇā, lobhasanaṇṇā, logasanaṇṇā, ohasanaṇṇā.
31. The Doctrines; p.40.
32. Dr. J. S. Sikdar, Studies in Bhagavatī Sūtra; p.
33. History of Indian Philosophy; I; p.194.
34. Studies in the Bhagavatī Sūtra ; p.2-14.
35. (i) Ācārāṅga; 1/1-4,8—ihamegesim ṇo saṇṇā bhāvai taṃ jahā—puratthimāo vā disāo āgao ahamāsi dāhiṇāo vā disāo āgao ahamāsi
- (ii) Bh.S; 1/9/390; 2/1/49.

36. (i) Ācārā.; 1/27, 50,81,109, 118, 152—jamaṇaṃ viruvaruvehiṃ satthehiṃ pudhavi-kamma-sāmarambheṇaṃ? pudhavi-satthaṃ samārambhemāṇe aṇṇe vanegaruve paṇe vihiṅsai.
(ii) Bh.S; 2/1/2012; 19/3/5-37.
37. (i) Sūtrakṛtāṅga; 1/5 ch. (ii) Bh.S; 1/5/211-244.
38. (i) Sthānāṅga; 2/221-233. (ii) Bh.S; 2/10/12.
39. (i) Sthānā.; 3/125. (ii) Bh.S; 6/7/129-131.
40. (i) Sthānā.; 4/221-222. (ii) Bh.S; 3/7/247-270—cattāri logapālā paṇṇattā, taṃ jahā—some, jame, varūne, vesamāṇe.
41. (i) Sthānā.; 5/169-174. (ii) Bh.S; 2/10/124-129.
42. (i) Sthānā.; 6/47-49. (ii) Bh.S; 4/10/8.
43. (i) Sthānā.; 10/1. (ii) Bh.S; 1/6/310-311.
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45. Jñātadharmakathā; 1/8 ch.
46. *Ibid.*, 1/16 Ch.
47. (i) Upāsakadaśā; 1 ch.
(ii) Bh.S; 7/2/27-57; 2/5/111—se ṇaṃ bhante! paccakkhaṇe kiṃ phale? sanjamaphale.
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50. *Ibid.*, 16/5 uddeśaka.
51. *Ibid.*, 7/9/173-191.
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53. *Ibid.*, 1/3 uddeśaka.
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59. (i) Jīvābhigama; 988-1130; 259-975. (ii) Bh.S; 2/7/116-117; 2/9/122-123; 19/6/65 kati ṇaṃ bhante! devā paṇṇattā? taṃ jahā—bhāvanāvāsi-vāṇamantara-joisavemānīya.
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61. (i) Prajñāpanā; Pada 23-27.
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63. *Ibid.*, 5/1/1-30; 5/6/250-267; 11/11/119-132.
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65. *Ibid.*, 7/1/22-23.
66. Daśavaiāligam; 5/1/97-99.
67. *Ibid.*, 4 Ch.
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69. Uttarājghayanaṇi; 1,2,3,5,6,15 etc., Ch.
70. *Ibid.*, 36 Ch.—jīvā ceva ajīvā ya esa loe viyahie; ajīvadesamagase aloe se viyahie
71. *Ibid.*, 9,13,14,18,19 etc. Ch.

72. *Ibid.*, 33,29,33 Ch.
73. Bh.S; 11/11/120-125.
74. (i) Bh.S; 1/2/113. (ii) Uttara.; 36/263-265.
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76. Nandī Sūtra; 7-22.
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80. (i) Bh.S.; 6/7/134, (ii) Anuyogadvāra; 399.
81. Bh.S; 6/7/134.
82. *Ibid.*, 19/3/33-34.
83. *Ibid.*, 1/9/417-418—lāghaviyaṃ, appicchā, agehī appaḍibaddhayā samaṇāṇaṃ nigganthāṇaṃ pasatthaṃ.
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The Model of the Universe in the Bh.S & Its Scientific Assessment

We are living in a universe without knowing much about its origin, vastness and complexities. But the curiosity to know about these attributes is irrepressible and disturbing the human mind since the beginning of the human-race. Philosophy, whether it is Eastern or Western, has been engaged to answer these queries but the mystery of the universe remains unsolved. Each system of philosophy accepts the change posed by the universe but interprets it in its own way. The queries raised about the universe or cosmos are in the nature of; Has the universe a beginning? Where did the universe originate? What would happen to it ultimately? Is there any order in the universe? What are the building blocks of the universe if any? Is the universe finite or infinite? And so on. The answers to these questions in some schools of thought have been given in mythological terms, in some mystical forms and in others in highly abstruse philosophical terms. As such they are beyond the understanding of the common man. Hence, it would be necessary to study these questions in the light of modern researches in the field of philosophy and science.

In this chapter, an attempt has been made to examine the theory of the universe according to the Jain philosophy in a scientific manner. The Jain philosophy also states that the universe is tremendously vast. What is amazing is that whatever facts have been presented in the scriptures are finding their parallels in the discoveries of modern physics. The principles stated about the universe in the Bh.S. are discussed here in the context of questions raised above.

According to Jain Physics, the Universe is very vast. From a geometrical point of view, it is very surprising. (see figure-1 in appendix). The geometrical shape and conditions of the cosmos are still the subject of scientific research. Discussed below are only a few important aspects related to the cosmos and beyond.

What is the Universe?

According to the Jain Cosmology, the universe is a collective form of five or six substances, viz.; the medium of motion, the medium of rest, space, soul, matter and time.¹ In other words, the space where these entities are found together is called universe or cosmos (*loka*). Beyond it there is nothing but pure and endless space known as supra-cosmos or transcocosmos (*Aloka*). In the Bh.S² Indrabhuti Gautama (a disciple of Lord Mahāvira) has raised a question with reference to the universe. Lord Mahāvira replies to the question. The conversation goes as follows:

Gautam: “What is this universe, O Lord!”

Mahāvira: “O Gautama! The universe is composed of five extensive substances, viz., *dharmāstikāya* (the medium of motion), *adharmāstikāya* (the medium of rest), *ākāśastikāya* (space) *jīvāstikāya* (soul) and *pudgalāstikāya* (matter).”

According to the canon *Sthānāṅga Sūtra*³ another text, the universe is nothing but a meeting place of two entities, i.e., *jīva* (sentient) and *ajīva* (insentient). Whatever is seen or experienced in the world is the manifestation of these two basic elements. The multiformity of the cosmos is only on account of the multiformity of the interaction of sentient and insentient elements.⁴ Whenever we analyze anything, we would find it either sentient or insentient or both. Thus, the five extensive substances mentioned, are mere the elaboration of the two principles.

In the above two definitions of the universe time has not been mentioned as an independent entity. But in many places, in the Bh.S,⁵ where Mahāvira analyses the nature of things time appears as a separate entity. In other canons like *Uttarajjhayanāni*,⁶ time has been treated as an independent element. This treatment of time shows that there were two schools of thought about time in Jainism. One did not believe in time as a separate entity and the other considered time as a separate and independent entity but not as an extensive reality.

The above discussion can be summed up in the words of Dr. Nathmal Tatia—“Space is infinite because we cannot conceive of any limit beyond which space does not exist. But it is divided in Jain cosmology, into two parts, viz.; cosmic and supra cosmic. The cosmic space is one in which the sentient and the insentient do find accommodation. There can be no movement without *dharma* i.e. the medium of motion and no rest without *adharma* i.e. the medium of rest. That part of space in which these two mediums are spread over is called the cosmic space i.e. the universe. The remaining space is simply empty.”⁷

The whole cosmos is very small in comparison to the transcocosmos. The cosmos is like a continent in a boundless ocean of the transcocosmos.⁸ (see figure-2 in appendix)

When did the Universe Originate?

By the definition, this is quite clear that the entire universe is comprised of five or six eternal principles. They have no beginning and they will never cease to exist.⁹ Consequently, the universe has no beginning and will never come to an end.¹⁰ whether it is universe or supra-universe, both are eternal and exist simultaneously. They are devoid of priority and posteriority. An interesting discussion regarding the beginning period of the universe and that of the supra-universe also took place between Lord Mahāvīra and the ascetic Arya Roha. Arya Roha asked:¹¹

“Was the cosmos, O Lord, in existence before the transcocosmos or the transcocosmos was before the cosmos?”

“O, Roha! The cosmos and the transcocosmos were both before as well as after—both are eternal; there is no temporal sequence.”

To clarify this, the Bh.S describes four kinds of universe, viz., 1. *dravyaloka* i.e. the universe of substance, 2. *kṣetraloka* i.e. the universe of space, 3. *kālaloka* i.e. the universe of time, 4. *bhāvaloka* i.e. the universe of mode.¹² In this reference when the universe is mentioned from the standpoint of time, it has been clearly stated that it is ever existent. It is in the sense that there is no point of time at which the universe does not exist. It was, it is and it will be. That’s why it is eternally perennial, permanent, indestructible, imperishable, ever-present and persistent.¹³

This is the view of all other Jain canonical¹⁴ and philosophical treatises.¹⁵ In all of them the universe has been described as without a beginning in time and without ending in time.

Moreover, the Bh.S also clarifies that the division of the cosmos and transcocosmos is natural and beginningless. Any divine did not create it as the Semitic religions and Sankhya, Vedanta philosophies believe. But the existence of cosmos in one form or another has been accepted by almost all religio-philosophical systems of India. However, the concept of transcocosmos is a something unique to Jain philosophy. According to Acharya Mahapragya, the doctrine of thesis and antithesis as well as contrary twins is the outcome of these postulates. The principle, underlying such a doctrine is the doctrine of non-absolutism.¹⁶

Along with the above facts the Bh.S raises a query about the boundary of the cosmos, whether it exists before or after the transcocosmos?¹⁷ It is also asked whether the border of the cosmos exists before the seventh interspace (discussed latter) or the seventh interspace exists before this border of the cosmos? Similarly the questions have also been raised with regard to the prior existence between the border of the cosmos and the inter space and the layers that are situated before the seventh infernal world i.e. pitch dark.¹⁸

The answers given by Lord Mahāvīra in relation to these curiosities are similar that is, all layers and the border of the cosmos exist before as well as after—all are eternal there is no temporal sequence.¹⁹

This conversation reveals that the principles that build up the universe are without beginning. The building principles as mentioned above are six in number, viz. cosmos, transcocosmos, interspace, the rings of the thin air, dense air, and dense ocean and the nether earths. The transcocosmos is like an empty sphere which spreads all round the cosmos.²⁰ (See figure-2). The cosmos is more or less like a patch stitched on the surface of the transcocosmos.²¹ This model of the universe comes quite close to the view of modern physics. Accordingly, the explicit order of the universe floats on the implicit order of the universe just like a set of bubbles on the surface of water.²² So far as the conceptions of interspace, the ring of thin air etc. and the nether earth are concerned, these are all quite new and provide scope for scientific researches. (See figure-9)

The beginningless origination of the world, postulation, by the Jains is philosophical. In his commentary, Abhayadeva Sūri refers to it by saying that, "the aforesaid queries and answers refute nihilism, idealism and creator God and establish the doctrine of beginningless creation of the universe."²³

In this context the concept of interspace is noticeable in the light of science. An interspace is simply a synonym of space.²⁴ The view of interspace lying between two nether regions resembles to some extent the discovery of interspace or vaccums in the domain of physics. Accordingly, there is interspace in each entity. The atom is not devoid of interspace. The doctrine of interspace is confirmed by modern science. An atom has two parts, one consisting of electrons and the other nucleus, is made up of protons and neutrons. There is interspace between all of them. If the interspace is taken out of all the constituents of the universe, then the size of the universe will shrink to that of a small ball.²⁵

In science, so far as the origin of the universe in time is concerned, there are some theories which emerge especially to explain the universe. They accept beginning of the universe in time. The most accepted scientific theory about the origin of the universe is the **Big Bang** theory. Alexander Friendmann and Abbe George Lemaitre proposed the theory in 1920. George Gamov and his colleagues developed its modern version in 1940. According to this theory, the universe began some 10 to 20 billion years ago. There was a cosmic egg that was infinitely hot. The egg was compressed to infinite density with a gigantic explosion and went on expanding. All elementary particles were created within a fraction of a second after the explosion. Space and time also originated with the **Big Bang**. According to modern science, the universe is still expanding and the distant galaxies have been found receding from us with a velocity in direct proportion to their distance from an observer on earth. Eventually the expansion of the universe will stop at some point and it will begin to contract under the gravitational pull of its parts and then again get condensed into a superhot tiny ball, which it was in the beginning. Following which there will be a Big Bang again and the

process of expansion and contraction will continue indefinitely in a cyclic manner. In this whole process matter is neither created nor destroyed but is merely rearranged.²⁶

Center of the Universe

Jain philosophers have made an effort to search out the central point of the universe. The Bh.S mentions that after crossing the innumerable part of the first nether land we reach the center of universe.²⁷ Above and below this point the universe is of the same size i.e. 7 *raju* above and 7 *raju* below. After having indicated the center of the whole universe the Bh.S indicates the central point of each part of it. Accordingly, the center of the lower section of world lies in between the fourth and fifth nether lands and, that of the upper section lies in between the third, fourth and fifth heaven. So far as the center of the middle section is concerned, it is situated in the mid part of the mountain Meru. The part is made up of eight points technically known as *Rucaka Pradeśa*.²⁸

In reference to the central point of the universe, the concept of *Rucaka Pradeśa* is really astonishing and noticeable. Through this postulation the Jains have formulated a new scientific paradigm in the field of cosmology. The scientific significance of this paradigm can be supposed from the critical research of Mahavir Raj Gelara. He has not only indicated towards cosmological importance of *Rucaka Pradeśa* but has tried to sketch out some figures which help us to understand the model of universe in Jain view. His critique goes on as follows:²⁹

First, he has compared the EPC (Eight Point Center) to the figure that emerges when the four udders of a cow are in one plane and four udders of an another cow are in a lower plane. According to him, this is probably a three-dimensional figure (see figure-3, 4 in appendix). EPC exists at half way of the vertical dimension of the universe.

Second, according to the scriptures like Bh.S, it is emphasized that from the corner points of EPC figures four main directions (East, West, North and South), four intermediate directions and two zenith (upper) and nadir (lower) directions originate. We can see it through figures 5, 6 in appendix sketched out by Dr. Gelara.

E. Schubring the German Indologist highly appreciated the Jain mathematicians' remarkable model of developing an EPC, which is geometrically a figure of three-dimensional cube.

This cubical unit, in the view of Gelara, is quite significant since all directions originate from the central cubical unit by elongation of point-peas (region) gradually. The origination of directions is independent of the sun.

He further writes that Jains have illustrated the shape of the universe with the help of three bowls including the shape of the EPC. It reveals a notable degree of correct observation in the field of geometry and wonderful insight into the natural world. Jain mathematicians contributed tremendously

to the growth of geometry by advancing in the early stages of the Vedic period. Cosmology is a modern and advanced subject and during this century various models of cosmology have been formulated by scientists (static, steady state, evolutionary) under various assumptions. Scientists could find the mass density and the total-mass content, the age, the phase of its present dynamical behavior and its chemical evolution, with time, for formulating a comprehensive theory on cosmology. It is, however, important to note that the modern cosmology have not proposed any centers of universe.³⁰ The subject of modern cosmology has been a meeting place of contradictory (or at least alternative) theories and observation. The present observational status does not let any cosmology model to be either wholly accepted or totally rejected. Hence none of the models can be singled out as an ideal one. Even the most powerful optical and radio telescopes available at present are unable to fathom the whole depth of universe and whatever observations obtained at large distances, their correct interpretations have quite often eluded the scientists.

This, according to Gelara, has thrilled the traditional cosmologists particularly Jain cosmologists on account of identical and closer interpretations that appear to be quite rational and scientific. We consider cosmology as a truly modern subject but at the same time it has ancient roots. It would therefore, be a worthwhile exercise to investigate the issues in Jain cosmology which are either in tune with or may provide suggestive leads to modern cosmology.

The Universe is Self-guided

The origin of the universe is shrouded in mystery. Various interpretations that are based on crude dogmas do not stand the rigorous philosophical analysis or scientific scrutiny. So far as the Jain cosmological view is concerned, the universe is eternal, self-existent and has got an objective reality. For its existence, the universe is not dependent upon any one's cognition as the Vijñānavādin Buddhists say.³¹ Nor is it an appearance of some higher reality, as the *Advaita* vedantins conceive.³² According to the Vedanta system. 'Being' is an eternal and self-existent reality, so the universe is not subject to cosmic creation (*syṣṭi*) and cosmic dissolution (*Pralaya*). According to the Sankhya theory of creation, creation means manifestation of the world out of some higher reality—*Prakṛti* and dissolution means merging of the same into that primordial reality.³³ These two phases come in a cyclic way, and the whole process takes place in the presence of the Purusa as a witness (*sākṣi*) to be guided by some conscious principle—*Īśvara* or *Brhman*.³⁴ The Jain Philosophy is not in favour of any theory of creation and dissolution. According to it, the universe is self-guided. It does not emerge from any higher reality or from beyond it. The nature of the universe itself is such that, after it has completely run down, it re-generates itself by carrying out the cycle in the reverse order.

The Jain philosophy considers that individual things or effects in the world spontaneously emerge out of their material causes and dissolve into them. In this sense it also propounds a theory of creation and dissolution but at an individual level or better said at a modificational level. It divides the cycle of time into two states, namely, '*Utsarpiṇī*' (ascending time) and '*Avasarpiṇī*' (descending time).³⁵ Each of these two stages, is further divided into six epochs.³⁶ In the *Utsarpiṇī* stage, there is a gradual development of the individual things, while during the *Avasarpiṇī* stage, there is a gradual disintegration of the individual things. The Bh.S³⁷ clearly mentions that in the last phase or the sixth epoch of the *Avasarpiṇī* stage the situation on the earth will deteriorate to such an extent that life would be in constant danger and countries and cities would become subject to destruction. After the sixth epoch has ended the *Utsarpiṇī* stage would begin gradual development. The Jains hold that this process of gradual development and destruction of the world is not guided by any spiritual or almighty principle. The world runs according to certain natural laws.

Frankly speaking, the concept of existence, which is unique postulate of the Jains, is working behind the theory of origination and dissolution of things in the sense stated above. To the Jains, existence has threefold definition, i.e., origination, cessation and persistence.³⁸ Origination here stands for appearance of new modes; cessation stands for disappearance of the former modes; and persistence means the characteristic of not being subject to origination and destruction.³⁹ For example, when butter is produced from curd, the former modes of the curd are destroyed, and at the same time some new modes appear, while at the same time the essence of the curd continues to exist. Thus, a phenomenon or reality flows through modes, which are infinite and ever changing. Through its constantly changing phases, the real is rising and ending at every moment and thereby persists. In this way nothing is destroyed totally. In the modern science, the '**Big Bang Theory**' also endorses this fact by declaring it that matter is neither created nor destroyed but is merely rearranged.

Is the Universe Finite or Infinite

In this perspective when we study the Bh.S⁴⁰ and consider the reply of Lord Mahāvīra we find a non-absolutistic answer regarding the end of universe, i.e., the universe is with and without end. The ascetic Skandaka once asked Lord Mahavir—"Is the universe with end? Is the universe without end?"

The reply given by Mahavir is—"I conceive the universe in four ways as substance, space, time and modes". The Lord clarified each one in the following manner:

"As substance, the world is a unitary entity with end. As space, the universe is innumerable $10^7 \times 10^7$ Yojanas* in length and breadth and

* One Yojana is equivalent to 8 thousand Miles.

innumerable Yojanas in circumference. Ultimately it has an end. According to modern science the diameter of the universe is 35 billion light years. As regards time, the universe was never non-existent, nor shall it ever be non-existent—it was, it is and it will be eternal, fixed, perennial, indestructible, ever present, persistent, without end. As modes, the world has infinite modes of colour, smell, taste, touch, configuration, heaviness, lightness and neither heavy nor light. In this sense, the universe is without end.”

“Thus, O Skandaka! As substance the universe has end, as space it has end, as time the universe has no end and as mode it has no end.”

Acharya Mahapragya⁴¹ has elaborately discussed the concept of mode in his commentary on the Bh.S. Etymologically, the word ‘loka’ (universe) means what is perceptible.⁴² The universe in terms of modes is described through the modes of colour, smell etc. Mode is expressed as *pariyāya*, *Pariyāva*, *viśeṣa*, *dharma*, *bheda* and *bhāva*.⁴³ Mode is of two kinds: intrinsic (*svabhāva*) and extrinsic (*vibhāva*). Among the six fundamental elements, soul and matter have both types of modes, but other substances have only intrinsic modes.⁴⁴ Colour, smell, taste and touch—these are intrinsic modes of matter. Unity, separation, number, configuration, conjunction and disjunction are the extrinsic modes of matter. Similarly, knowledge, intuition, bliss and energy are the intrinsic modes of the soul and to be endowed with different bodies and senses are extrinsic modes of it. Both the modes are changeable and undergo infinite grades, e.g. there are infinite grades of colour property of an atom and a cluster. Similarly, there are infinite grades of smell, touch, taste and number etc. Knowledge also undergoes infinite modes. Consequently, we find several kinds of knowledge in one as well as in different beings. These grades may be in the form of higher to lower and lower to higher degree e.g. one atom which is of one degree black colour may change into two to infinite degree of blackness and vice-versa. The same applies with other properties. The heavy-cum-light mode is common to both—matter and soul associated with the matter. The mode neither heavy nor light is a specific quality or potency. Due to it, animate does not become inanimate, and vice-versa. It is on account of this potency that the qualities of the real undergo six fold increase and decrease without losing their identity.⁴⁵ This potency is not the subject of speech as it is momentary⁴⁶ and acceptable on the authority of the scripture.⁴⁷ The mode called neither heavy nor light has been designated as an intrinsic mode of an entity technically known as an *arthapariyāya*. Neither heavy nor light means weightless. Neither heavy nor light is also a type of body-karma (*nāma-karma*) which is also weightless but that is not intended here.

The beginningless intrinsic potency called ‘neither heavy nor light’ exists in every substance. It is not discussed here. In the context of universe it is mentioned here only in the sense of mode that is different from it. Actually, it is determining potency of weightless objects and also the determiner of the mode known as heavy-cum-light. This potency of neither heavy nor light

is available even in an atom, in a subtle material cluster and in a formless substance also.⁴⁸ In a mundane soul there are both the modes. Heavy-cum-light is due to the bodies being gross technically known as *Audārikaśarīra*. And the mode called neither heavy nor light exists in the karmic body and also in the soul.⁴⁹ The emancipated souls are without body and so they possess only the mode—neither heavy nor light. It means there are things or objects in the universe, which are having no weight at all. Now, this view is getting support from scientific discovery. In modern science, it has been discovered that there are some particles which have no mass and therefore no weight.⁵⁰

In reference to *bhāvaloka* i.e. the universe of mode, we can understand easily the view of Modern Science about the universe. According to Modern Science, the universe is gradually running down in the material sense of the word, known as the entropy that is tending towards the maximum. Maxwell has proved this mathematically from the second law of thermodynamics. In nature, heat is constantly flowing without interruption from a body at a higher temperature to a body at a lower temperature and vice-versa. Thus, there is a tendency towards equalization of temperature and pressure all over the universe.⁵¹

The sum total of energy in the universe will be the same as before but it will not be functional. No motion of any kind will be possible. The whole universe together with its entire inmate will come to a standstill. Living beings will neither be able to move nor to breathe. Life of all forms will be extinct. What is next? is a glaring question before the scientists. They believe that the universe cannot end. They think, some unknown force must rewind the clock of the universe, so that it may be set running once again. According to predominant schools of Indian philosophy, God does the rewinding, whereas according to the Jain philosophy the process is automatic. To denote this fact the word mentioned in the Bh.S is 'niyae'.⁵² It means the universe is fixed, uniform and determined by natural laws. The gradual decline of the universe is taking place only at the level of modes and not at the existential level. The fundamental elements never cease to exist. The Bh.S uses certain words⁵³ to show that the sum total of energy in the universe remains the same as before. The word '*Akkhae*' is used to prove the universe indestructible. In the same way the word '*Avvae*' shows that the universe is imperishable, no part of it ever perishes. The word '*Avatthie*' speaks of its forever presence, free from decrease and increase. The word '*nicce*' represents the persistence of the universe. It always exists because of persistence and the word '*Sasae*' indicates that the universe is perennial, always existent. It only moves from the state of evolution to that of devolution and vice-versa. This process goes on forever in a cyclic order.

The recent scientific theories also show the process of expanding and shrinking universe in a cyclic way. According to Prof. L.C. Jain—the debate about the open or closed universe is unending. Any theory dealing with the evolution of universe holds that it was possibly once compressed

into a very small and dense volume. Experimental evidence shows that the universe is expanding and galaxies are running from one another and the farther away the galaxy the faster is its speed of receding. Yet the equations of the theory of relativity allow a shrinking universe as well.⁵⁴

Thus, according to the Bh.S' description, the universe is having an end from the standpoint of substance and space. The universe is endless from the viewpoint of mode and time factor.

Configuration of the Universe

The universe does not only exist eternally but it also has a particular eternal shape. According to the Bh.S,⁵⁵ the shape of the universe resembles the shape of a *Supraṭiṣṭhaka*, which is expanded at bottom, contracted at middle, and again vastly expanded at the top. A *Supraṭiṣṭhaka* is a configuration made up of conjunction of three conical bowls with the shape of chopped of pyramids in the manner—one bowl placed convex wise (upside down) at the bottom, the second bowl placed concave wise (with the face upward) above it, and the third one placed convex wise again upon the second. The resultant configuration arising from the above-said adjustment is styled *Supraṭiṣṭhaka* (see figure-1).⁵⁶ Since the universe has three parts; viz. [1] horizontal (*madhyaloka*), [2] upper vertical (*ūrdhvaloka*) and [3] lower vertical (*adholoka*)⁵⁷ and each part is located in an order and the shape of the above mentioned bowls; the resultant figure would be same, i.e. *Supraṭiṣṭhaka*. Besides the configuration of the universe as a whole the text depicts particular shape of each section of the universe. Accordingly the shape of the lower section as like that of a lead of a vessel (*Tappāgār saṅṭhie*).⁵⁸ The shape of the middle section is like that of a cymbal (*Jhallariesaṅṭhie*).⁵⁹ The shape of the upper section is like that of a vertically placed drum (*Uddhamuiṅgā-kārasaṅṭhie*).⁶⁰

Generally, the cosmos is detected like a palm tree or a human standing with legs apart and palms resting on his waist (see figure-1), and is, therefore, known as "the cosmic person."⁶¹

Here, as we see in the figure-1, the universe has been depicted through the plane lines but according to Mahavir Raj Gelra, the figure should be of elliptical shape because that only can be scientifically stable for a longer time. This view supports the figure prescribed in the Bh.S.

So far as the configuration of transcocosmos is concerned, it is stated to have a round shape with perforation in the center.⁶² [See figure-2]

Division of the Universe

It has already been indicated that the universe consists of three compartments—the upper (*ūrdhva*) the lower (*adhah*) and the middle section (*madhya*), with measures evident from the figure-1. The Bh.S does not describe

the measurement of the compartment of the universe in numerical figures. The figures are found in the latter works.⁶³ Accordingly, the whole universe in height is of 14 and in breadth 49 Rajju.‡

(i) The Upper Section

The upper part of the universe is somewhat less than 7 Rajju.⁶⁴ The upper universe comprises of heavenly abodes, for the gods and more and godlier in succession from the initial first to the twenty-sixth. The Bh.S mentions the upper section of fifteen types including nine *Graiveyakas* and five *Anuttaravimānas*.⁶⁵ and also the uppermost earth named '*Īsatprāgbhāra*'.⁶⁶ In total the heavens are twenty-six in numbers. (See figure-7 in appendix) *Sarvārthasiddhi*, a commentary on *Tattvārtha*, accepts thirty-nine heavens.⁶⁷ (See figure-8 in appendix). The names of heavens are clear from the figures. The highest heaven is *Sarvārthasiddhi*. *Īsatprāgbhāra*, one of the earths and the abode for the liberated beings, is situated twelve yojanas above the heaven *Sarvārthasiddhi*.⁶⁸ It measures 45 lake yojanas in length and breadth. The circumference of it measures a little more than the breadth by three times. In the center it measures 8 yojanas.⁶⁹ It is white and pure like the conch or the pearl and therefore, it is named as 'Sītā'. Another name for it is 'Siddha-śilā' because in the uppermost one-sixth portion of this earth, the liberated souls reside.⁷⁰ One yojana above there is the end of the universe. Therefore, it is recognized by the name 'Lokānta' or 'Lokāgra' i.e. the summit of the universe also.⁷¹

(ii) The Middle Section

The middle universe is the abode for the humans and animals. The middle section (region), in elevation, is eighteen hundred yojanas and in extension, equivalent to the dimension of innumerable islands and oceans.⁷² The islands and ocean have special names such as Jambu island, *Lavaṇa* ocean and so on.⁷³ According to the scriptures and the later works⁷⁴ the islands and oceans are concentric rings, the succeeding ring being double the preceding one in breadth. At the center of all these islands and oceans is the round island of Jambu and Mount Meru is at its navel (See figure-10 in appendix).

Jambu Island is perfectly round like a potter's wheel. It is just in the center of the middle region of the cosmos. The diameter of the island is 100,000 yojanas⁷⁵ (909,000 miles). Mount Meru in the middle of the island is 99000 above and 1000 yojanas below the earth. The base of Mount Meru touches the top of the first infernal land and its peak touches the bottom of the celestial region above.⁷⁶

Jambu is ringed by the *Lavaṇa* ocean (salt ocean) which is twice as wide as Jambu. The *Lavaṇa* ocean is ringed by *Dhātakikhaṇḍa* island. Similarly it

‡ **Rajju:** A rajju is a conceptual measure consisting of innumerable *pramaṇa* Yojanas, each *pramaṇa* yojana being almost equivalent to eight thousand miles.

continues with Puṣkara Island, the Puṣkara ocean, Varuṇa island, the Varuṇa ocean, Kṣīra island, the Kṣīra ocean and so on unto the Svayambhuramaṇa ocean that rings the last island of the same name. In this way there are innumerable islands and oceans in the mid-part of the universe (See figure-10). The middle region is again divided into fifteen **Karmabhūmi** and thirty **Akarmabhūmi**. Besides, there are many mountains as depicted below in the figure-11 in appendix.

(iii) The Lower Section

The part of the universe that is below the middle section is known as the lower section (*adho-loka*). The lower section is a little more than seven rajjus in dimensions.⁷⁷ There are seven lands, one below the other.⁷⁸ They are known as seven 'Narakas' (Hells). Mostly, the infernal beings live in these lands. Each land is having a wider base than the one above. From top to bottom, these lands are commonly recognised as the gem-hued, pebble-hued, sand-hued, mud-hued, smoke-hued, dark and pitch-dark lands (See figure-1). Each land floats on a dense ocean, which floats on a layer of dense air, which floats on a layer of thin air, which floats on self-supporting space.⁷⁹

The seven infernal lands indicated as gem-hued etc. are technically known as 1. Ratnaprabhā, 2. Śarkarāprabhā, 3. Bālukāprabhā, 4. Paṅkaprabhā, 5. Dhūmaprabhā, 6. Tamahprabhā, 7. Mahātamahprabhā.⁸⁰ The dwelling places of the infernal being are within these lands. They inhabit all of the infernal lands except for the top 1000 Yojanas and the bottom 1000 Yojanas of each.⁸¹ According to the Bh.S and other philosophical texts,⁸² the number of strata and dwelling places in the neather lands are as follows:

Table No. 1

| <i>Infernal or Neather lands</i> | <i>Number of Strata's</i> | <i>Number of Dwelling Places</i> |
|----------------------------------|---------------------------|----------------------------------|
| Gem-hued (Ratna-Prabhā) | 13 | 3,000,000 |
| Pebble-hued (Śarkarā-Prabhā) | 11 | 2,500,000 |
| Sand-hued (Bālukā-Prabhā) | 09 | 1,500,000 |
| Mud-hued (Paṅka-Prabhā) | 07 | 1,000,000 |
| Smoke-hued (Dhūma-Prabhā) | 05 | 300,000 |
| Dark (Tamah-Prabhā) | 03 | 99,995 |
| Pitch-dark (Mahātamah-Prabhā) | 01 | |

The seven neather (infernal) lands are divided by huge gaps occupied by layers of dense oceans, dense air, thin air and interspace.⁸³ The dense ocean between each land is 20,000 Yojanas deep, but the layers of dense and thin air and the interspace increase, the further down the cosmos they are, so that the deepest layers are above the seventh infernal land. According to

Tattvārthā dhigamasūtram,⁸⁴ none of the layers and inter space are less than innumerable Yojanas deep. According to the Sarvārthasiddhi, the layers of dense ocean, dense air and thin air are each 20,000 Yojanas deep. (See figure-8)

Here to be clear about the three circles of layers of dense ocean, dense air, and thin air some detail is necessary. The Jain Acharyas have thought of their nature and colour etc., e.g., in the Tattvārthā Vṛtti, the dense ocean has been identified with the circle of air.⁸⁵ In the Tattvārthā Rajavārtika, the dense ocean is explained as solidified water.⁸⁶ Abhayadevasūri explains the dense ocean as solidified water, like iceberg.⁸⁷ According to Acharya Akalaṅka, the dense ocean, dense air and thin air are rings. The nether region is situated on the dense ocean, the dense ocean is situated on dense air, the dense air is situated on thin air, the thin air on space and the space is situated in itself.

In the Tiloyapaṇṇatti, the colours of the rings are also described. The colour of the dense ocean is like that of the cow's urine, the color of dense air is like that of pea, and the colour of thin air is manifold.⁸⁸ In Tattvārtharajavārtika, the colours are described somewhat differently. The colour of the dense ocean is like that of the pea and the colour of dense air is like that of cow's urine, and the colour of thin air is unmanifest.⁸⁹

The Cosmic Dimension

The whole cosmos is very vast and cannot be measured by the physical unit of measurement. Its length and breadth are not expressible in numerical figure. Yet, the Jain mathematicians have made great efforts to indicate the vastness of the universe. They have used astrophysical unit of measurement such as Rajju or rope and Yojana for it (see figure-1). According to the Jains the cosmos are four sided with a base of $7 \times 7 = 49$ square Rajjus. In length the universe is of fourteen Rajjus as indicated before.⁹⁰ The concept of measuring universe in terms of Rajju looks later development because the Bh.S does not mention it to explain the vastness of the universe. The text mentions only Yojana as a larger unit of measurement to long distances. The entire cosmos, according to the Bh.S, is of innumerable $10^7 \times 10^7$ Yojanas in length and breadth and innumerable $10^7 \times 10^7$ Yojanas in circumference.⁹¹ In spite of such length and breadth, cosmos has a limit.

Curvature in the Universe

The wonder-evoking postulate we find in the Bh.S. is the assumption of curvature in cosmos. The questions raised are where is the most contracted part of the universe? Is curvature somewhere in the universe? The answer given by Lord Mahāvīra is that the center of the middle section is the most contracted part of the universe.⁹² and near the fifth heaven the universe is curved.⁹³ Besides, wherever the universe is contracted and expanded, there

is curvature. Such curvatures are found only in the ends of the universe⁹⁴

This assumption is really similar to the cosmologists of today. It is somehow closer to the Einstein preposition of the curvature of three-dimensional space with slight difference. By that he supposed that the universe is finite. According to the general theory of relativity, "the three dimensional space of our universe can curve around itself and be finite just like the curved surface of the earth".⁹⁵ In spite of having accepted the finite of the universe the scientists, like Jains, also regard that we would never encounter a physical boundary or a stop sign that says the universe ends here.

The Expanse of the Universe

The cosmos is bounded and limited while the transcocosmos is limitless. The former has only innumerable space-points (*pradeśa*) while the latter has infinite.⁹⁶ Instead of being limited with reference to the substance and also with reference to the space the extension of the universe cannot be numerically expressed.

The canon Bh.S indicates the largeness of the universe and that of the Supra-universe with the help of the examples of the inability of sixteen swiftest gods to reach the end of the universe with their fastest divine speed. The analogical parables used by Lord Mahavir are as follows—

"Imagine, six gods of higher level are standing on the top of the Mount Meru situated in the mid of the universe, which is one lake Yojanas in height. Suppose again that at the foot of the Mount Meru, four goddesses (*dikkumārikas*) are standing facing the opposite directions of the Mount. They throw four balls in all the four directions. At that time one of the six gods starts flying to catch all the balls in mid before they touch the ground. This speed is the fastest one."

With this fastest divine speed the six gods run in each direction; one goes in the East, one in the West, one in the North, one in the South, one in the upper and one in the lower direction. At the same time a child is born in a merchant's house. He lives for one thousand years. His parents die after his birth. He also dies. Not only he but seven successors of his age also die. Even the memory of their family and the status etc. are totally obliterated from the minds of the people. Still, the gods continue to run yet, they could not get to the end of the universe. Nevertheless, it is sure that they have covered the major portion of the distance of the universe and the crossed space is much more than uncrossed space, even though the end of the universe is far from them."⁹⁷

In the same manner the vastness of the transcocosmos has also been dealt with. The difference lies only in the number of gods, goddesses and the directions. In the context of transcocosmos, the gods are ten in number and the goddesses are eight. Additional four directions are Southeast, Northeast, Southwest and Northwest. But, in the case of transcocosmos, the distance

covered by the gods is less and the rest is more.⁹⁸

Thus, the universe is stated to be very spacious; in the east it is countless or innumerable crores and crores of leagues (*yojanakoḍākoḍī*); in the South it is countless crores and crores leagues, likewise it is in the West and in the North. Similarly with regard to the upper and lower regions it is countless crores and crores of leagues in length and breadth.⁹⁹

The experiments made in the field of science also show that the vastness of the universe cannot be indicated with great consistency or accuracy. According to Stephen W. Hawking, the scientific theories that emerge to explicate the structural largeness of the cosmos are contradictory. He writes—

“Today scientists describe the universe in terms of two basic partial theories—the general theory of relativity and quantum mechanics. They are the great intellectual achievements of the first half of this century. Einstein’s general theory of relativity describes the force of gravity and the large scale structure of the universe, that is, the structure on scales from only a few miles to as large as a million million million million (1 with twenty-four zeros after it) miles, the size of the observable universe. Quantum mechanics, on the other hand, deals with phenomenon on extremely small scales, such as a millionth of a millionth of an inch. Unfortunately, however, these two theories are known to be inconsistent with each other—they cannot both be correct.”¹⁰⁰

The Stratification of the Cosmos

The Bh.S mentions the order of the universe in a well-confined manner. According to it, the universe is not chaos but it has a systematic and static universal order. As far as the structure is concerned the universe is surrounded by fourfold layers. Once the disciple Indrabhuti Gautama asked Mahāvīra—“how many strata are there, O Lord! in the cosmos?” The answer was, “there are eight strata”. The strata are as follows:—

1. The air rests on space
2. The ocean rests on the air
3. The earth rests on the ocean (water)
4. The mobile and immobile creatures rest on the earth
5. The non-souls rest on the souls
6. The souls rest on karma
7. The non-souls are seized by the souls
8. The souls are seized by the karma.”¹⁰¹

In this discussion eight strata have been described keeping the whole picture of the universe in view. The first four strata have been dealt with to

describe the structure of the universe. Accordingly, the sentience—mobiles and immobile are based on the earth, the earth is based on the ocean, the ocean is based on the air and the air is based on space. (See figure-9) The rest four are not concerned with the structure of the universe but are of paramount importance from the viewpoint of mutual effect of physical and non-physical elements upon each other.

Again it is said that the air is based on the space. The question is what about the space? The *Vṛtti*,¹⁰² a commentary on the Bh.S explains that the space rests on itself so there is no need of anything to support it. The thing noticeable here, according to the *Vṛtti*, is that the earth rests on the ocean. This however is to be understood as such with an exception because the land that is the abode of the liberated souls does not rest on the ocean but on the space.¹⁰³ Like-wise, the mobile and immobile beings rest on the earth. This also has an exception because some creatures also rest on space, mountains and space-vehicles. It shows that whatever has been said in the scriptures should be taken in a relative sense and not in an absolute sense.

The last four strata give some glimpse of how the universe is going on and how the physical objects depend on the non-physical, i.e., the soul and vice-versa, and how the multiformity of universe takes place by a symbiotic relationship of the physical and non-physical objects.

When it is said that non-souls rest on souls; here non-souls, according to the *Vṛtti*, represent the material body of the soul and the like which rest on souls.¹⁰⁴ The implication is that the varieties of physical world and its transformations that are taking place are due to activities of the soul. Whatever is visible in the world is either living bodies or dead bodies left behind by the souls. It is in this sense that the non-souls rest on the soul. On the other hand, whatever varieties and whatever changes and formations are seen of soul, all of them are due to karma. The Bh.S states that all these are the result of karma (subtle karmic matter). Hence, it has been stated that the soul rests on karma.¹⁰⁵

Further, the last two strata i.e. the non-soul is seized by the soul and the soul are seized by the karma, prove that there should be something similar due to which immaterial and material (whether it is karma or physical body et.) can seize one another. The Bh.S mentions that similarity by the name affection, (*sneha*).¹⁰⁶ This quality is responsible for the relationship between the immaterial and material objects. With the help of it both the physical and non-physical entities cause various transformations in one another.

Besides, the last two strata also throw light on the relationship between soul and matter or mind and body, which has been a long-standing problem before the philosophers as well as the scientists. As far as the Bh.S is concerned, it does discuss this problem and suggests some solution that has been dealt with at length in the sixth chapter.

With a view to explain the order of strata in the above-said manner Lord Mahāvira has given two similar examples as follows:¹⁰⁷

“Suppose a person fills a leather bag with air and ties its mouth tightly with a thread. Then he ties a knot in the middle, and then unties the upper knot. He empties it of the air from the upper open part. Then he fills the upper part with water and ties the end of it with a thread. Then he unties the middle knot. In result, the water rests upon the air.

In another example, a person fills a leather bag with air and ties it to his waist. After he dives into deep, uncrossable and unfathomable waters. But he will float on and not get immersed into the water because of the help of the upward force of the bag. These illustrations show how the air is resting on space, the ocean is resting on air, the earth is resting on ocean and the sentient are resting on earth (See figure-7).

The Building Blocks of Universe

Philosophers and sages, right from the Vedic period, have been in search of the fundamental elements constituting of the world of our experience. Diving deep into the self and the world they have arrived at various conclusions. According to the Nyaya¹⁰⁸-Vaisheshika¹⁰⁹ philosophy, there are nine entities in the world, viz. space, direction, time, soul, mind, earth, water, air, and fire. The Samkhya-Yoga philosophy posits two basic elements named ‘Prakṛti’ and ‘Purusa’.¹¹⁰ The world is a manifestation of the former one. The Vedanta philosophy regards only one element i.e. Brahma (the supreme principle or God).¹¹¹ The whole world is coming out of the one.

In the same vein the Jain philosophy regards five extensive entities which constitute the fabric of the universe.¹¹² These entities are—the medium of motion, the medium of rest, space, matter and consciousness (soul or self).

As a matter of fact the Jain philosophy is dualistic as it accepts two fundamental principles i.e. soul and non-soul.¹¹³ Of the five extended substances the four are the elaboration of latter one. The dualism in the form of soul and matter is found in all other dualistic philosophies of India but the concept of the medium of motion and the medium of rest is found only in Jain Philosophy. They are unique postulates in themselves.

Moreover, the word ‘*Dravya*’ is available in Vaisheshika philosophy. But the word ‘*Astikāya*’[#] is not found in any other philosophy. It is a technical word of Jain philosophy. It denotes to a homogeneous extended reality. The five realities mentioned above in Jain philosophy come under the category of *Astikāya*. All have eternal independent existence. They are made up of innumerable or infinite units just as matter is made up of small atoms. But the atoms of the last four substances cannot be detached or detected. They are always connected and therefore called *pradeśa*. In the medium of motion and the medium of rest the number of the *pradeśas* is innumerable, while in

Astikāya: ‘*Asti*’ has two meanings, 1. Existence in three periods of time, viz. past, present and future. 2. Individual unit. *Kaya* means heap.

space, matter and soul is infinite.¹²⁴ According to Acharya Mahapragya, the doctrine of six substances in which time is added to the five extended realities is a later development. This can be surmised from following two contexts in the Bh.S. The heretical teachers like Kalodāyi started discussion that Śrmana Jñātaputra (Lord Mahavir) propounded five Astikāyas. According of among the five substances, the soul is only a sentient entity while other are insentient. Moreover, of the five extended substances matter is corporeal, whereas the other four are non-corporeal. The non-corporeal is devoid of physical qualities i.e. colour, smell, taste and touch. The corporeal, on the other hand, possesses all the qualities.¹¹⁵

The Astikāyas and their properties are as follows. Here only a general description of them has been presented through a table. In the subsequent chapters each has been discussed in details with scientific assessment.

Table No. 2 Five Extended Substances and their Properties

| <i>Substance</i> | <i>Conscious/ Non-conscious</i> | <i>Corporeal/ Non-corporeal</i> | <i>Number units</i> | <i>Function</i> | <i>One Infinite</i> | <i>With respect to space</i> |
|------------------|-------------------------------------|-------------------------------------|--|--|-------------------------------------|---|
| Dharmāstikāya | Non-conscious | Non-corporeal | Innumerable | Indifferent auxiliary condition of motion | Single substance | Coextensive with cosmic space |
| Adharmāstikāya | - do - | - do - | - do - | Indifferent auxiliary condition of rest | - do - | - do - |
| Ākāśastikāya | - do - | - do - | Infinite | Receptacle | - do - | Coextensive with cosmic & trans- cosmic space |
| Pudgalāstikāya | - do - | Corporeal | - do - | Integration | Infinite number of substances | Coextensive with cosmic space |
| Jivāstikāya | Conscious | Non-corporeal | With respect to single soul it is innum- erable; with respect to Jivāstikāya (all the souls) it is infinite | Sentience | - do - | - do- |

The Line of Demarcation of the Universe

The new discoveries of modern science such as the dual nature of matter i.e. (mass and energy) and the dual nature of sub-atomic particles (wave and particle) are all associated with the reality of space and its contents. Space

in itself, according to the Jain philosophy, is infinite extension and only a portion of it is filled with other real substances. It is this finite portion known as universe.

The four Astikāyas i.e. the medium of motion, the medium of rest, matter and consciousness and the cosmic-space (*Lokākāśa*) together make up the entire universe. It is the theatre of the entire cosmic dance. The space is finite because of the two substances, viz., the medium of motion and medium of rest. The systematic structure of the cosmos is seen because of the two media. In the absence of the media the world had been chaos. Here, it will, therefore, be relevant to know about the medium of motion and medium of rest to understand the systematic order and end of the universe.

Like the beginning, the end of the universe is also questionable. Once the disciple Indrabhuti asked Mahāvīra about the end of the universe.¹¹⁶ The answer given is non-absolutic i.e. the universe is with and without end. It is with end because of number and space occupied.¹¹⁷ Universe is one in number and therefore it is with end. It means Multi-universe theory of science is not acceptable to the Jain cosmologists. Universe is limited and not without boundary. This is the reason why it is with end from the spacial point of view. The boundaries are the medium of motion and the medium of rest. The living and non-living objects are confined themselves only to the media. In other words, where the two media are there is the universe. They prevail in innumerable points of space. Therefore, the universe is also of innumerable space-points.¹¹⁸ Thus, the two cosmic principles i.e. the medium of motion and the medium of rest are the line of demarcation of universe.¹¹⁹

Being essential constituents of the cosmos the medium of motion and the medium of rest are called cosmos as such.¹²⁰ Both are mutually interpenetrating and concomitant with cosmic space. Without them cosmos is impossible. Their existence and influence do not extend beyond the cosmos, but within the cosmos. They are all pervasive and co-extensive. Their separate existence cannot be inferred from the difference of locality as there is no such difference, It can be inferred by their different functions. In other words, they have a unity of locality with a diversity of functions. Being devoid of physical qualities as well as consciousness, they can be distinguished by their respective functions.¹²¹

The Bh.S gives detailed explanation about the medium of motion and the medium of rest in different contexts at many places. Accordingly, they can be understood in the following five respects, such as, substance, space, time, quality and function as given below.¹²²

As substance, the medium of motion and the medium of rest are only one.

As space, both are co-extensive with the cosmos.

As time, both of them were never non-existent, they are never non-existent and they will never be non-existent; they were, they are and they

will be, so both are eternal, fixed, perennial, indestructible, imperishable, ever present and persistent.

As quality, they have no colour, no smell, no taste and no touch.

As function, the medium of motion is an indifferent condition of motion and the medium of rest is an indifferent condition of rest.

In the Bh.S the word '*gūṇa*' in the case of the two media is used to denote function and not concurrent properties as in popular parlance. It has been used in the sense of function or an auxiliary feature (*upakāra*).¹²³ It does mean that the substances called as the medium of motion and the medium of rest are not the initiator of motion and rest but they are only their auxiliary condition.¹²⁴ Without the help of the two media nothing can move or agitate and rest. Hence, these two substances are essential to any type of motion and rest throughout the world.

Acceptance of the two principles is important to understand motion as such. If one accepts the reality of the physical object, one must accept the reality of motion also. Although looked upon with suspicion by idealist metaphysicians, both realist philosophers as well as scientists accept the doctrine of reality of motion.

In order to accept the reality of motion of physical objects not only the reality of space but also that of the two media of motion and rest must be accepted. None of the non-Jain Indian schools of thought has paid attention to this problem. It is to the credit of the ancient Jain sages alone that they boldly grappled with the problem with significant success.

Actually, the cosmos is nothing but an integral system of infinite living beings, infinite physical objects, the medium of motion and the medium of rest and time existing in a limited space. This is quite natural to suppose some force or power that holds the constituent elements of the universe together. According to the Jain thinkers that force is the medium of motion and the medium of rest. "It is really wonderful that Jain thinkers several centuries ago felt the same intellectual necessity of supposing a physical force which maintains the cosmic unity".¹²⁵ The thing worthy to note here is that in the above-said statement the word 'physical' is used before the 'force', in my opinion it should be 'non-physical' because both the media are devoid of physical properties.

One question has been raised—cannot space be credited with the function of motion and rest in addition to its own function of accommodating things? According to the reply given by Acharya Kundakunda, such a hypothesis would be impossible because it would be conflicting with other facts. If the space is endowed with the attribute of motion and rest then why do the emancipated souls (*siddhās*) whose tendency is to go upwards come to stay at the summit of the world. Moreover, wherever there is space there should be free chance for motion and rest. But neither a living entity nor a single atom of matter could travel beyond the limit of cosmos though there is space

beyond. Therefore, Kundakunda concludes that space is neither the condition of motion, nor of rest. These require independent principle as their condition.¹²⁶

Besides, if space had been the condition of motion and rest, then there would have not been any transcosmos and a systematic cosmos at all because space is everywhere. All the sentient and insentient would have not been confined to the universe only. They would have been scattered throughout the space.¹²⁷

Thus, the medium of motion and the medium of rest are essential for the smooth functioning of the universe. Just as the medium of motion is a guarantee for motion, so the medium of rest puts limits to the objects in motion. One and the same body has motion as well as rest. It may move or it may come to stay. Therefore, the medium of motion and the medium of rest are free from the principle of causality. They can only be an auxiliary cause (*bahiraṅga hetu* or *udāsīna hetu*), i.e., they must be indifferent and neutral in themselves and yet, they are indispensable (*āvaśyaka*) to the composition of the world. The most approximate modern conception answering to the description of the medium of motion will be about ether of the physicist. Though the concept of ether is not acceptable today yet, it has been mentioned here only to show the necessity of the medium of motion in the field of science. Besides, the properties of ether, which had been accepted later on also come close to the properties of the medium of motion contended by the Jains.

Ether, in Physics, a theoretical, universal substance believed during the 19th century to act as the medium for transmission of electromagnetic waves (e.g. light and X-rays) similar to sound waves transmitted by elastic media such as air.¹²⁸ It was believed that the ether was a kind of matter having properties, such as, mass, rigidity, motion like ordinary matter. But after the Michelson experiment and the theory of Relativity, it is agreed that ether is not a kind of matter. Being non-material, its properties are *sui generis* (quite unique). Characteristics, such as, mass and rigidity which are seen in matter are naturally absent in ether but ether has new and definite character of its own. On the basis of latter scientific evidences two points are well established—the medium of motion is non-material, filling all space and not moving. The Jain view expressed in the following quotation regarding the medium of motion and of rest is quite close and clear to the two points.

“The medium of motion being a non-corporeal substance has none of the properties ordinarily associated with matter, i.e., it is devoid of qualities of touch, taste, smell and colour. It is a continuous medium pervading the whole universe. Although, it is non-atomic in nature, for purpose of practical convenience, it is regarded as made up of innumerable units.”¹²⁹

Acharya Kundakunda further writes, “it (the medium of motion) undergoes an infinite number of modifications of an incorporeal nature and

persists through modes. Hence, it is a real and permanent substance. It remains unchanged by the motion of objects inspite of being condition of motion of all those that can move."¹³⁰

The Bh.S is quite clear about the functional feature of the medium of motion. When Indrabhuti Gautama asked Lord Mahavir about the utility or function of the two media to the living beings and non-living, the Lord replied that the medium of motion is the cause of all the mental, vocal and physical activities of a living being. In the same way, all the activities of non-living take place with the help of the medium of motion.¹³¹ It behaves like water towards the fish in the world. As water is indifferent to the movement of fish, so the medium of motion is indifferent to the movement of living and non-living things. Truly speaking, it neither moves nor causes any motion in other objects. It supplies only the necessary support for the motion of a movable body. In this regard, Science comes closer to the Jain physics when it deals with ether as non-material, non-atomic, non-discrete, continuous, co-extensive with space, indivisible and unmoved but a necessary medium for motion.

Like the medium of motion (*Dharmāstikāya*) described above, the medium of rest (*Adharmāstikāya*) is also non-living, formless, inactive, and continuous. The difference lies in their functions. Whereas the medium of motion helps in motion, the medium of rest helps in rest to the objects in motion. It is a binding force to the living and non-living. It is responsible for the stability of every kind. In the case of living beings, standing, sitting, sleeping and mental concentration etc., all such things take place with the help of the medium of rest.¹³²

Apart from this difference, both the medium of motion and the medium of rest pervade through space unto world-limit. They are absolutely non-physical, non-atomic and non-discrete in structure. The qualities of matter are not found therein. They have different constituents than space. These non-physical principles are perfectly simple. They are spacial and yet they are not spacial. They are neither heavy nor light. Their existence is inferred only through their function. The characteristics of these two principles are distinctly peculiar to Jain physics.

In this context we find some similar declarations of modern science, which have been mentioned by Prof. G. R. Jain in his book 'Cosmology Old and New'. Just as the Jain thinkers have divided space into cosmos (finite) and trans-cosmos (infinite), so is the verdict of the modern mathematicians. Mr. H. Ward, in his book 'Exploring the Universe', writes—

"Strangely enough the mathematicians reckon that the total amount of matter which exists is limited, and that the total extent of universe is finite. They do not conceive that there is a limit beyond which no space exists but that the totality of space is so 'curved' that a ray of light, after travelling in a direct line for a long enough time, would come back to its starting point. They

have even made a preliminary estimate of the time a ray of light would require for the round trip in the totality of curvature—not less than ten trillions, i.e., 10000000000000 years. And such a space is very cozy quarters compared with infinity. A mathematician feels positively cramped in it.”¹³³

Further G. R. Jain mentions—

“Mr. Ward may, please, note that it is not in the least necessary to unmake the brain and visualize finite space if we slightly modify our present theory and accept the Jaina idea of a finite universe and an infinite empty space beyond, in which exists nothing, no soul, no matter and no media necessary for motion and rest. How very reasonable and easily conceivable it is to suppose that beyond the boundary of the finite universe the medium of motion is absent and thus a ray of light or any other forms of energy or even a single particle of matter cannot go beyond *lokākāśa* i.e., beyond the boundary of the finite universe. Thus, the stability of the universe is established without postulating the idea of ‘curving of space’, the latter being a difficult pill to swallow.”¹³⁴

The point worthy to note here is that in the view of Jain cosmologists actually space is not divided but it is the medium of motion and the medium of rest which cause the treatment of one space as cosmos and transcocosmos. It only means, the space pervaded by the two media is cosmos and the rest transcocosmos. Curvature in the universe occurs because of the media and not due to space itself. The scientific researches made after Einstein preposition of the curvature of three dimensional space, have proved this truth that space should be flat and not curved.

Prof. G.R. Jain has tried to interpret the concept of medium of rest (*adharmāstikāya*) in terms of the concept of gravitation in modern physics. In his book ‘Cosmology: Old and new’, he writes “These considerations lead us to the conclusion that gravitation is the cause of the stability of the macroscopic as well as microscopic systems of the universe. But for the gravitation, there would be all chaos, there would be no world. The atoms would be scattered throughout space; the galaxies would disperse; the members of the solar system would be torn off one from the other. Hence, the necessity of the important postulate of *adharmāstikāya*, **the gravitation is.**”¹³⁵

The note-worthy thing here is that Newton regarded the force of gravity as an active force, although acting like an invisible agency. The modification of the concept of gravitation introduced by the author of relativity, Prof. Albert Einstein, renders gravitation quite inactive and thus, brings it on the same level as the medium of rest *Adharmāstikāya* of the Jain philosophers.

G. R. Jain writes—it is the greatest triumph of the Jain theory of *Adharma Dravya* that science had to postulate the existence of an invisible force of gravitation to account for the stability of the universe, and that Einstein's modification of the law of gravitation had entirely divested the latter of its active character. Gravitation is now regarded as an auxiliary cause and not an active puller, so that its character is now brought in exact conformity with the Jain view:

'The medium of rest (*adharmāstikāya*), like the medium of motion (*dharmāstikāya*), is without form, inactive and eternal, it is the auxiliary cause of rest to soul and matter as is the shade of a tree the auxiliary cause of rest for the travellers.'¹³⁶

As the interpretation made by Prof. G. R. Jain is examined critically, the comparison of *Adharmāstikāya* with gravitation is only an apparent one. When we go into the root cause of gravitational effect, it is mainly the mass of the matter that is responsible for creating the gravitational force. But according to Jain metaphysics only the gross matter possessed of all the eight kinds of touch has mass. All other matter and other substances, such as, the medium of motion, the medium of rest, space and soul are completely massless, and therefore, there cannot be any gravitational force between them. Hence, to consider *Adharmāstikāya* as an equivalent of gravitational force is not correct.

We should not forget that all the forces in physics are essential due to the qualities of touch etc. of matter, while the principles of *Dharma*, *Adharma* etc. are all non-physical in nature. In other words gravitational force and other such forces of physics have a limited application in the universe because of their physical nature. On the contrary, the Jain concept of *Dharma-Adharma* apply equally to all the substances whether physical or non-physical.

Let us conclude above discussion with the views that the universe is finite and there should be some force in the form of matter or something else which holds all the living and non-living together and keeps the whole universe in a systematic universal order.

Concluding the topic of universe, it can be said that the Bh.S presents a vivid and multidimensional picture of the universe. Its method to deal with the problem is to break the problem up into bits and to invent a number of partial theories. Each partial theory describes and predicts a certain limited class of intuitive perceptions that are sometimes being neutral to the results of the other and sometimes being contrary or even complementary to them. The thing worthy to note is that almost all the predictions that seem contrary are expressed relatively. That is why in depth they have no contradiction as such.

Reference

1. (i) Pañcāstikāya; 3
(ii) Illuminator of Jaina Tenets; 1/8 Saḍdravyātmalco lokaly
2. (i) Bh.S.; 13/4/55—kimiyam bhante! loeti pavuccai?
Goyamā—pañcatthikāya, esa ṇam evatie loetti pavuccai, taṃ jahā—
dhammatthikāe, adhammatthikāe, āgāsathikāe, jīvaththikāe, poggalaththikāe.
(ii) Uttarājhhayaṇaṇi, part II; 28/7
(iii) Āvaśyaka Sūtra, Hāribhadrīyā Vṛtti 2; p. 73
3. (i) Sthānāṅga; 2/417 (ii) Uttarā.; 36/2
4. Illuminator of Jaina Tenets; 1/10—jīvapudgalayor vividhasaṅyogaiḥ sa
vividharūpaḥ.
5. Bh.S; 2/10/124-129; 11/10/90; 11/11/119-129; 25/5/ 247-272
6. (i) Uttara.part-I; 5/22 (ii) Gommatasāra, Jīvakāṇḍa; 568—vattaṇāhedu kālo
vattanaguṇabhaviya davvāṇicayesu—kālādhāraṇe va ya vaṭṭanti hu
savvadavvāṇi
7. Illu. of. J.T.; p. 6
8. Uttara—dhammo ahammoāgāsam kālo puggalajantao, *esa logo tti paṇṇatto
jīnehim varadaṅsihim*
9. Bh.S; 1/6/291—jīvā ya ajīvā ya puvviṃ pete, pacchā pete—do vete sāsaya
bhāvā, aṇṇupuvvi esā Rohā!
10. (i) Bh.S; 2/1/45—nicce, natthi puṇa se ante.
11. Bh.S; 1/6/290—loe ya aloe ya puvviṃ pete, pacchā pete—do vete sāsaya
bhāvā, aṇṇupuvvi esā Rohā!
12. Bh.S; 2/1/45—kālo ṇam loe na kayāi na āsi, na kayāi na bhavai, na kayāi na
bhavissai—bhaviṅsu ya, bhavati ya, bhavissai ya.....
13. *Ibid.*, 2/1/45—dhuve ṇiyae, sāsae akkhae avvae avatṭhie nicce, natthi puṇa se
ante.
14. Āvaśyaka Sū. Hāribhadrīyā Vṛtti; 2; p. 73—Pañcāstikayamaiyam
logamanādinidhanam.
15. Pañcāstikāya; 6,11,15
16. Acharya Mahapragya, Bhagavaī Bhāṣya.
17. Bh.S; 1/6/296—loyante ya aloyante ya puvviṃ pete, pacchā pete—do vete
sāsaya bhāvā, aṇṇupuvvi esā Rohā!
18. *Ibid.*, 1/6/297-298—Rohā! loyante ya sattame ovāsantare ya puvviṃ pete,
pacchā pete—do vete sāsaya bhāvā, aṇṇupuvvi esā Rohā!; evaṃ loyante ya
sattame ya taṇuvāe evaṃ ghanavāe, ghanodahi.....
19. *Ibid.*, 1/6/290-307
20. *Ibid.*, 11/10/99—aloe ṇam bhante! kiṃ saṅthie Goyamā! jhusiragolasanṭhie
paṇṇatte ?
21. Paṇṇvaṇā; 15/53—āgāsathiggale ṇam bhante! kiṇā phude? kahiṃ vā kāehiṃ phude?
22. Sthānāṅga; 7/14-22
23. Bh.S; 1/301 Vṛtti—etāni ca sūtrāṇi śūnyajñānādivādanirāsena
vicitrabāhyādhyaṅmikavastusattā'bhidhānārthāni īśvarādikṛtatvanirāsena
cānāditvabhidhānārthānīti.
24. Bh.S; 20/ 1/16, Tattvārtha Sū.; 3/1
25. Acharya Mahapragya, Bhagavaī Bhāṣya (under publication)
26. The New Encyclopaedia Britannica; Vol.-2; p. 205
27. Bh.S; 13/4/47
28. *Ibid.*, 13/4/50

29. Mahavir Raj Gelara, an article 'Concept of Eight-Point Centre in Jain Cosmology: A Critique' published in Tulāsi-Prajñā from J.V.B.I., Ladnun, July-Sep., 1999.
30. Basu, Baidya Nath (1997), 'An Introduction to Astrophysics' prentice'—Hall of India Pvt. Ltd. New Delhi.
31. Boddha-Dharma-Darśana; p. 415
32. (i) Śvetośvataropaniṣad; 3/15—puruṣa evedaṃ sarvaṃ yadbhūtam yacca bhāvyaṃ utam | tatvasesāno yadannenatirohati (ii) Māndukyopaniṣad; Maṅtra; 6—eṣa sarveśvara eṣa sarvajña eso'ntaryāmyeṣa yoniḥ sarvasya prabhavāpyayau bhūtānām.
33. Sāṅkhyakārikā; 16—kāraṇamavyaktaṃ pravartate triguṇataḥ samudayācca pariṇāmataḥ salilavat pratipratiguṇāśrayaviśeṣāt
34. Nyāya Darśana; 4/19—īśvarah kāraṇaṃ puruṣakarmāphalyadarśanāt.
35. Bh.S; 8/2/198—Osappiṇi ussappiṇio kālao.
36. Sarvārthāsiddhi; 3/22—bharatairāvatayor vṛddhihrāsausaṣṭsamayābhyāmtsarpin yavasarpinībhyām.
37. Bh.S; 7/6/117-120
38. Tattvārtha Sū; 5/29—utpādayayadhrauvyayuktaṃ sat.
39. That Which Is; p. XXII
40. Bh.S 2/1/45 davvao loe saante, khettao loe saante, kālao loe anante, bhāvāo loe anante.
41. Acharya Mahapragya, Bhagavaī Bhāṣya, part-1 (under publication)
42. Bh.S; /255—ajīvehiṃ lokkai palokkai, je lokkai se loe.
43. Ekārthaka Koṣa, p. 91—pajjavvo tti vā bhedo tti vā guṇo tti vā egaṭṭhā.
44. Nayacakra, verse; 18—sabbhāvāṃ khu vihāvāṃ davvānaṃ pajjayāṃ jīṇuddiṭṭham savvesiṃ ca sahāvāṃ, vibbhāvāṃ jīvāpoggallaṇaṃ ca
45. Ālāpapaddhati Nayacakra, Paṇiṣṭa; p. 211
46. Illu. of J.T.; 1/43—sūkṣmo vartamānavartyarthaparīṇāmo'rthaparyāyaḥ.
47. Ālāpapaddhati..... p. 219—sūkṣmo jīnoditaṃ tattvaṃ hetubhir neva hanyate ājñāsiddhaṃ tu tadgrāhyaṃ nanyathāvādino jīnāḥ
48. Bhagavatī Vṛtti; 2/45—vaṇṇapajjava'tti varnaviśeṣā ekaguṇakālatvādagaḥ, evamanye'pi gurulaghuparyav-āstadviśeṣā bādaraskandhānāṃ, agurulaghuparyava aṇṇāṃ sūkṣmaśkadhānāmamūrtānāṃ ca.
49. *Ibid.*, 2/46—anantā gurulaghuparyavā audārikadiśarīrānyāśritya, itare tu kārmaṇādīdravyāni jīvāsvarūpaṃ cāśrityeti.
50. Mahavir Raj Gelara, an article 'Concept of the Eight Point Centre in Jain Cosmology: A Critique' published in Tulāsi Prajñā
51. (1) Cosmology Old and New; p. 195 (2) The Cosmic Code; p. 16-17
52. Bh.S; 2/1/45
53. *Ibid.*, 2/1/45
54. The Tao of Jain Science; Vol.2; p. 16
55. Bh.S; 7/1/3; 11/10/98—loe ṇaṃ bhante! kimsaṅṭṭhie paṇṇatte? Goyamā! supaiṭṭhāgāsaṅṭṭhie paṇṇatte, taṃ jahā—heṭṭhae vicchiṇṇe, majjhe saṅkhitte, uppiṃ visāle.....
56. Illu. of J.T; p. 4
57. Bh.S; 11/10/91—khettao loe ṇaṃ bhante! kati vihe? Goyamā! tīvihe paṇṇatte, taṃ jahā—aheloyakhettao, tīriyaloyakhettao, uddhaloyakhettao.
58. Bh.S; 11/10/98—aheloyakhettao loe ṇaṃ bhante! kimsaṅṭṭhie paṇṇatte? Goyamā! tappāgārasaṅṭṭhie paṇṇatte.

59. Bh.S; 11/10/96—tiriyaloyakhettaloe ṇaṃ bhante! kimsaṅṭṭhie paṇṇatte? Goyamā! jhallariṇaṅṭṭhie paṇṇatte.
60. Bh.S; 11/10/97—uddhaloyakhettaloe ṇaṃ bhante! kimsaṅṭṭhie paṇṇatte? Goyamā! uddhamuiṅgākāra ṇaṅṭṭhie paṇṇatte.
61. Dhavatā; 4/1,3,2/Gāthā 7/11 talarukkhasaṅṭṭāṇo.
62. Bh.S; 11/10/99—aloe ṇaṃ bhante! kimsaṅṭṭhie paṇṇatte? Goyamā! jhusiragolasanṭṭhie paṇṇatte.
63. Āvaśyaka Sū. Hāribhadriyā Vṛtti; p. 76—logo cauddasarajūsito.
64. (1) Bhagavatī Vṛtti, patra 616, (2) Illu. of J. T.; 1/8—
65. Bh.S; 11/10/94—paṇṇarasavihe paṇṇatte.....
66. *Ibid*; 11/10/94
67. Sarvārtha-Siddhi; 4/19
68. Uttara.; 36/57—bārasehiṃ joyaṇehiṃ savvaṭṭhassuvarim bhava īsippabbharaṇamā u pudhavi chattasaṅṭṭhiyā.
69. Uttara.; 36/58-59—atṭhajoyaṇabāhallā sā majjhammi viyāhiyā.
70. Uttara.; 36/57-62—joyaṇassa u jo tassa koso uvarimo bhavi • tassa kasassa chabbhae siddhanogahana bhavi •
71. (i) Bh.S; 1/6/296; (ii) Uttara; 36/56—aloe paḍihayā siddhā loyagge ya.....
72. Bh.S; 11/9/77; 11/10/93—asaṅkhejjavihe paṇṇatte, taṃ jahā—jambuddīve dīve tiriyaloyakhettaloe jāva sayambhuramaṇasamudde tiriyakhettaloe.
73. *Ibid.*, 9/2/3-4; 11/9/83—evaṃ khalu jambudīvādīva dīvī lavaṇādīyā samuddā taṃ ceva jāva asaṅkhejjā dīvasamuddā paṇṇattā.....
74. *Ibid.*, 11/9/77-79
75. Bh.S; 11/10/109—ayaṇṇaṃ jambuddīve dīve savvadīva-samuddāṇaṃ savvabbhantarāe jāva egaṃ joyaṇasahassaṃ āyāma-vikkhambheṇaṃ.....
76. That Which Is; p.75
77. Illu. of J.T; 1/6
78. Bh.S; 6/6/120; 11/10/92—aheloyakhettaloe ṇaṃ bhante! katiavihe Goyamā! sattavihe paṇṇatte, taṃ jahā—rayanaṇṇabhā pudhavi paṇṇatte aheloyakhettaloe jāva ahesattamā pudhavi aheloyakhettaloe.
79. (i) Bh.S; 1/6/298-303-305—evaṃ loyante ya sattame ya taṇuvāe, evaṃ ghanavāe, ghanodahi..... (ii) Tattvārthādhigamasūtram ; 3/1 Bhāṣya
80. Bh.S; 6/6/120—satta pudhavi paṇṇattāo, taṃ jahā—rayanaṇṇabhā jāva ahesattamā.
81. Tattvārthādhī.; p. 234—ratnaprabhādyaṣu bhūmiṣu urdhvamadhaścaikaikaśo yojaṇasahasramekaikaṃ varjayitvā madhye narakāḥ bhāvanti.
82. *Ibid.*, p. 36
83. *Ibid.*, p. 229—kaikā ekaikaśaḥ ghanāmbuvātākāśākrameṇa pratiṣṭhitāḥ.
84. *Ibid.*, p. 233—sarve ghanodadhayo viṅṣatiyojanasahasraṇi, ghanavātatanuvātāstvasaṅkhyeyāni, adho'dhastu ghanatarā viśeṣaṇeti.
85. Tattvārthādhī.; 3/1
86. Tattvārtha Rājavārtika; 3/1, p. 160
87. Sthānāṅga Vṛtti; p. 166 tatra ghaṇaḥ—styano hīmaṣilavad udadhiḥ—jalanicayaḥ, sa ca iti ghanodadhiḥ.
88. Tiloyapaṇṇati; 1/268—gomuttamuggavaṇṇa ghanodadhi taha ghananilo vāu tanuvādo bahuvaṇṇo rukkhasa tayam va vayatiyam
89. Tattvā. Rāj.; 3/1 p. 160—tatra ghanodadhayo mudgasanṇibhāḥ, ghanavāta gomutravarṇāḥ, avyaktavarṇastanuvātāḥ.

90. Āvaśyaka Sū. Hāribhadriyā Vṛtti; p. 76
91. Bh.S; 2/1/45 and its Bhāṣya.
92. *Ibid.*, 13/4/88
93. *Ibid.*, 13/4/89
94. (i) *Ibid.*, 13/5/89—vigghakandae, ettha ṇaṃ vigghaviggahie loe paṇṇatte.
(ii) Vyākhyā prajñapti; Vol.3, p. 308
95. The Cosmic Code; p. 15
96. *Ibid.*, 2/10/134-135—asaṅkhejjā dhammatthikāyapadesā. tiṇhaṃ pi padesā aṇantā bhāṇiyavvā.
97. *Ibid.*, 11/10/109—loe ṇaṃ bhante! kemahalae paṇṇatte?.....
98. *Ibid.*, 11/10/110 aloe ṇaṃ bhante! kemahālae paṇṇatte?.....
99. *Ibid.*, 12/7/130—puratthime ṇaṃ asaṅkhejjao joyaṇakoḍākoḍio, dāhiṇe ṇaṃ asaṅkhejjāo joyaṇakoḍākoḍio, evaṃ pacatthimeṇa vi.....
100. A Brief History of Time; p. 12-13
101. Bh.S; 1/6/310—kativihā ṇaṃ bhante! loyaṭṭhidi paṇṇattā?
Goyamā! atṭhavihā loyaṭṭhiti paṇṇattā, taṃ jahā—1. āgāsapaṭṭhīe vāe, 2. vāyapaṭṭhīe udahi, 3. udahipaṭṭhīya puḍhavi, 4. puḍhavipaṭṭhīya tasasthāvarā pāṇā, 5. ajīvā jīvapaṭṭhīyā, 6. jīvā kammaapaṭṭhīya, 7. ajīvā jīvāsangahiya, 8. jīvā kammaasangahiya.
(ii) Sthānāṅga; 3/319
102. Bha. Vṛtti; 1/310—akāśaṃ tu pratiṣṭhitameveti na tatpratiṣṭhacintā kṛteti.
103. Acharya Mahapragya, Bhagavaī Bhāṣya
104. Bha. Vṛtti; 1/310
105. Bh.S; 12/120—kammao ṇaṃ bhante! jive no akammao vibhattibhāvāṃ pariṇamai? kammao ṇaṃ jive no akammao vibhattibhāvāṃ pariṇamai. hanta Goyamā! kammao ṇaṃ jive no akammao vibhattibhāvāṃ pariṇamai, kammao ṇaṃ no akammao vibhattibhāvāṃ pariṇamai.
106. *Ibid.*, 1/312—aṇṇamaṇṇāsinehapaḍibaddhā.
107. *Ibid.*, 1/6/311
108. Nyaya Darśana; 1/1/13—pṛthivyapastejovāyurākāśamiti bhūtāni.
109. Vaiśeṣika Darśana; 1/1/5—pṛthivyapastejovāyurākāśaṃ kālodigātma mana iti dravyāṇi.
110. (i) Sāṃkhyakārikā; 36—mulaprakṛtiravikṛtir mahadādyah prakṛtirikṛtayah sapta / ṣoḍaśakastu vikāro na prakṛtir na vikṛtiḥ puruṣah
111. Taittiriya Upaniṣada, Bhṛguvalli Prakaraṇa; 3/1/1—tam hovaca, yato vā imāni bhūtāni jāyante, yena jātāni, jīvanti, yat prayantyaḥ samvisanti tad vijijñāsasva, tad brahmeti,
112. (i) Bh.S; 13/4/55; (ii) Uttarā; 28/7—dhammo adhammo āgāsaṃ kālo puggalajantavo eṣā logo tti paṇṇatto, jiṇehiṃ varadaṅsihiṃ
113. (i) Bh.S; 25/2/9—jīvadavvā ya, ajīvadavvā ya. (ii) *Ibid.*, 36/2—jīvā ceva ajīvā ya, eṣā loe viyāhie ajīvadesamāgāse, aloe se viyāhie
114. *Ibid.*, 2/10/125-135—asaṅkhejjā dhammatthikāyapadesā.....evaṃ adhammatthikāe vi.... tiṇhaṃ pi padesā aṇantā.....
115. Bh.S; 7/10/212-220
116. *Ibid.*, 2/1/44—kiṃ sante loe aṇante loe?
117. *Ibid.*, 2/1/45—khettao ṇaṃ loe asaṅkhejjāo joyaṇakoḍākoḍio āyāma-vikkhambheṇaṃ, asaṅkhejjāo joyaṇakoḍākoḍio parikkheveṇaṃ paṇṇatte, atthi puṇa se ante.

118. *Ibid.*, 2/10/143—loyāgāseṇaṃ bhante! kemahālae paṇṇatte? Goyamā! loe loyamette loyappamaṇe loyaphude loyaṃ ceva phusittānaṃ ciṭṭhai.
119. Pañcāstikāya; 2/94 jado alogalogo jesim sabbhāvado ya gamaṇaṭhidi do vi ya mayā vibhattā avibhattā loyamettā ya
120. Bh.S; Vṛtti; 2/125—lokasya—pañcāstikāyātmakasyamsabhūtaṃ dravyaṃ lokadravyam.
121. Pañcāstikāya; 103—dhammādhammāgāsa apuḍhabbhudā samānaparimāṇā puḍhaguvaladdhivisesā karanti egattapaṇṇattāṃ.
122. *Ibid.*, 2/10/125-126—dhammatthikāe ṇaṃ bhante! kativaṇṇe? katigandhe? katirase? katiphāse? Goyamā! avaṇṇe, agandhe, arase, aphāse, arūvi, ajive, sāsae avaṭṭhie logadavve. davvao ṇaṃ dhammatthikāe ege davve khettao logappamāṇamette kālao na kayāi na āsi, na kayāi natthi, na kayāi na bhavissai—bhavisu ya bhāvāti ya, bhavissai ya—dhuve, ṇiyac, sāsae, akkhae, avvae, avaṭṭhie, nicce. bhavao avaṇṇe, agandhe, arase, aphase. guṇao gamaṇaguṇe.
123. Bha. Vṛtti; 2/125—‘guṇao’tti kāryataḥ.
124. Illu. of J. T., commentary on 1/4-5
125. Cosmology.; p. 20
126. Pañcāstikāya; 2/90
127. *Ibid.*, 2/91-92, 95-96—agurulaghugehim sayā tesim anantehim pariṇadaṃ niccam gadikiriyaṃjuttānaṃ kāraṇabhūdam sayamakajjaṃ udayaṃ jahā macchāṇaṃ gamaṇānuggahayaraṃ havadi loe taha jīvāpuggalāṇaṃ dhammaṃ davvaṃ viyāṇehi na ya gacchadi dhammaṭṭhi gamaṇaṃ ṇa karedi aṇṇadaviyassa havadi gati sa ppararo jīvāṇaṃ pggalāṇaṃ ca vijjadi jesim gamaṇa ṭhaṇaṃ puṇa tesimeva sambhāvādi te sagaparaṇāmehim du gamaṇaṃ ṭhaṇaṃ ca kuvvanti
128. The New Encyclopaedia of Britannica ;Vol. 4, p. 577
129. Pañcāstikāya; 83
130. *Ibid.*, p. 84
131. Bh.S.; 13/4/56
132. *Ibid.*, 13/4/57
133. Cosmology; p. 37
134. *Ibid.*, p. 38
135. *Ibid.*, p. 39
136. Vardhamāna purāna; 16/30

3

Space and Time in the Bh.S.

The Jain concepts of space and time have generally been understood only theoretically. Seldom have they been explained either philosophically or scientifically. This thesis attempts to offer an explanation on these terms.

The Jain doctrine of Space is put on a par with the doctrine propounded by Newton, in apparent contrast to the doctrine propounded by Kant and Einstein. The Bh.S¹ elucidates it on an extensive scale and accommodates it with the theory of cosmology and cosmogony. The Jain doctrine of space and time is receiving a scientific analysis and vindication in some form in the light of modern physics.

The word 'Universe' implies that several reals are subsumed under it. According to the Bh.S, it is quite clear that the universe consists of the five extended realities or six substances as indicated in the previous chapter.² The common experience reveals that everything and every event, experienced with the help of sense-organs, persist in space and happen in time. The question arises whether space and time are real existents? If so, are they of the material nature or of immaterial nature?

Space

An Objective Reality

According to the Bh.S, space (*Ākāśa*) is an independent and objective reality.³ It is self-content and the container of all other substances. It is boundless and infinite. Space is not occupied by any other entities, as they are finite or limited. Like other elements, space also represents a manifold reality. It means, inspite of being incorporeal, space consists of infinite space-points.⁴ According to Abhayadeva and Prabhācandra, even an incorporeal or formless object may contain parts or divisions.⁵ Abhayadeva

points out further that to be divisible (*Sāvayava*) does not necessarily mean that the parts should be together at some point of time prior to division.⁶ So space has infinite points which are in a continuum form. In other words, indivisibility is an intrinsic feature of the space points.

According to the Jain view space is divided into two parts, viz; cosmic and transcosmic.⁷ Cosmic space is the part which is occupied by souls and matter and which is co-extensive with the media of motion and rest.⁸ The cosmic space is made up of innumerable space-points while, transcosmic of infinite.⁹ In total, the cosmic and transcosmic together are of infinite space-points.

Beyond cosmic space is transcosmic space. It is a receptacle without contents.¹⁰ Truly speaking, cosmic space is a plenum and transcosmic space is a vacuum empty-space. In this space, no substance exists. Neither an atom of matter nor any living entity can cross the boundary of cosmos and enter into supra cosmos. In fact, space is one and indivisible entity. It is a homogeneous whole.¹¹ It is not divided into two parts as we see in the case of material object.

The distinction between the cosmos and transcosmos is only due to the operation of two cosmic principles, viz. the medium of motion and the medium rest as discussed before in the second chapter.¹² Actually where these two are, there is the cosmic space. In the absence of the two there is no cosmos at all. The three substances the medium of motion, the medium of rest and the cosmic space, are co-existent and co-extensive.¹³ They penetrate each other without offering any sort of resistance. There is one-to-one correspondence between the points of the three elements. Sarvārthasiddhi, the commentary on Tattvārtha Sūtra, compares this pervasion of the media in the cosmic space to the pervasion of oil in the sesame seed.¹⁴ This is in contrast to the location of a jar in a particular place in the room.

Thus, space is one and continuum. It is distinguished as cosmos and transcosmos due to the presence or absence of the medium of motion and the medium of rest. Living beings and matter move and rest up to the confines of the universe only. Beyond this the media are absent. It is these two media that determinate the limitation of the universe. The transcosmos is an infinite pure space. There is nothing as living or non-living phenomenon and it surrounds the cosmos from all sides.¹⁵

According to the Bh.S, space acts as the receptacle of all substances.¹⁶ The points of the medium of motion and the medium of rest coalesce with the points of cosmic space. This coalescence is a kind of mutual co-operation and the condition for mutual existence. In addition to these three, the other two substances i.e. soul and matter, are also housed in cosmic space. It is, therefore, the container of all substance.

Accommodation: A Characteristic

The Bh.S regards accommodation as a specific attribute of space.¹⁷ There is no other substance except space in transcosmos yet, it is space because it possesses the quality of accommodation. The text refers to this functional feature of space through a dialogue between Lord Mahāvīra and Gautama. The dialogue goes on as follows:¹⁸

“Gautama: what is the use of space for living and non-living?”

Mahāvīra: space provides place to sentient and insentient.

Single space point can contain one, two, hundred, crores or even—more atoms in itself.

To provide room or interpenetrability is the characteristic of space”.

Here, one thing is certainly true that which provides room to the things in the universe is space. In this sense, cosmic space is really space. But the limitless space beyond the universe and which is known as transcosmic space does not accommodate anything; then why is it still recognized as space? The fact is that due to the absence of the medium of motion and the medium of rest, substances are limited up to the cosmos only, that is why transcosmos does not accommodate them but it does not mean that it loses its capacity of accommodation. It always possesses the power of accommodation.

It may also be questioned why some other substances do not accommodate space itself? The answer is that space is more extensive than all other substances; so there is no question of any other substance which can contain it in itself.¹⁹ Secondly, in fact, space itself needs not such matrix due to its self-supporting capacity. According to the Bh.S, water is the support of the earth. Air is the support of water and space is the support of air. But space has no support outside itself. It is self-supporting and self-existent.²⁰ If we accept any other supporting substance, it would inevitably lead to **an infinite regress**.

So far as the power of accommodation is concerned, the cosmic space accommodates infinite sentient and insentient in its finite points. The Bh.S²¹ is emphatic obvious in this connection that even one space-point can provide room to infinite material objects. Depending on its contracted or expanded condition, a cluster of one, two, three or more atoms occupies at least one space unit and, at most, as many space-units as there are atoms in the cluster. Even though the maximum expansion of the biggest cluster would not be more than innumerable space-points. If the Cluster is of infinite atoms, it cannot occupy infinite space points because of the limitation of cosmic space. Thus, the cosmic space is densely packed with infinite diverse atoms, subtle and gross clusters of matter and, infinite sentient.²²

The commentary Sarvārthasiddhi explains that infinite atoms and

clusters can penetrate each other just like the non-material substance such as the media of motion and of rest.²³ This fact is made clear through the example of lamps lighting the same space without any mutual resistance. According to Dr. Nathmal Tatia, this discussion reveals a conundrum of Jain philosophy.²⁴ A space unit is measured as a space occupied by one atom; yet, it is possible for an infinite number of atoms to occupy one space-unit.

So far as the living being is concerned, minimum innumerableth part of cosmic space is necessary to be occupied.²⁵ In fact, the soul is an extended substance with innumerable units which contract and expand to fit the body determined by its karma. However, the units of the soul are not like the units of a cluster of matter. They are non-detachable and devoid of the material qualities i.e. touch, taste, smell and colour.

In normal condition, the soul is co-extensive with the body in which it lives.²⁶ But during the astral projection the soul extends itself to cover the entire cosmic space in order to make sensation-producing karma (*vedaniya karma*) equal to life-span determining karma at once. In this state, the innumerable units of the soul coincide one-to-one with the innumerable units of cosmic space.²⁷ Though, this is exceptional or rare condition. Generally soul occupies minimum innumerableth part of cosmic space.

The question arises here is, why the contraction of the soul only reduces to an innumerableth part of cosmic space rather than a single space unit? Answer given is the worldly soul always accompanied by the karmic body, which is composed of infinite atoms, which must occupy innumerable space units.²⁸ Even the liberated soul cannot contract itself to a single space unit, because it eliminates one-third of the body occupied during its last worldly existence and that reduced size is maintained in the liberated state.²⁹

One remarkable question raised and answered in Sarvārthasiddhi is that if an individual soul occupies an innumerableth part of the cosmic space, how can the infinite souls with their body be accommodated in cosmic space?³⁰ The answer is there are two types of soul viz; subtle-bodied and gross-bodied. Subtle-bodied souls do not offer resistance to each other and to gross bodied ones. They are able to co-exist in space whatever they find. Besides this, infinite number of souls can jointly inhabit the space occupied by the sub-microscopic body of the least developed soul.

So far as the medium of motion and the medium of rest are concerned, because of being co-existent and co-extensive they occupy the entire cosmic space.³¹

The above discussion can be summarized in the words of Dr. Nathmal Tatia as follows:

"All the substances exist and have accommodation in cosmic space. Space, however, is not contained in anything, but is self-subsistent. It has been conceived as containing six substances because it is the locus of all the five substances and also of itself.

Space is locus of itself from the conceptual standpoint but of others in the literal sense of the term. The medium of motion and the medium of rest, although they exist in the entire extent of cosmic space, are not independent of their locus. It is space which is the ultimate locus of everything."³².

Bh.S in Comparison to Other Indian Systems

Space is the substance which is accepted almost by all the Indian and Western thinkers. The noteworthy thing in this connection is that such comprehensive and critical discussion about space, as found in Jain metaphysics, is not traceable in other philosophical systems like Buddhist, Vaisheshika, Samkhya and Vedānta schools. In the Buddhist philosophy, space is regarded as having the characteristic of *āvaraṇābhāva* (absence of pervasion)³³ and it is considered to be simple element (*asaṃskṛta dharma*).³⁴ On the contrary, in the Jain philosophy, it is not postulated in a negative connotation, in terms of non-existence (*abhāva*). Further, it is not regarded as *asaṃskṛta dharma*, since it really exists³⁵ and has the general and special characteristics, such as, origination, permanence and destruction along with accommodation etc.³⁶ According to the definition of the substance also, space is a substance because it is never devoid of qualities and modes, their association being natural and eternal substances are distinguished from one another. Here, the specific quality i.e. accommodation or receptacle of space distinguishes it from other objects. This is the reason the Bh.S dealing with five extended realities, it describes space as a separate independent real.

According to Nayacakra Vṛtti, space is of sixteen types of general and specific nature.³⁷

Vaisheshikas have propounded the concept of space as independent substance and it has quality of producing sound (*śabda*).³⁸ They have considered the direction (*dik*) as different from space.³⁹ Accordingly, that which has the attribute of sound is space, and that which limits the external world by direction is *dik*.⁴⁰ *Nyaya-kārikāvalī* defines direction which has the attributes of the farness and nearness (*dūrtva and sāmipyā*) and which makes distinction between one place and the other. Direction is one and eternal (*nitya*). By purpose or empirical consideration it is called the East and the West and other directions. But according to the Bh.S⁴¹ direction is not distinct from the space. In fact, the directions are specific determinations of space and do not constitute a different substance.⁴²

According to the text, direction is a measurement of cosmic-space with reference to the various locations. All the directions begin⁴³ from the central part of the mount Meru situated in the center of middle part of the universe.

The canonical texts refer two types of word, viz; direction (*diśā*) and intermediate direction (*anudiśā*).⁴⁴ East, West, North and South these are

directions. These begin with two space-points and increasing by two it covers infinite number of space-points in the end. Intermediate direction is a part of direction. The intermediate direction like upward direction (*ūrdhve diśā*) and downward direction (*adho diśā*) begins with four space-points and remains same till the end. There is no increase in the space-points of intermediate one.

There are found different descriptions regarding direction in Jain canonical texts. Generally the East is the direction in which the sun rises. The direction in which the sun sets is the west. If a man faces to the East and expands his both hands, the direction to the right hand is south and the direction to the left is the North. These directions are conventional measurements based on the sunrise and sun's movement. Technically they are known as *tāpadiśā*.⁴⁵

In *Ācārāṅga-Niryukti*, we find another description of direction meant for astrological purpose. The East would be in front of the Astrologer, the West behind him, and the North to his left hand and the South to his right hand. This distinction is called *Prajñāpaka Diśā*.⁴⁶

Frankly speaking, direction is not an independent element. It has been conventionally formed for the sake of measuring space and determining directions. As already pointed out space has infinite space-points. Just as every point in a piece of cloth is necessary for giving pattern; similarly all the space-points give a pattern for the empirical measurement of space whenever we measure and determine the directions like East and West.

Like the Jain concept, Modern science is not in favour of the concept that space possesses the characteristic of producing sound: It is matter which is attributed to produce sound.⁴⁷ Sound is experienced by the sense organs, which are material in nature. Material particles come into contact with the other material particles and also separate from them as a result of their integration and separation sound is produced. The stimulation of the sound is received by the sense organs, as a result of which sound is experienced.

In Samkhya philosophy, prakṛiti is the primordial substance and space is one of the products of it.⁴⁸ But it is a problem worth considering. The products of Prakṛiti like earth, water, air and fire etc. have form and how can it be right that space, that is also a product of Prakṛiti, cannot have a form? Besides, Prakṛiti evolves into a variety of complex modes to form the universe. The evolution of the Prakṛiti is based on the disturbance in the equilibrium of the three *gunas* i.e. *Sattva*, *Rajas* and *Tamas*. How is it possible that some of the evaluates of Prakṛiti have the three *gunas* and some have not, if we accept space as a product of Prakṛiti. In conclusion, it is apt to say that space is neither a product, nor a mode of a material substance. It is also not an appearance of the supreme principle known as Brahman. It, in fact, is an eternal independent substance.

The Buddhist thinkers have deemed space to be a simple element. It is

not a composite because of being free from the characteristic of origin and destruction. They have described it as having the quality of *anāvṛtti* (non-covering) and *āvaraṇābhāva* (non-pervasion).⁴⁹ It does not pervade anything nor any object covers it. This is the view of Sarvaśhaṅikavādi Buddhists. Vaibhashikas describe space as a non-pervasive element, but it has its own characteristic.⁵⁰ Here, the question arises, is it possible to an object to have empirical qualities and at the same time not to produce them? It is true that we cannot describe the products of space in the language of origination and destruction. It is true that space is eternal and not produced like earth, water, air, and fire. The treatment of *Abhidhammāsaṅgraha* is rather comprehensive. It explains space in terms of '*Pariccheda*'. It means space is one and continuous and having the empirical qualities i.e. origination and destruction.⁵¹

Unlike the Samkhya system, the Jain philosophers never mention that space is a product of anything else. As far as the Buddhist system is concerned, they are unanimous in the view that space is one and continuum. They also accept that space does not pervade in other substance. It is self-existent and self-supported. But the Jain view differs on this point that space is a simple element and not a composite one. Although the composition of space is different yet, it is.

Time

Time in Jainism: A General Review

Anindita Niyogi Balslev in her book 'A study of Time in Indian Philosophy' has made a good endeavor to study the problem of time in Indian philosophy. Here, only a review of the study about Jainism is being given as follows:⁵²

A survey of philosophical and theological thinking, pertaining to the problem of time, reveals a continued search for greater clarification and understanding, involving different approaches and methods, and consequently resulting in widely divergent philosophical formulations.

It is evident that a study of such fundamental problems as that of time cannot be isolated and disconnected from other major philosophical issues of a specific system in a given tradition. It is interrelated and interwoven with such basic concepts as those of being and becoming, change and causality, creation and annihilation.

The metaphysical stand of Jainism, known as Non-absolutism, is, as the term designates, an attempt to construct a conceptual structure that makes room for a many-sided view of reality. It aims at formulating a conception of reality, which can accommodate identity and difference, permanence and change. It, therefore, seeks to avoid such views that are extreme and one-sided, which either emphasize the reality of the ultimate identity at the

exclusion of change or maintain the reality of perpetual change at the price of identity. The system of Advaita Vedānta, for example, represents the former and Buddhism the latter, which Jains designate as extreme views technically known as **Dravya-ekāntavāda** and **Paryāya-ekāntavāda** respectively.⁵³ Jainism seeks to avoid these extreme views and puts forward a comprehensive philosophical position as a metaphysical reconciliation.

The Jain attempt to avoid these extreme, one-sided views gave rise to a distinct conception of the real, which is found in the canons⁵⁴ and formulated by Umāsvāti in his *Tattvārthaasūtra*⁵⁵ as origin, decay and permanency are the characteristics of the real. This definition of the real is expressing the Jain conception that allows for difference (change) and yet, maintains an underlying identity (permanence). This becomes even clearer when one notes the conception of substance that plays an important role in Jain metaphysics.

The Jaina metaphysical system is one of the realistic pluralism. The two important terms that occur throughout the Jain philosophical literature, are *dravya* (substance) and *Astikāya* (extended real).⁵⁶ It is only through our understanding of these concepts that we can grasp the distinct Jain formulation of the problem of time.

Achary Umāsvāti defines substance as that which is possessed of qualities and modes.⁵⁷ To talk about a substance without qualities and modes or vice versa is merely an intellectual abstraction, which does not do justice to reality. The system lists six substances as ultimate real, of which one is time. The various principles that are employed to classify the substances according to their characteristics focus on the Jain view of time along with its similarities with and differences from other substances. The six substances, listed as metaphysically real, are—the soul/the conscious substance, matter, and the medium of motion, the medium of rest, space and time.

Of the six five substances except time are called *Astikāya*. *Astikāya* are the substances which are composed of small units or in principle at least capable of being mixed up.⁵⁸

Though time is of atomic nature⁵⁹ but the characteristic of the time-atoms is such that they remain distinct and can never be mixed up.⁶⁰ This is brought out by saying that time has only one unit, i.e. the time-atoms can never be combined. This explains why time cannot be classified as *Astikāya*. This, again, is a clear way of indicating the difference between the atoms of space, matter, etc. from that of time.

An important understanding pertaining to the time-atoms is discussed in the Jain text.⁶¹ There it is pointed out that time has no corpus (*kāyatva*) or extension, it is generated by such an arrangement that the time-atoms can constitute a moni-dimensional series which is unilateral. This is what in Jain terminology is called *ūrdhva pracaya* e.g. multi-dimensional series of vertical extension as opposed to the *tiryak pracaya* i.e. a multi-

dimensional series of horizontal extension.⁶² A Chakravarti writes in his 'Philosophical Introduction' to *Pancāstikāyasāra* as follows:

"...when the simple elements, say the points, are so arranged in a series, where each term is an item also in another series, we must have the two-dimensional series, which will correspond to surface or extension. Wherever there is such a *tiryak pracaya* we have *astikāya*. But time has only *ūrdhva pracaya*. The elements are in a forward direction..."⁶³

The Jain understanding specially of Digambara tradition of the time-atoms (*kālāṇu*) as ultimate,⁶⁴ absolute and eternal, again points to its distinction from the conventional i.e. common-sense time (*vyavahāra kāla*). The conventional time-periods, of which we find a long list in the Bh.S⁶⁵ ranging from the last unit of time technically called *samaya* (instant) to *śrīṣapraheḷikā*, the largest unit of numerable time.

It is obvious that these distinctions of conventional time-periods are made possible only with the help of some extraneous factors. The units of measurement are generally based on some changes in the physical world, such as, the motion of the sun and the moon.⁶⁶ This is why conventional time is never unconditional but dependent on other outside factors. The absolute time is unconditioned (*paramārtha kāla*), true (*niścaya kāla*) and real (*dravya kāla*).⁶⁷

The conventional time presupposes the absolute time. In the Digambara Jain text the absolute time is described not only as a real existent but also as being potent, i.e. it brings about changes in the other substances.⁶⁸ Birth, growth and decay of things are subject to its influence.

The absolute time, consisting of instants, is conceived as beginningless and endless, whereas conventional time has both. This brings into light an important feature of the Jain understanding of time, i.e., the instants arranged unilaterally are conceived as permanent (*nitya*).⁶⁹ Jains agree with the other atomic views of time⁷⁰ (Yoga and Buddhist views) in maintaining that no two instants can be found simultaneously.⁷¹ Here, the imperishable does not mean that no instant will perish at all but instant will be present at every moment. This is well known that every instant is coming into existence in one moment and passing away in the next moment. Nevertheless, it is eternal. It implies that the flow of instant will continue forever. It is running from the past unknown to the endless future. Time is eternal for Jain, as the *Vaisheshika* philosophers held it to be, but the difference between them is glaring. The *Vaisheshika*⁷² view of one ubiquitous time is found to be untenable while the Jains propound an atomic,⁷³ plural view of time instead.

The Jain conception of the absolute time is to be contrasted to the idea of time as appearance. Time, to the Jain thinkers, is a substance, having an ultimate status in the pluralistic metaphysics of the system. No modification in the universe can be conceived without time.⁷⁴

It is significant that Jainism with its realistic framework of thinking accepts the reality of change which, in turn, points to the reality of time. To deny the reality of time is tantamount to the dismissal of all changes involving birth, growth, decay or motion. It is precisely this position that is avoided by maintaining the reality of time.

The absolute time-atoms are conceived as co-terminus to the cosmic space, the instant having no extension of volume. In other words, there can be no question of simultaneous moments, the time series consisting of time-atoms is always to be understood as successive.

The different principles classifying the substances in distinct groups are as indicated in the second chapter, a source of our knowledge about the Jain idea of time. The substances are classified as physical and non-physical.⁷⁵ Physical means the substance that is endowed with sense-qualities, such as, touch, taste, smell, colour, sound etc. This is why time cannot be the subject of sense perception. It can be known through inference.

Again, according to another principle of classification, on the basis of which a substance can be said to have consciousness, we find that soul alone is singled out as conscious. All the other substances including time are listed as non-conscious.⁷⁶

These are the main ideas about time that can be traced from the original Jain texts. The Bh.S' conception of time is documented in an illuminating discussion that will now be taken up. The text refers to both the concepts of time, absolute as well as conventional. The thing worth noticing is that unlike the Digamber view of time, it never mentions that there are actually innumerable time atoms that are co-tremens to the cosmic space. According to it, the absolute time is momentary and applies everywhere. It is not different from the sentient and insentient entities. It causes all the changes going on every moment in each object.

Time: in the Bh.S

In the Bh.S we find two words for Time—*Addhāsamaya* and *Kāla*.⁸⁸ Etymologically the term '*addhā*' denotes distance (or length) of time as well as that of space,⁷⁸ while '*samaya*' signifies a point of time (moment);⁷⁹ *kāla* is the substantial cause of *samaya*.⁸⁰ From the study of the Bh.S it becomes clear that *Addhāsamaya* can be defined as an instantaneous, eternal, fundamental, formless, non-living, independent substance.⁸¹ *Kāla* can be understood as an entity of atomic structure.⁸² The shvetambara scripture⁸³ often identifies time with the modification of sentient and non-sentient entities as we see in answering to many questions, such as , the question of the beginning and ending of the universe etc. *Sthānāṅga sūtra*⁸⁴ endorses the same view. On the other hand, in the same text time has been mentioned as a substance. In the twenty fifth chapter (*śataka*), it has been asked—"How

many substances are there, O Lord?" Mahāvīra replied: "O Gautama, there are two substances—1. Living and 2. Non-living. The five are non-living, such as, the medium of motion, the medium of rest, space, soul, and the unit of time."⁸⁵ Here, time is regarded as a substance. Time is, thus, considered both a mode as well as a substance.

In the canons like Anuyogadvāra and Uttarādhyayana,⁸⁶ time is defined as momentary or continuum. Tattvārtha Sūtra⁸⁷ defines time as the substance which is recognized from the phenomena of becoming, change, motion, before and after.

The commentary on Tattvārtha Sūtra⁸⁸ proves the existence of time as an independent substance by arguing that time satisfies the definition of an existent. This is because it has modes and qualities. Its modes are origination, cessation and persistence; the present ends and begins again at every moment, and persists through the process. The common qualities of time are non-sentience and the absence of material qualities. Its unique qualities are its functions such as becoming, change, motion, and the sequence of before and after.

Thus, time possesses the characteristic of persistence through change and therefore, is a substance. It is the necessary condition of duration, modification, motion, newness and oldness of the objects. Time by itself cannot cause an object to exist, but at the same time it can not be conceived without time, because change implies temporal succession of something in which modification takes place. Similarly, motion implies different positions of an object in space in temporal succession. Besides, time causes the distinction between the old and the new, the former and the latter.

Different Views about Time

It appears from the Bh.S⁸⁹ that there are two traditions about time regarding its separate and in separate existence. According to one view, time is considered to be the mode of all substances,—sentients (*jīva*) and insentients (*ajīva*). In this sense, time is not separate reality. The other view conceives time as an independent substance, just as the other living and non-living substances are independent. In this sense time causes change in the object though favours the former view. It remains the medium of change.

Shvetambara tradition yet mentions both the views as found in the *Bhagavatī*, *Uttarādhyayana*, *Jīvābhigama* and *Prajñāpanā*. Latter Acharyas Umāsvāti, Siddhasena Divākara, Jinabhadragaṇi, Haribhadrasūri, Acharya Hemachandra, Upādhyāya Yaśovijaya, Vinayavijaya, and other Shvetambara scholars have also mentioned both the notions. But Digambara Acharyas like Kundakunda, Pujyapāda, Akalaṅkadeva and Vidyānanda have discussed time, only as an independent substance.

The Shvetambara view holds that the measurable duration, such as, instance, intra-hour, day and night, month and year are the modes of time

from the conventional point of view. From the transcendental point of view they are the modes of sentient and insentient entities. The sentient and insentient entities constitute the world undergoing through various modifications.⁹⁰ These modifications are considered as time. So time by itself is not an independent reality.

According to the Digamber view, time is an independent element like the medium of motion and the medium of rest. Time is an existent and change is possible only through time.⁹² It appears that the tradition of accepting time as a separate entity is not much old. Moreover, the given about time as a separate entity is not different from the time defined in Shvetambar tradition.

Nature of Time

The Bh.S. never mentions time as an *Astikāya*. It means that time is not a homogenous entity. The Digamber tradition also explains that time does not form a magnitudinal extension (*kāya*), though it has got existence like the heaps of pearls.⁹²

In the Bh.S, time is considered as *paramāṇu* i.e. atom of time. It is characterized as colourless, smellless, and tasteless and touchless.⁹³ This theory reveals the atomic conception of time which is found in detail in the literature of the Digambara tradition. The smallest time-unit is *samaya* that is eternal and instantaneous by nature. Commentary on Pañcāstihaya⁹⁴ defines *samaya* as the time taken by an atom to traverse one space point to the next one.

However, in the non-absolutistic philosophy of Lord Mahāvīra, the two different ideas about time are not contradictory, but they are complementary to each other. From nominal point of view time is a mode of the other substances and not an independent real. But from phenomenal point of view it is a substance because of its utility. In fact, time has relevancy in the world of men and also in the astronomical and astrological calculations. The rotations and revolutions of planets are possible in time. In this sense time has relevancy with reference to human intellect. In the Digambara tradition time is not merely considered as an expression of human intellect with reference to human activity, but it is objective and is also pervading the entire universe as mentioned before.

Moreover, being different in opinion about the objectivity of time even though all the Jain Acharyas are unanimous on the issue that time is a single unitary substance. It is a substance but not like other five substances that have extended existence. It is, in fact, of atomic nature. The time series are always in forward direction technically called *ūrdhva pracaya*. It flows in a linear series. The span of time is considered to be uni-dimensional. Time always moves in one direction. It is always forward looking. Every unit of it is discrete, since at a particular moment of time the present alone exists and the past is gone and the future is yet to come. Hence, there is only one

instant (*samaya*) every time.⁹⁵ Therefore, the possibility to be an aggregate of the instants is negated automatically. As it is uni-dimensional it cannot present itself in a reverse direction, i.e. *tiryak pracaya*.

Forms of Time

The Bh.S⁹⁶ mentions four kinds of time. They are, such as, *Pramāṇa kāla* (standardized time), *Yathāyurnirvṛtti kāla* (time when the binding of life-span-determining karma takes place), *Maraṇakāla* (death-time) and *Addhākāla* (time associated with nature). Sthānāṅga Sūtra also discusses the same four kinds of time.⁹⁷

The four kinds of time mentioned in the Bh.S. can be subsumed in the two i.e. *Pramāṇa kāla* and *Addhākāla*. The rest two can be included in the latter one. The detailed description of each found in the text is as follows:

Pramāṇa kāla is the standardized time. It is again divided into two classes, viz. *Divasapramāṇakāla* and *Rātripramāṇakāla*. The day of four *praharas*; the night of four *praharas*.⁹⁸ The second is dependent on the life-span time of living-beings. The third one is associated with the moment of death. The life and death are two relative spans of time. The duration of life is considered as *Yathāyurnirvṛtikāla* and the cessation of the duration of life is death and is called *Maraṇakāla*. The fourth one is related to the nature of time and is evolved by the travelling of the moon and the sun. Actually, this one is the primary form of time. The rest are different forms of it. This is the phenomenal measurement of time with a practical purpose of determining the span of time. Therefore, this is restricted to the human world⁹⁹ and it is meant to measure the various distinctions of time for human activities. All the divisions ranging from *samaya* (instant) to *pudgala-parāvartana* are made of the *Addhākāla*.¹⁰⁰ It is obvious that the smallest unit of time is *samaya*. It is indivisible time-unit. It can be expressed only through analogy as explained just below. The time-units after *samaya* right from *Āvalikā* to *Pudgal-parāvartana* have been dealt with in the next points.

The Subtlety of the Last Unit of Time

The subtlety of the unit of time is explained in the scripture *Anuyogadvāra* and other works, by the examples of a strong young tailor tearing up a piece of cloth and of an effort to make a hole in the leaves of a lotus¹⁰¹ e.g. suppose 100 petals of lotus are kept one over another and if one is to pierce a needle so as to penetrate all the petals, it may appear that all of them have been penetrated simultaneously. But this is not so. Every petal is pierced successively within the smallest fraction of time.

Similarly, as a strong man tears a piece of cloth at once it may sound that the whole piece is torn out in a moment. But this is not true. Because

a piece of cloth is woven out of a large number of threads and each thread is made of infinite points of cotton. When the piece of cloth is torn every thread of the cloth and every point of thread needs to be torn separately and each requires an indivisible and smallest fraction of time. A time unit, however, is subtler than the subtlest moment arrived at in these abovesaid processes.

The Units of Numerable Time

The Bh.S¹⁰² and the other canons¹⁰³ mention the conventional measurements of time starting from the smallest to the largest unit of time for the purpose of human activities. They are as follows:—

Table No. 3

| | |
|---|---|
| Minimum self-raised time unit | = 1 <i>samaya</i> |
| Minimum self-raised innumerable time units | = 1 <i>Āvalikā</i> |
| Numerable or 4446 ²⁴⁵⁸ /3773 <i>Āvalikās</i> | = 1 pulse beat (inhalation-exhalation) |
| 7 Pulse beats | = 1 <i>stoka</i> |
| 7 <i>stokas</i> | = 1 <i>lava</i> |
| 77 <i>Lavas</i> or 3773 inhalations | = 1 <i>muhūrta</i> |
| 30 <i>muhūrtas</i> | = 1 day and night |
| 15 days and nights | = 1 fortnight (<i>pakṣa</i>) |
| 2 fortnights | = 1 month or solar (<i>māsa</i>) |
| 2 months | = 1 season (<i>ṛtu</i>) |
| 3 seasons | = 1 <i>ayana</i> (solstice) |
| 2 <i>ayanas</i> | = 1 year (<i>samvatsara</i>) |
| 5 years | = 1 <i>yuga</i> (aeon) |
| 20 <i>yugas</i> | = 1 hundred years or century |
| 10 hundred years | = 1 thousand years or millenium |
| 100 thousand years | = 1 hundred thousand years or 100,000 years |
| 8,400,000 years | = 1 <i>pūrvāṅga</i> |
| 8,400,000 <i>pūrvāṅgas</i> | = 1 <i>pūrva</i> |
| 8,400,000 <i>pūrvās</i> | = 1 <i>truṣṭitāṅg</i> |
| 8,400,000 <i>truṣṭitāṅgas</i> | = 1 <i>truṣṭita</i> |

| | |
|---|----------------------------------|
| 8,400,000 <i>truṭitās</i> | = 1 <i>aṭaṭāṅga</i> |
| 8,400,000 <i>aṭaṭāṅgas</i> | = 1 <i>aṭaṭa</i> |
| 8,400,000 <i>aṭaṭas</i> | = 1 <i>avavāṅga</i> |
| 8,400,000 <i>avavāṅgas</i> | = 1 <i>avava</i> |
| 8,400,000 <i>avavas</i> | = 1 <i>huhukāṅga</i> |
| 8,400,000 <i>huhukāṅgas</i> | = 1 <i>huhuka</i> |
| 8,400,000 <i>huhukas</i> | = 1 <i>utpalāṅga</i> |
| 8,400,000 <i>utpalāṅgas</i> | = 1 <i>utpala</i> |
| 8,400,000 <i>utpalas</i> | = 1 <i>padmāṅga</i> |
| 8,400,000 <i>padmāṅgas</i> | = 1 <i>padma</i> |
| 8,400,000 <i>padmas</i> | = 1 <i>nalīnāṅga</i> |
| 8,400,000 <i>nalīnāṅgas</i> | = 1 <i>nalina</i> |
| 8,400,000 <i>nalinas</i> | = 1 <i>arthanipurāṅga</i> |
| 8,400,000 <i>arthanipurāṅgas</i> | = 1 <i>arthanipura</i> |
| 8,400,000 <i>arthanipurās</i> | = 1 <i>ayutāṅga</i> |
| 8,400,000 <i>ayutāṅgas</i> | = 1 <i>ayuta</i> |
| 8,400,000 <i>ayutas</i> | = 1 <i>nayutāṅga</i> |
| 8,400,000 <i>nayutāṅgas</i> | = 1 <i>nayuta</i> |
| 8,400,000 <i>nayutas</i> | = 1 <i>prayutāṅga</i> |
| 8,400,000 <i>prayutāṅgas</i> | = 1 <i>prayuta</i> |
| 8,400,000 <i>prayutas</i> | = 1 <i>cūlikāṅga</i> |
| 8,400,000 <i>cūlikāṅgas</i> | = 1 <i>cūlika</i> |
| 8,400,000 <i>cūlikās</i> | = 1 <i>śīrṣaprahelikāṅga</i> |
| 8,400,000 <i>śīrṣaprahelikāṅgas</i> | = 1 <i>śīrṣaprahelikā</i> |
| Innumerable Years | = 1 <i>palyopama</i> |
| 10 crore-crore <i>palyopama</i> | = 1 <i>sāgara</i> |
| 20 crore-crore <i>sāgara</i> | = 1 <i>kālacakra</i> |
| | (1 <i>Avasarpīṇi-utsarpīṇi</i>) |
| Infinite ascending and descending cycle | = 1 <i>pudgalaparāvartana</i> |

The Units of Innumerable Time

In the numerable periods of time after 100,000 years each successive period is 8,400,000 times longer than the preceding one. Up to *śīrṣaprahelikā* all these distinctions are known as *gāṇitika kāla* (Mathematical time).¹⁰⁴ Since, they can be calculated. After these, according to the Bh.S and the scriptures like Anuyogadvāra etc., time cannot be

expressed in statistics. If we want to know we have to take the help of analogy. The time discussed on the basis of analogical explanation is called *Aupamika kāla* (time based on similes).¹⁰⁵ *Aupamika kāla* is divided into two forms—*Palyopama* and *Sāgaropama*¹⁰⁶ as shown above in Table N. 3.

Unlike the Bh.S.,¹⁰⁷ *Anuyogadvāra* and the auto-commentary on *Tattvārtha Sūtra* clarify these similes in a descriptive manner. Both the texts state that the above sphere of arithmetical calculation is followed by calculations based on similes of pits.¹⁰⁸ The commentary on *Tattvārthaa* identifies three types of pits: transfer, time based and space based each of the three having a gross and subtle variety.

The similes of the gross and subtle transfer pits are explained as follows—

A round pit, one *Yojana* in diameter and one *Yojana* deep, is tightly packed with sheep wool of one to seven days' growth. Now, if one wool fibre is pulled out every time unit, the time taken to empty the pit completely is called one gross transfer pit-measured year. This period consists of a countable number of time-units. If each of the fibres in the transfer pit is cut into innumerable pieces, and then one such piece is pulled out every time unit, the time taken to empty the pit is called one subtle transfer pit-measured year. This period consists of a numerable number of years multiplied by 10^7 .

In the case of the gross time-based pit, a single wool fibre fragment in the subtle transfer pit is pulled out every one hundred years. The time required for emptying the pit in this manner is called one gross time-based pit-measured year. Now, if each wool fibre is further cut into innumerable pieces so that they become indivisible, and then one piece is pulled out every one hundred years, the time needed to empty the pit is called one subtle time-based pit-measured year.

Lastly, among the gross and subtle space-based pit similes the gross time-based pit, the space units touched by all the wool fibres in the pit are pulled out one by one every time unit. The time required for emptying the pit in this manner is called one gross space-based pit-measured year. In the case of the simile of the subtle space-based pit, each wool fibre is cut into an innumerable number of pieces to fill up the pit. Those subtle wool fibres are now imagined to be pulled out one by one on each time unit. The time required for emptying the pit in this manner is called one subtle space-based pit-measured year. Innumerable numbers of ascending cycles in the cosmic cycle of time are required to empty this pit. The total number of the single-sensed earth-bodied, fire-bodied, plant-bodied, water-bodied and air-bodied souls is determined by this simile.

Each of the pit similes is converted into an ocean simile by multiplying its number of years by 10^{15} . This, again, is of two categories of similes, pit-measured periods and ocean measured periods.

The Utility of the Analogical Time Periods

The Bh.S explains that the similies of innumerable time based on pits and oceans are used to calculate the periods of ascending and descending cycles in cosmic time, the duration of knowledge-covering and other types of karmic bondage, and the lengths of repeated births of different living beings in similar body.¹⁰⁹ The total number of islands and oceans in the middle region is calculated as equal to 2.5 times the number of time units in the subtle transfer ocean-measured year.

Two types of Time

In Digamber tradition, time is distinguished from two standpoints—conventional (*vyavahāra*) and real (*parmārtha*).¹¹⁰ The conventional is the time which helps to determine changes in a substance and which is known from modifications produced in it, while i.e. real time is considered from continuity. It is the change of an object which takes place every moment and therefore it is not considered different from the living and non-living entities, according to Shvetambar tradition. But Digambar tradition explains it differently and therefore regards it as an independent reality. Accordingly, it is time element due to which change in an object takes place.

The Digambara tradition holds that the real time consists of innumerable units of time technically known as *kalāṇu* i.e. atom of time that never mix up with one another.¹¹¹ The universe is full of these units of time. No space-point of the universe is devoid of it. Each space-unit contains a unit of time in it. The units of time are indivisible, innumerable and without form. It is remarked: Those innumerable substances which exist one by one in each space-point of universe, like heaps of jewels, are units of time. Hence, time is not one substance but innumerable substances. All are eternal and indivisible.

Really speaking, time is nothing but the auxiliary cause of change. This change is understood in relation to continuity. Without continuity change cannot be understood at all. If there is no continuity, what changes? Hence, continuity is the ground of change. From ordinary point of view time is understood in seconds, minutes, hours etc. by which we call a thing to be new or old according to changes produced in the same.

Time in Indian Systems

The term *kāla* has been mentioned at many places in the Vedas and Upanisadas. But the clear idea or the exact meaning of *kāla* is not found in these references.

Kanada, in the Vaisheshika philosophy,¹¹² has presented four aphorisms for describing the principle of time (*kāla*). He states that time is a substance; it is eternal and the ground of all activities. Before, after, simultaneity, order, late and soon etc. are the characteristic qualities of time according to the

Vaisheshika view. In the Nyaya philosophy, Gautama has not given an independent treatment of time. Incidentally, he considers time as the ground of all activities.¹¹³ Thus, both the philosophies hold a similar view of time.

In the Pūrva-mīmāṃsā there is not much discussion about the nature of time. Jaimini has given no specific references in regard to time. However, the commentator, like Parthasarathi and Pandita Ramakrishna¹¹⁴ have discussed this problem and have largely accepted the Vaisheshika concept of time with certain modification. Vaisheshika considers time as a matter of indirect cognition, while Mimamsakas consider it as direct. However, all these systems view time as an independent substance.

According to the Sankhya system *Puruṣa* and *Prakṛti*, are the two fundamental principles. Space, mind, time etc. are nothing but the products of *Prakṛti*. There is no independent substance like time, but it is only an expression of *Prakṛti*.¹¹⁵

In the Yoga philosophy too, we do not get any prominent discussion regarding the nature of time. But in the commentary, Vyasa has discussed time in specific manner. He says that measurable unit of time like *muhūrta*, *prahara*, day and night etc. are phenomenal measurements of time. For practical purpose they are products of intellectual discrimination, position similar to one held by Jains. Here like the Samkhya philosophy *Prakṛti* is considered to be unconscious, but active. Activity is the intrinsic attribute of it. That is why it does not require any other force to cause activity in *Prakṛti*. But the ground of activity, and not its material cause, is the principle of time. It is to be understood as a principle in terms of which change can be measured. Unlike the Nyaya-Vaisheshika, the Samkhya-Yoga systems do not consider time as an independent category of existence.

In Vedānta school, Badarayana did not discuss the nature of time but Acharya Shankar has presented his theory of absolutism. According to him, Brahman, the Supreme Being is the only reality. Anything else is appearance. Like Shankara all the Vedantins whether they are Ramanuja, Nimbarka, Madhva or Vallabha, etc. have not considered time as an independent substance. All these vedantins along with the Samkhya and the Yoga are agreed that the time is not an independent substance. Like the Jains, in the Vedic tradition we also find two views, the one advocating time as an independent substance and the other denying the independence of it.

In the philosophy of Buddha, time is regarded as a mental construct for the sake of the practical purpose. Time is not an independent substance. It is only an experience. It is cognition.¹¹⁶ The past, the present and the future are all phenomenal distinctions of time made for practical purpose and they do not exist.

Unlike the Greek philosophy, the Buddhist philosophy has always maintained that space and time are constructs of the mind. It regards them as relative, limited and illusory. The Buddhist view can be understood well in the words of the Buddha himself in the following manner:

“Oh monk, that... The past, the future, physical space, ...and individuals are nothing but names, forms of thought, and words of common usage, merely superficial realities.”¹¹⁷

Space and Time in the Western Philosophy

Philosophers and scientists hold different opinions about space and time. The Greek philosophers like Democritus, Leucippus, Epicurus and Empidocleus maintain that space is a reality.¹¹⁸ They are of the view that matter and space are different entities. Space accommodates everything. Plato refined these views. According to him, the space, in his word “Chora”, is a receptacle.¹¹⁹ Plato’s concept of chora is not an objective reality. On this issue Aristotle’s view shows his realistic and scientific bent of mind.¹²⁰ He maintained that space and time are real. Their existence is irrespective of their knowledge by the knower. He is of the view that all the things are found to exist in space just as the pot contains water. Space is very close to the objects contained therein. The non-existence of any object does not presuppose the existence of space. Aristotle pushes the argument to the extreme point by declaring that non-existence of space is the end of the world.

According to the modern philosophers like Leibnitz and scientists like Einstein, space and time are to be decided on the strength of the knowledge of a knower. Newton held the view that space and time are reals and therefore they are not relative and hence absolute ones.¹²¹ On the contrary, Liebnitz was of the firm view that things happening in empty space are not to be taken as having any relation with the absolute space.¹²² But they are occurring within the framework of their nature. As such space is relatively real and not absolutely real. Thus, Liebnitz destroyed the concept of absolute space and held time only as real.

After Liebnitz and Newton, Kantian period represents the full bloom of German Enlightenment. The product of this period is Kant himself. According to Kant, space and time are the constructs of the mind. They are imposed on the physical objects.¹²³ Both are intuitively known and do not have absolute existence irrespective of the knowing mind. He considers space and time as a-priori notions i.e. subjective categories. They exist in the mind of the knower before the external objects are seen. When they are seen, the a-priori notions of space and time come to be verified by the posterior experience. In other words, the doctrine can be summarized as a-posteriori justification of an a-priori principle.¹²⁴

Kant’s doctrines of space and time are not accepted by modern science, particularly scientists like Einstein.¹²⁵ On the basis of his mathematical thinking Einstein came to the conclusion that space and time are not two absolute and separate categories but they make a four dimensional continuum. This can be explained with the help of an example—if any object

located in space is also located in time. Every object, according to Einstein, is an event that takes place in a four-dimensional continuum. Another scientist Heisenberg discovered a new principle known as theory of uncertainty or indeterminacy.¹²⁶ According to this theory, it is not possible to determine the position and momentum of a sub-atomic particle simultaneously i.e. if you know its position you cannot know its momentum and vice-versa. It means the knowledge of one variable affects the knowledge of the other. This limitation is not the characteristic of the measuring technique but is the very nature of the sub-atomic world itself.

The fundamental importance of the uncertainty principle is that it expresses the limitations of our classical concepts in a precise mathematical form. The subatomic world appears as a web of relations between the various parts of a unified whole. The more we impose one concept on the physical object, the more uncertain becomes the other concept and the precise relation between the two is governed by the uncertainty principle.

To understand the relation between pairs of classical concepts, Niels Bohr has introduced the notion of complementarity.¹²⁷ In this reference, the theories of space and time propounded by Jain philosophers may look pedantic but have their own scientific value, validity and relevancy.

Space and Time in Modern Science

Space, time, matter and cause-effect are basic concepts of modern science with which it understands and interprets the universe. Physicists have thought of space and time from the very beginning. There have been two views in regard to space and time in science; one the classical view and the other the modern view. The latter has profoundly changed the world-view based on the former. Fritzof Capra has dealt with both the views and eastern mysticism with some detail in his book, 'The Tao of Physics'.¹²⁸

The worldview of classical physics regarding the space and time had been based on Newton's mechano-morphic model of the universe. This model constituted the solid framework of classical physics. It was, as Capra writes, indeed a most formidable foundation supporting, like a mighty rock, all of science and providing a firm basis for natural philosophy for almost three centuries.¹²⁹

The stage of the Newton's universe, on which all physical phenomena took place, was the three dimensional space of classical Euclidean geometry. It was an absolute space, always at rest and unchangeable. In Newton's own words, 'Absolute space, in its own nature, without regard to anything external, remains always similar and immovable.'¹³⁰ All changes in the physical world were described in terms of a separate dimension, called time, which again was absolute, having no connection with the material world and flowing smoothly from the past through the present to the future.

Absolute, true and mathematical time, said Newton, 'of itself and by its own nature, flows uniformly, without regard to anything external.' Thus, Newton had accepted space and time as absolute and unchangeable phenomena.

The classical mechanistic worldview had to be abandoned at the beginning of the twentieth century when relativity theory and quantum theory—the two basic theories of modern physics—forced the scientists to adopt a much more subtle, holistic and 'organic' view of nature.

The discoveries of modern physics brought a profound change in the whole situation in Physics, radically. Two separate developments—that of relativity theory and of atomic physics—shattered all the principal concepts of the Newtonian world view: the notion of absolute space and time, the elementary solid particles, the strictly causal nature of physical phenomena and the ideal of an objective description of nature.

The new concepts of modern physics came into existence due to the extraordinary intellectual feat of one man: Albert Einstein. He strongly believed in nature's inherent-harmony and his deepest concern throughout his scientific life was to find a unified foundation of physics. He began to move towards this goal by constructing a common framework for electrodynamics and mechanics, the two separate theories of classical physics. This framework is known as the Special Theory of Relativity (in 1905). It unified and completed the structure of classical physics, but at the same time it involved drastic changes in the traditional concepts of space and time and undermined one of the foundations of the Newtonian worldview.

According to relativity theory,¹³¹ space is not three-dimensional and time is not a separate entity. Both are intimately connected and form a four-dimensional continuum called 'space-time'. In Relativity Theory, therefore, space can never be discussed without talking about time and vice-versa. Furthermore, there is no universal flow of time as in the Newtonian model. Different observers will order events differently in time if they move with different velocities relative to the observed events. In such a case, two events that are seen occurring simultaneously by one observer may occur in different temporal sequences for other observers. All measurements involving space and time thus lose their absolute significance. In Relativity Theory, the concept of an absolute space as the stage of physical phenomena is abandoned and so is the concept of an absolute time.

As far as the interpretation of modern theory of space-time goes, it is presumed that the relativity of space and time in the world of physics is dependent on the velocity of light which is considered to be the maximum and unchanging. The fastest media of knowledge or perception available in physical world is the electromagnetic radiation travelling at the speed of light. Therefore, any event-taking place in any part of the world can be known only through this medium. Thus, the distance between the observer

and the observed event will decide the time taken by the observer to know that event. This distance, however, has its importance in temporal calculation. It means that space and time are always relative and interconnected in the world of physics. Besides, as the theory of relativity shows that there is an effect of the velocity of the observer on the measurement of space and time.

When we consider the metaphysical aspect of space, time and matter the theory of relativity has a limited application. This is because the absolute velocity of light can be transcended in metaphysical world, making it possible for an observer to comprehend an event at the same instant it takes place. In this condition the relativity of space and time ceases to exist and their inter-relation also gets broken. Now, it is to see how the concept of absolute space and time expressed in the Bh.S is beyond the scope of the Theory of Relativity of physics. This means, the application of the theory of Naya (standpoints) of the Jain logic, which is essentially the view of Physics, makes our passage clear to understand better the notion of the relativity and inter-relationship of space and time. On the other hand, the transcendental standpoint makes it possible to accept the absoluteness and independence of space and time. According to the Jain theory of epistemology, in omniscience (*kevalajnana*) an observer directly comprehends an event without being affected by the relativity of space and time.

Now, let us conclude the whole discussion in the light of the metaphysical and epistemological explanation about space and time in Jain philosophy. The concept of space as *Astikāya* (extended reality) makes quite clear that space is an objective reality pervading the whole cosmos as well as the trans-cosmos. This concept also makes it clear that space can exist in both the forms such as plenum and vacuum. It means that the existence of space does not depend upon the occupying substances. Although space in modern physics is invariably related to the matter occupied in it. It can be safely concluded that as far as the cosmic space is concerned the above view is quite true. But when the transcosmic space is taken into account modern physics cannot ban its vacuum because the field of physics is not directly concerned with the transcosmic space. On the other hand, the propositions of Jain theory of the media of motion and the medium of rest respectively make it clear that the presence and absence of these two media decide the fate of space by making it a plenum or a vacuum respectively. Since, the modern physics does not throw any light on the cosmic principle of motion and rest, it cannot deny existence of such media, which are non-physical in nature.

As a matter of fact while the question as to how the finite space of the universe can exist without anything beyond it, remains unanswered? In modern science, it gets settled once for all through the concepts of the medium of motion and the medium of rest existing in the cosmic space and being absent in the transcosmos.

As regards we shall have to consider the two different schools prevailing in Jain tradition. One tradition that considers time as only the mode of other

substances, both living and non-living and does not give a status of an independent substance to time. Time, in this tradition is the innate aspect of each substance. It is responsible for the mutation of substance. Because of this nature, time is related with all the five extended realities including space. This is why Jain philosophy accepts space-time relation. The other view accepts time as absolute, which is flowing from infinite past to infinite future continuously and is of an atomic structure.

References

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2. Bh.S; 2/10/127
3. Bh.S; 2/10/124—pañca atthikāyā paṇṇattā ...āgāsathikāe
4. Bh.S; 2/10/135—padesā aṇaṇṭā bhāniyavvā
5. Bhagavatī Vṛtti; 2/139
6. Bhagavatī Vṛtti; 2/139
7. Bh.S; 2/10/127; 20/2/10—duvihe āgāse paṇṇatte, taṃ jahā—loyāgāse ya aloyāgāse ya.
8. Ibid; 13/4/55
9. Ibid; 2/1/45-143; 12/7/130
10. (i) Ibid; 2/10/140, (ii) Illu. of J.T; 1/13—śeṣadravyasūnyamākāsāmalokaḥ.
11. Bh.S; 2/10/127—davvao ṇaṃ āgāsathikāe ege davve.
12. (i) Bh.S; 2/10/141-142, (ii) Pañcāstikāya; 87—jado alogalogo jesim sabbhāvado ya gamaṇaṭhidi / do vi ya mayā vibhattā avibhattā loyamettā ya //
13. (i) Bh.S; 2/10/146-153, (ii) Pañcāstikāya; 96—dhammādhamaṅgāsa apudhabbhudā samānāparimaṇā /
14. Sarvārthasiddhi; 5/13 Vṛtti, p.211—kṛtsne tilesu tailavaditi.
15. Bh.S; 2/10/140
16. (i) Bh.S; 2/10/127—guṇao avagāhaṇaguṇe.
(ii) Pañcāstikāya; 90
17. Bh.S; 2/10/139; 13/4/74-87; 11/10/100-113; 13/4/58
18. Ibid; 13/4/58
19. Tattvārtha Rājavārtika; 5/12 Vṛtti—tato'dhikapramāṇadravyantarābhāvāt.
20. Bh.S; 1/6/309-310—āgāsapaṭṭhiḥ vāe
21. (i) Ibid; 13/4/58—egeṇa vi se puṇṇe, dohi vi puṇṇe sayam pi māejjā / kodisaṇa vi punne, kodisahassam pi māejjā // (ii) Pañcāstikāya; 64
22. (i) Bh.S; 11/10/111-113; 13/4/58-74-87, (ii) Tattvārtha. Sū.; 5/14
23. Sarvārthasiddhi; 5/14 Vṛtti
24. That Which Is; p.127 Vṛtti
25. (i) Illu. of J.T.; 1/34, (ii) Tattvā. Sū.; 5/15—asaṅkhyeyabhāgādiṣu jīvanām.
26. Bh.S; 7/8/159—jīve vi jaṃ jarisayam puvvakammanibaddhām bondi nivvattei tam asaṅkhehiṃ jīvapadesehiṃ saccittikarei.
27. Illu. of J.T.; 7/29-30, Vṛtti; p.151-152
28. Tattvārthādhigamasūtram; 5/16 Bhāṣya & Vṛtti, p. 336

29. (i) Ibid; 5/16 Bhāṣya & Vṛtti, p.336
(ii) Uttarajjhayaṇaṇi; 36/64
30. Sarvā; 5/15 Vṛtti
31. (i) Bh.S; 2/10/124-125, (ii) Tattvā. Sū.; 5/13—dharmādharmayoḥ kṛtsne.
32. Illu. of J.T.; p.3
33. Boddha-Dharma-Darśana; p.321
34. Ibid; p.321
35. Bh.S; 13
36. (i) Bh.S; 2/10/127, (ii) Tattvā. Sū.; 5/2
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38. Tarkasaṅgraha; p.2-9—śabdaguṇakamākāśaṃ.
39. Vaiśeṣhika Sūtra; 2/2/13.
40. Nyāyākārikāvalī; 46-47
41. Bh.S; 13/4/5
42. Illu. of J.T.; 1/6 Vṛtti—digapyākāśaviśeṣo na tu dravyāntaram.
43. Bh.S; 13/4/50-54
44. Āyāro; 1/4—imāo disāo aṇudisāo vā
45. Ācārāṅganiryukti; 47-48
46. Ibid; 51
47. A Source Book in Jain Philosophy; p.137
48. Sāmkyakārikā; 3—mahadādyah prakrtivkṛtayah sapta.
49. Abhidharma Kosa; 1/5—tatrakāśamanāvṛtti.
50. Ibid; 1/28—chidramākāśadhātuvākhyam ālokatamasī kila.
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52. A Study of Time in Indian Philosophy; p.73-77
53. Pramāṇamīmāṃsā; p.25
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55. Tattvā. Sū.; 5/29—utpādavyayadhrauvyayuktaṃ sat.
56. Bh.S; 2/10/124; 25/2/9
57. Tattvā. Sū.; 5/37—guṇaparyāyavad dravyam.
58. (i) Illu. of J.T.; 1/2 Vṛtti—kṣaṇavartitvanna cāstikāyah. (ii) Pañcāstikāya; 102
59. Bṛhad-Dravyasaṅgraha; 1/22—loyāyāsapadese ikkikke je ṭhiyā hu ikkikkā/-
rayanāṇaṃ rāsi iva te kālāṇu asaṅkhadvāṇi //
60. (i) Ibid; 1/22 (ii) Dravyānuyogatarkaṇā; 10/15
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samae
65. Bh.S; 11/11/128
66. Dravyānu.; 10/12
67. (i) Dravyānu.; 10/10, (ii) Pañcāstikāya; 100, 101
68. (i) Tattvā. Sū.; 5/22—vartanāpariṇāmakriyāḥ paratvāparatve ca kālasya.
(ii) Dravyānu.; 10/10
69. Pañcāstikāya; 101
70. Abhidharmakośa; 1/7

71. Bṛhad-Dravyasaṅgraha; 1/25
72. Nyāyasiddhāntamuktāvalī; 45 Vṛtti
73. Bṛhad-Dravyasaṅgraha; 1/22
74. Dravyānu.; 10/10—vartanālakkhaṇo kālaḥ paryavadravymīṣyate.
75. (i) Bh.S; 20/5/40; 25/2/10-16 (ii) Pañcāstikāya; 97—āgāsakālijīva
muttiparihiṇā.
76. (i) Bh.S; 25/2/11—arūviajīvadavvā addhāsamae. (ii) Pañcāstikāya;
97—muttaṃ puggaladavvaṃ jivo khalu cedaṇo tesu.
77. Bh.S; 2/10/128 Vṛtti; 25/2/11; 11/11/119—kativihe ṇaṃ bhante! kāle paṇṇatte?
78. Dr. J.S. Sikdar, Studies in the Bhagavatī Sūtra; p.573
79. Ibid; p.573
80. Pañcāstikāya; 100—kālo pariṇāmabhavo pariṇāmo davvakālasambhudo.
81. Bh.S; 11/11/119
82. Bh.S; 20/5/40—kālaparamāṇuṇāṃ
83. (i) Bh.S; 25/2/10 (ii) Dravyānu.; 10/11—jīvājīvamayaḥ kālaḥ
84. Sthānāṅga sū; 2/387-389
85. Bh.S; 25/2/10-12
86. (i)Uttarādhyayana;28/10
(ii)Anuyogadvāra.;10/417
87. Tattvā. Sū.; 5/22
88. Sarvārthasiddhi; 5/39 Vṛtti
89. Bh.S; 2/10/124-129; 11/11/129; 25/2/10-11
90. (i) Illu. of J.T.; 1/9—jīvapudgalayor vividhasaṅyogaiḥ sa vividharūpaḥ.
91. Pañcāstikāya; 100
92. Bṛhad-Dravyasaṅgraha; 1/22
93. Bh.S; 20/2/37-40—kālaparamāṇu avaṇṇe, agandhe, arase, aphāse.
94. (i) Pañcāstikāya;100 ṭīkā p. 159 (ii) Dravyānu.; 10/14
95. Bṛhad-Dravyasaṅgraha; 1/25—kālassego na teṇa so kāo.
96. Bh.S; 11/11/119—cauvihe kāle paṇṇatte, taṃ jahā—pamāṇakāle,
Yathagunivvattikāle, maraṇakāle, addhākāle.
97. Sthānāṅga; 14/134
98. Bh.S; 11/11/120-125
99. (i) Bh.S; 5/1/1-29, 251 (ii) Illu. of J.T.; 1/—kālaḥ samayaḥsetravarti.
100. Bh.S; 11/11/128—addhākāle—se ṇaṃ samayaṭṭhayāe āvaliyatṭhayāe jāva
uvasappiṇaṭṭhayāe.
101. (i) Anuyogadvāra; 10/416 (ii) Illu. of J.T.; 1/22
102. Bh.S; 6/7/132; 11/11/128; 25/5/247-272
103. Anuyogadvāra; 10/415
104. (i) Bh.S; 6/7/132 (ii) Anuyogadvāra; 10/415
105. Bh.S; 6/7/132
106. Ibid; 6/7/133—paliovame ya, sāgarovame ya.
107. Ibid; 6/7/134
108. Anuyogadvāra; 10/418-439
109. Bh.S; 6/7/134; 11/11/129
110. Pañcāstikāya; 100
111. Bṛhad-Dravyasaṅgraha; 1/22—rayanāṇaṃ rāsi iva

112. Vaiśeṣika Darśana; 2/2/6-9
113. Pañcādhyāyī; p. 254—digdeśakālākāṣeṣvathevam prasāṅgaḥ.
114. Yuktisnehapuran Siddhāntacandrikā; 1/1/5/5
115. Sāṃkhya Pravacana; 2/12
116. The Tao of Physics; p.179
117. (i) Greek Darśana; p.102 (ii) History of Western Philosophy; p.89 (iii) Physics and Philosophy; p.63-64
118. Muni Mahendrkumar, Viśva-Praheḷikā; p.22
119. (i) A Critical History of Greek Philosophy, p.291-292 (ii) Paśchātya Darśana; p.87
120. Viśva.; p.22
121. The Tao of Physics; p.63
122. Liebnitz; p.162
123. Critic of Pure Reason; Transcendental Esthetics section-1
124. Ibid; p.40
125. The Tao of Physics; p.69
126. (i) A Brief History of Time; Ch.4 (ii) The Tao of Physics; Ch.4
127. A Brief History of Time; p.64
128. Ibid; Ch. 4,12
129. Ibid; p.63
130. Quoted in M. Capek, The Philosophical Impact of Contemporary Physics (Dr. Van Nestrnd, Princeton, Newjersey, 1961), p.7
131. The Tao of Physics; p.71

4

Theory of Pudgala

The Jain thinkers have made splendid contribution towards the development of scientific temperament and have espoused several theories in the fields of Physics, Chemistry and Botany etc. Although all may not be observed and proved through modern scientific methods but one has to appreciate the incisive insight of Jain thinkers into the complex nature of the physical and non-physical objects and the enormous body of knowledge generated by them. The Jain thinkers have contributed to the field of Physics through the concept of *Pudgala* (matter) and *Paramānu* (atom) which will be discussed respectively in this and the subsequent chapter.

Modern Physics has produced extra-ordinary innovative theories. Scientists like Einstein,¹ Ernest Rutherford,² Niels Bohr, Louis De Broglie, Erwin Schrodinger, Wolfgang Pauli, Werner Heisenberg etc.³ have shown one thing that matter is not at all as passive and inert as it appears, but it is in a continuous vibrating and dynamic state. Remarkably this is also the view of the Jain philosophers who have systematically laid down certain principles that have come to be validated and practically examined in the light of the recent scientific researches. They have all emphasized that the universe has to be grasped dynamically. Nature is not in a static but in a dynamic equilibrium. Jain seers also believe in dynamism of nature. Seers and scientists both talk of atom, the smallest physical unit, to the macro world of stars and galaxies but with a little difference. According to the Jain seers dynamism is found at two levels i.e. mutation and motion. The former can be understood as motion without change and the latter as motion with change. Mutation is continuous all the time in all the things but motion is not found all the time and in all the things. Sometimes atoms vibrate and sometimes they are at rest. All the planets are also not in motion. According to the Jain Astronomy, there are a huge number of Suns, Moons and Stars in the universe, which are stand still and are not moving at all.

Theory of Pudgala can be studied when one has the penetration into the deeper layers of matter and sharp insight in the atomic and sub-atomic world. Also, in Modern Physics the atoms and nuclei move so fast that they can only be described correctly in the framework of the special theory of Relativity. To understand the nature, properties and interactions of subatomic particles is impossible, unless one knows the Quantum Theory and Relativity Theory.

In Jainism, there is the doctrine of five extended reals, such as, the medium of motion, the medium of rest, space, matter and soul, so also in modern physics there are basic concepts Matter, Energy, Mass, Space and time. In this chapter, however, we shall confine ourselves to the Jain concept of Pudgala as found in the Bh.S.

The concept of Pudgala makes the major portion of Jain Philosophy. It is not centered on a mechanistic view of nature, which when logically pushed, leads to determinism. The philosophical doctrine of the rigorous determinism is found in the philosophy of Descartes.⁴ The tremendous success of Newtonian mechanistic world-view was based on Cartesian Proposition that remained in vogue till the 19th Century. In the beginning of 20th Century, a new theory of physical reality was propounded i.e. Special Theory of Relativity which brought to light the limitations of the Newtonian model and denied its thesis of space and time absolute.⁵ Jain thinkers hold the doctrine of Pudgala in total opposition to the deterministic view of classical Physics.

Etymological Meaning

The Jain thinkers have used the term Pudgala or pudgalastikaya exactly in the sense of physical substance, which includes both matter and energy. Pudgala is one of the five extended substances. The etymological meaning of the word 'Pudgala' is that it has the property of integration and disintegration or to be attracted and assimilated. The word 'Pudgala' is composed of two parts: 'Pud' + 'gala'. The first part 'Pud' means fusion or 'to combine' and the second part 'gala' means fission or 'to dissociate'. Hence, the etymological meaning of the word 'Pudgala' is the substance which undergoes modification by combinations and dissociations.⁶ In the words of modern science, we can say that what is fissionable and fusionable is Pudgala. This meaning is significant because it is Pudgala that undergoes modifications by fusion and fission. This process of combination and dissociation does not occur in other substances. The use of the word Pudgala in the sense of physical substance is quite peculiar to Jainism. It is meaningful, since it denotes that the process of integration and separation are intrinsic properties of the physical world. Thus, the meaning inherent in the word 'Pudgala' indicates the deep insight of the Jain philosophers into the structure and characteristics of the physical existence.

In Science, the discoveries of immense sources of nuclear energy have

thrown the words fission and fusion into popular limelight. But quite apart from this comparatively recent knowledge of the nuclear physics, we can see innumerable instances of both fusion and fission of Pudgala in day to day life. Both are essential whenever energy is released from something, as in the common case of lighting of the matchstick. The cellulose of the match fission into its components of carbon and hydrogen; that again fuse with the oxygen of the air to burn and release the chemical energy. The same thing happens when coal catches fire. The continuous processes of emission and absorption by the radioactive elements are also examples of self-activated 'Pud' and 'gala' i.e. fusion and fission.

The exploration of the sub-atomic world has also revealed the intrinsically dynamic nature of matter. It has revealed that the constituents of atoms, the sub-atomic particles, remain as parts of an inseparable network of interactions. These interactions involve a dynamic interplay in which particles are emitted and absorbed, created and destroyed in continual variations of energy patterns. They give rise to the stable structures that build up the infinite variety of material world. The whole physical universe is, thus, engaged in endless integration and disintegration.⁷

In this way the use of the word Pudgala reveals the profoundness of knowledge of its innovators.

Characteristic Quality

Special qualities possessed exclusively by Pudgala are four, viz. touch, taste, smell, colour.⁸ Pudgala in its atomic and subtle forms cannot be perceived by sense-organs yet, all modifications of it, be it a single atom or cluster composed of two to infinite number of atoms, do possess these four characteristic qualities. These qualities are inbuilt and do not depend for their existence upon the percipient.

Along with the four there are a number of other qualities. Of these attributes some are innate while, some are only modifications of it. Touch, taste smell and colour are innate while, sound, light etc. discussed latter on are only modifications. The four innate qualities are divided into twenty categories, viz; eight kinds of touch + five kinds of taste + two kinds of smell + five kinds of colour⁹ as given below in Table-4:

Table No. 4

| <i>Characteristic Types</i> | <i>Name</i> |
|-----------------------------|--|
| <i>Qualities</i> | |
| Colour | Five types Black, blue, red, yellow and white |
| Taste | Five types Sweet, bitter, sour (acidic),acidic and astringent |
| Smell | Two types Pleasant and unpleasant |
| Touch | Eight types Hot, cold, viscous (sticky),dry, hard, soft, light and heavy |

Out of the twenty the five elementary colours, five elementary tastes, two kinds of smell, and four elementary touches i.e. hot, cold, dry and viscous, make a total of sixteen varieties of characteristic qualities of all classes of Pudgala.¹⁰ The thing worthy to note here is that originally the quality touch is of four kinds, viz; hot, cold, dry and viscous. The rest four kinds i.e. hard, soft, light and heavy are due to the combination of the above-said four elementary touches. It means whenever the proportion of dryness increases the object would be the light and whenever the proportion of viscosity increases the object would be heavy. Moreover, combination of coldness and viscosity results in production of soft touch. Likewise, combination of hotness and dryness results in production of a hard touch.¹¹ It is the permutations and variations of the basic touches which cause the latter four which are found only in a composite body and not in an atom.

Though these 20 characteristic qualities are the principle division. Each of these may be further subdivided into numerable, innumerable and infinite types depending on the gradation of each quality. As the Bh.S mentions there are infinite number of atoms because of having difference in the degrees of their properties. For example, whereas one atom is possessed of one degree of colour, the other one is possessed of two degrees. Likewise, the third and the fourth one are having three and four degrees respectively and so on.¹² Like colour there is also difference of taste of one degree to infinite degrees, so with touch and smell of atoms and aggregates of the physical world. Possession of these qualities makes Pudgala perceivable by sense organs. Out of the five reals accepted in Jain philosophy, Pudgala alone is the substance which has the quality to be the object of sensuous cognition.¹³ As already indicated, atoms and some sort of material clusters are not perceivable yet, they retain all these four qualities essentially.

Moreover, unlike the Vaisheshika conception all the four qualities are concomitant. No modification of matter is such that possesses only three, two or one of the four qualities. Nor is there only substance other than matter that can possess any one of the physical qualities. The Vaisheshikas hold that the atoms of air are devoid of colour, taste and smell. They have only the characteristic of touch. The atoms of fire are devoid of taste and smell qualities and, possess touch as well as colour. Similarly, water possesses taste, colour and touch only. Earth is only the substance that possesses all the four qualities i.e. colour, touch, taste and smell.¹⁴

Definition

Pudgala can be defined from various points of view because of possessing various qualities and modes within it. To cover its most of the aspects and to present it in its comprehensive form the Bh.S defines Pudgala from the five standpoints which are common to Jains for describing anything.¹⁵ The standpoints are as follows:

1. Substantially, Pudgala is infinite in number; that is to say, there are infinite numbers of different physical entities throughout the cosmos.
2. Spatially; Pudgala fills the whole cosmic space.
3. Temporally, Pudgala is eternal i.e. without beginning and without end.
4. Qualitatively, Pudgala possesses colour, taste, smell and touch.
5. Interaction wise, Pudgala is capable of being taken in and transformed by living beings. This interaction can be understood in the following three ways:
 - **Karma** : A specific group of matter called *karmavargaṇā* is attracted and assimilated by living beings. Each individual living being during its worldly existence, continuously interacts with *karma-Pudgala*.¹⁶
 - **Body** : Each living being must have a body as the instrument for the experience of pleasure and pain during its worldly existence. Living beings for this purpose assimilates four groups of Pudgala. They are—*audārika* (Gross body), *vaikrīya* (protean body), *āhāraka* (Protein body), and *taijas* (Luminous body).¹⁷
 - **Vital functions**: Breathing, nutrition, speech and thought—all these physiological functions of living organism are possible only with the help of different groups of Pudgala possessing specific properties useful for specific functions.¹⁸

Besides, Pudgala is devoid of consciousness and life. It is eternal in its nature and constant in quantity i.e. neither increasing nor decreasing. It is a fundamental constituent of the universe.¹⁹ It pervades the whole of cosmos.²⁰ Extensity is also found in Pudgala yet, it is not an essential quality of it, because atoms have no extensity at all.²¹ All these characteristics will be discussed with some detail latter on.

Modification of Pudgala

Apart from the characteristic qualities the Jain texts refer to some important modes of Pudgala, viz.; sound, light and darkness; integration and disintegration; microscopicness and macroscopicness and shape or configuration.²² Muni Mahendra Kumar has explained each one very beautifully in his book 'Microcosmology; Atom in Modern Science & Jain Philosophy.'²³ The explanation is gaining ground in modern science. Here the explanation, somehow, has been borrowed as it is.

1. Sound

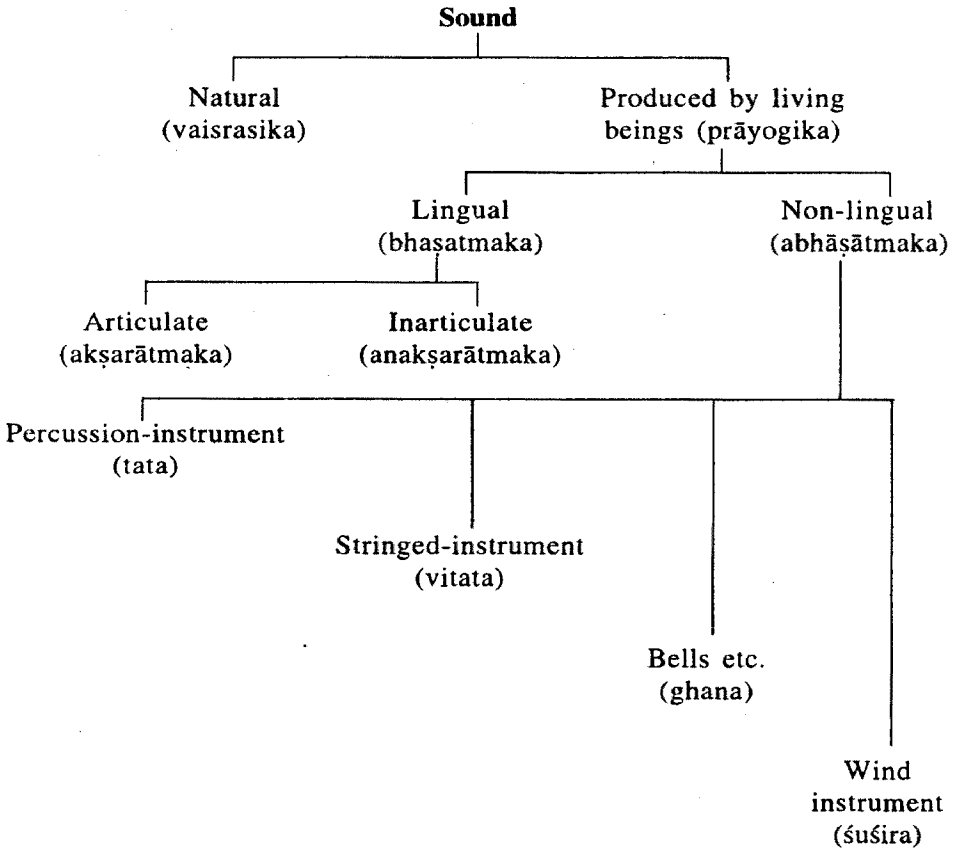
The Jain seers have thought much of sound. They feel sound is produced by collision or separation of two or more physical objects. It is the agitation set up by knocking together or splitting of two aggregates. An ultimate

atom cannot produce sound by itself. It is of two kinds (in respect of genesis)—(i) Natural or spontaneous, e.g. thunder and that produced by conscious effort. The latter is again of two kinds—(i) Lingual or Articulate. Articulate means which is made up of alphabetical composition, and (ii) Non-lingual or inarticulate i.e. sound produced by sub-human animals.

Non-lingual sound is produced with the help of instruments and is of four kinds:

- (a) *tata*—sound produced by percussion instruments like drum.
- (b) *vitata*—sound produced by stringed instruments like violin.
- (c) *ghana*—sound produced by bells, etc.
- (d) *śuśīra*—sound produced by flute, and such other wind instruments.

The classification of sound can be tabulated as under:



Sound may be divided into three kinds again

- (1) Sound produced by animate organisms.
- (2) Sound produced by inanimate objects.
- (3) Sound produced jointly by both.

Thus, sound is not a quality (*guna*) but a modification (*paryaya*) of Pudgala. This view can be understood through the view of science. Accordingly sound is in the form of waves produced by the vibrations of sound-producing aggregates and is propagated by material medium such as air or water but not by space i.e. in vacuum. Sound is perceived by the sense organ of hearing.

The Vaishesika philosophy does not accept sound as modification of Pudgala, but as an attribute of space. This view is patently untenable. Firstly, sound is *mūrta* (perceivable) by a sense-organ, while space is *amūrta* (imperceivable)—devoid of material qualities. The attribute of an *amūrta* substance can never be *mūrta*. For, the sound to be an attribute of space, the space must be considered as *mūrta*. The sound-waves are propagated dynamic, while space is static (*niskriya*). If it was an attribute of space, it must inhere everywhere in space. Hence, sound is a modification of physical element.

2. Light and Darkness

Light is an attribute of *Pudgala* and is the cause of visibility. Darkness, the anti-thesis of light and the cause of invisibility, is also an attribute of *Pudgala*. Darkness, according to Jain belief, is not merely absence of light but is a specific combination of physical bodies in which black colour is predominant.

According to the Jain view there are three kinds of light radiations:—

- [i] Hot effulgence (*ātapa*)
- [ii] Cold effulgence (*udyota*)
- [iii] Lustre (*prabha*)

Hot effulgence is the sun-light or light from a fire or a lamp etc. The emission from such sources is composed of a larger proportion of heat radiations than light, e.g. sun-light is only 35% light; lamp-light is 7 to 10%. Cold effulgence, on the other hand, predominates in light radiations, and there is very little heat, if at all. Reflection of sun-light by moon etc, falls into this kind. Light radiated from the tiny body of a glow-worm is 99% light and only 1% heat. Luster is light rays emitted by certain gems and the like.

Shadows (*chāyā*) and images are also produced by light, and are, therefore, physical objects.

3. Integration (Bandha) and Disintegration (Bheda)

The ultimate atom is the permanent basis of physical existence. All physical objects are constituted by the ultimate atoms which combine together to form composite bodies or aggregates. Smaller and simpler aggregates also combine together to form larger and more complex objects. Conversely, large and complex objects break up into smaller and simpler components. This synthesis or fusion and break-up or fission are eternal phenomena in the physical universe. All physical objects are the result of either integration or disintegration.

The integration is of two kinds—(i) Natural (*vaisrasika*) and (ii) Made by animate organisms (*prāyogika*). The natural, in respect of time, is again of two types: with a definite beginning and (ii) without a beginning. For example, clouds, lightening, rainbow etc. have beginning in time. As far as the physical existence is concerned, there is no integration without a beginning, either natural or made by organisms. The instances of eternal or beginningless integration are found only in the non-physical world. They are the medium of motion, the medium of rest, space and consciousness.

Integration made by living organisms is necessarily with a definite beginning and can be divided into two kinds from another aspect.

- (i) Integration of one kind of matter with another, e.g., production of chemical compounds.
- (ii) Combination of matter with living beings.

The last one is again of two types: (i) *karma-Bandha* i.e. bondage or Combination of karma-particles with living beings, and (ii) *No-karma-bandha* i.e. Combination of other groups of Pudgala with living beings.

Disintegration or break-up of physical bodies is also of two kinds:

- (i) Natural and
- (ii) Made by animate organisms.

Natural disintegration is the spontaneous decay of the physical substances e.g. radioactive elements due to their own inherent structural properties. This kind also includes disintegration by natural forces such as wind, rain, flow of water, etc.

Disintegration produced by animate organisms is of many varieties depending upon the methods of division and separation. Some typical methods of break-up are:

- (i) division by sawing or splitting (*utkara*)
- (ii) division by breaking into smaller pieces (*khaṇḍa*)
- (iii) division by grinding (*cūrṇa*)
- (iv) layer-by-layer separation (*pratara*)
- (v) division by fissures (*anuṭatikā*)

4. *Minuteness (Microscopicness) and Largeness (Macroscopicness)*

The physical universe is composed of innumerable varieties of physical objects, from a microscopic sub-atomic particle to a macroscopic giant star. Both these opposite qualities are, therefore, special attributes of the physical substance (*Pudgala*). Largeness and minuteness are, however, mostly relative. An object is large because there is another one which is smaller than it. Largeness of the former is strictly relative to the minuteness of the latter. An ultimate atom (*paramānu*) is the smallest indivisible form of *Pudgala*, and there is nothing more minute than it and hence minuteness (microscopicness) is of two kinds:

- (i) Relative
- (ii) Ultimate

Similarly largeness (macroscopicness) is also of two kinds :

- (i) Relative
- (ii) Ultimate

The ultimate macroscopic object is called *acitta mahbskandha* i.e. great aggregate which pervades the entire cosmic space.

5. *Shape/Configuration (Saṁsthāna)*

This is also an important attribute of the physical existence. It is related to the capability of the physical objects to extend into the three dimensional space. Shapes have infinite varieties, but they can be divided broadly into two groups:

- (i) Regular or Symmetrical.
- (ii) Irregular or Non-symmetrical.

General Properties of Pudgala

Apart from the afore-said qualities, Pudgala is possessed of some more general and specific properties. The general ones are as follows:

- (i) Extended Existence [*astikāya*]
- (ii) Real [*sat*]
- (iii) Substance [*dravya*]
- (iv) Indestructible [*śāśvat*]
- (v) Non-transmutable in nature [*avasthita*]

Extended Existence

Pudgala (matter) is an extended non-sentient entity. It is extended existence, because it is homogeneous, composed of multiple parts and has an extended body. *Pudgala* is found in two forms—1. Cluster and 2. Atom.²⁴

The smallest unit of Pudgala is atom. It is unitary substance and a conglomerate of the material qualities such as colour, taste, smell and touch.²⁵ Clusters are made up of numerable, innumerable or infinite number of atoms. The cluster as well as the atoms are spread throughout the cosmic space. In every space-unit, there are infinite number of atoms and clusters.²⁶

As regards extension in space, there is remarkable similarity between Jain view and modern science. The extension in space varies from aggregate to aggregate depending upon its density. Since, a free ultimate atom is an indivisible unit of matter, it will always occupy a single space-point, but a composite of two such atoms—a diatomic aggregate—may extend to two space-units, after fusion it can occupy a single one.²⁷ Similarly, an aggregate composed of numerable, innumerable or even infinite number of units, can be accommodated in a single space unit on account of its quality of compressibility or may extend to numerable or innumerable space units.²⁸

The extension of an aggregate of infinite atoms in the cosmic space cannot exceed the number of its constituent atoms.²⁹ Therefore, the maximum extension of a composite body of infinite atoms would always be in innumerable and not infinite space-points because cosmic space has only innumerable space-points. The thing worthy to note here is that a number of atoms may occupy a single space-point without being fused.³⁰ This is the reason that infinite atoms and clusters are accommodated in the cosmic space which is finite and consisting of innumerable space-points. This is possible only due to unique attribute of tremendous compressibility of Pudgala. According to J. S. Zaveri, this view of Jains is in line with the discoveries of modern science that 99.97% of mass of an atom is condensed in its nucleus that occupies 500000 billionth part of the space of the whole atom.³¹

Pudgala: As Real and Substance

Pudgala is an objective reality and independent substance.³² As a real, it is both permanent as well as changing. The change in attributes occurs at every moment and is due to its internal dynamic constitution and its interaction with other reals.³³ According to the Jain concept, all the modifications of Pudgala are events in time, but as a substance, it has continuity of substancehood which is not an event in time.³⁴ Whether it is free atoms or clusters, the continuity of the substancehood in all its modified forms is a fact.

As it is clear from the preceding chapter, the great Jain thinker Acharya Umaswati has defined substance as a unity of the three things, viz; generation, destruction and stability at a moment.³⁵ For example, a goldsmith converts a golden bangle into a ring. Here, we see the destruction of the golden bangle, the generation of the golden ring and in both the forms the specific qualities of the gold element inheres uniformly and all these take place at the same

time. The mutability of the gold to be transformed into different shapes and sizes makes it possible to become a bangle and sometimes a ring. This transformation of shapes is mutability and the shape for the time being is a mode. The bangle mode can be destroyed to create the ring mode, but the gold is permanent or identical in both. In the same way, the three qualities i.e. origination, cessation and persistence are found in Pudgala at a time. Thus, it is real and also a substance.

Pudgala as Indestructible

According to the Bh.S, nothing gets lost which exists.³⁶ Non-transmutability is a universal quality of all the substances. This is why temporally Pudgala is eternal and permanent. Its existence is beginningless and endless. The quality is referred to in the text as follows:³⁷

“Thus, in the past, there was never any time when Pudgala did not exist; in the present, there is no time when it does not exist; in the future, there will not be such time when it will not exist. It did exist at all times in the past, it does exist in the present and it will exist at all times in the future.”

The Bh.S uses various synonyms, such as, *dhue*, *niyae*, *akkhae*, *avvae*, *avatthie*, etc. to indicate the indestructible nature of Pudgala.³⁸

Pudgala is *dhue* i.e. perpetual or persistent. The synonym emphasizes endless continuity of Pudgala without any pause.

The synonym *Niyae* indicates that Pudgala is quantitatively immutable or fixed. It means that the law of conservation is strictly applicable to it. According to Siddhasena's commentary, the total quantity of matter in the universe is always constant.³⁹ Whatever was the quantity of it in the infinite past will always remain the same in the infinite future. Neither a single particle has been destroyed in the past nor will it be destroyed in future. Not a single particle was newly created in the past nor will it be generated in the future.⁴⁰

The Principle of Conservation of Matter and The Principle of Conservation of Energy in modern science support whatever is said through the synonym *Niyae*.⁴¹ In Physics, energy is always associated with some kind of activity but the total energy involved in the process is always conserved. Conservation of energy is one of the most fundamental laws of Physics. Like energy, no mass can ever get lost. According to Einstein, mass is nothing but a form of energy. The amount of energy contained in a particle is equal to the particle's mass. On the other hand, an object at rest has energy stored in its mass and the relation between the two is shown by the famous equation as follows—

$$E = MC^2, \text{ C being the speed of light.}$$

Pudgala is *shashvata*, i.e. timeless. It emphasizes that this substance does

not respect the limitations of time. The implication is that it had always existed in the past too and will exist forever. Thus, it is continuous.⁴²

Pudgala is *akṣaya* i.e. it is imperishable. This attribute expresses the fact that Pudgala never ceases to exist and its existence is not affected by the passage of time. It is immune from extinction.

Pudgala is '*avyaya*' means that it can't be spent. It is immune to loss. This synonym again emphasizes the quantitative steadiness or conservation of Pudgala.

Next synonym *avatthie* shows non-transmutability of Pudgala. There was no time when the non-living was the living or vice-versa. Likewise, there is or would not be no time when the non-living is or would be the living or vice-versa.

Lastly, Pudgala is said to be *nicca*. This means that it is permanent. The word emphasizes its uninterrupted continuity.

Non-transmutable (avasthita) in Nature

The term '*avasthita*' i.e. non-transmutable carries a profound significance. It means that Pudgala never loses its nature. It will never convert into non-material object.⁴³ The Jain philosophy emphasizes the persistence through change as the fundamental nature of real and therefore Pudgala must positively be subject to change. But the term 'change', generally, refers to the process of differentiation, less or more in appearance or essence.⁴⁴ Hence, the term '*avasthita*' does not affect the mutability of the matter in its own modifications but denies the transmutability into another non-physical substance. It can be stated in this way—that Pudgala does persist through modes. It is eternally Pudgala. It can never absolutely be destroyed nor be absolutely transmuted.⁴⁵

Although certain groups of aggregates of Pudgala technically known as *vargaṇā* (group) intimately interact with and are attracted, taken in and transformed by the conscious substance,⁴⁶ at no time, do these groups lose their own identity. They remain all the time Pudgala. In short, it is mutable, but not transmutable.

Specific Properties of Pudgala

Perceptibility

Pudgala is sense-perceptible. According to the Jain canonical literature, every Pudgala or physical object does possess colour, taste, smell and touch. As said already Pudgala alone is the substance that can be the object of sensory knowledge.

Each of the qualities is capable of stimulating specific sensory equipment of an animate organism. The stimuli are then conveyed by the respective sense organs to the cognizing apparatus, enabling it to perceive the physical object. Thus, whatever is perceived or is perceivable must necessarily belong

to the physical order of existence.⁴⁷ Conversely, whatever is bereft of sensory qualities is non-physical.⁴⁸

The other five substances (the medium of motion, the medium of rest, space, soul and time) are devoid of the material qualities and are, therefore, incapable of being the object of sense-cognition. That is how, matter alone is 'rupi' while the others are 'arupi'.⁴⁹ The term 'rupi' does not mean visible but perceivable and signifies the concurrent existence of all the four sense data. The physical order of existence is one that can be perceived by means of sense organs. The physical order does not depend for its existence upon the fact of actually being perceived. Thus, the Jain philosophical views broadly agree with the modern science in so far as the general definition of the physical existence is concerned.

One thing remarkable in this perspective is that perceptibility does not depend on the number of atoms in the cluster but on a special combination of atoms involving the joint process of integration and disintegration. According to the commentary on Tattvarth, neither disintegration nor integration alone can produce perceptibility.⁵⁰

The problem, as N. M. Tatia indicates, of perceptibility of matter is essentially connected with the integration of atoms which is a difficult issue.⁵¹ An atom has no parts. How can two atoms, both of which are without parts, combine together to make a single cluster? How can many imperceptible units create a perceptible one? The commentary⁵² discusses this problem at length and attempts to solve the issue by distinguishing two aspects of atom: an atom as partless matter and an atom as the integrated qualities of touch, taste, smell and colour. These two aspects are respectively called "matter-atom" and "quality-atom".⁵³ The integration of the qualities of touch, taste and so on, to a point of saturation, may result in perceptibility.

Fissionable and Fusionable

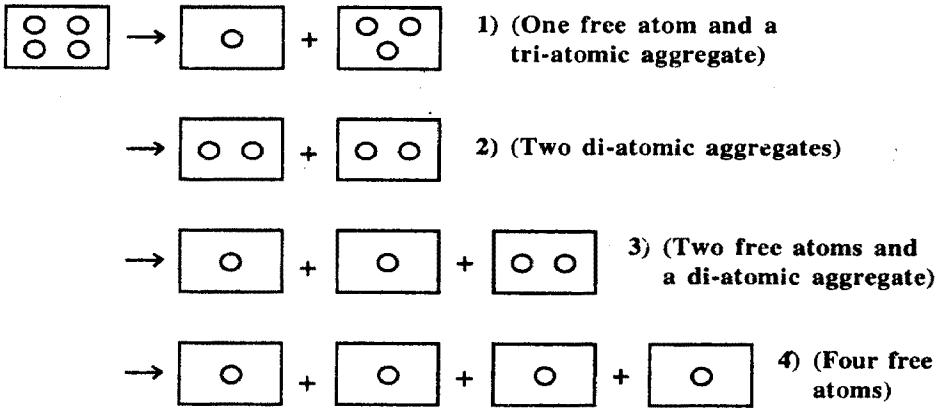
As pointed out, the very name 'Pudgala' is derived from its virtue of being fusionable and fissionable. Matter's extent is sometimes increased on account of the combination of its parts and is sometimes decreased as a result of their dissociation.

The process of fusion is called *bandha* i.e. integration. The process of fission is called *bheda* i.e. disintegration. The infinite variety of the physical universe and tremendous energy of Pudgala come into existence⁵¹ is due to its fissionable and fusionable properties.⁵⁴

The process of fusion, as indicated before, results in the formation of physical objects. The number of atom combining together in a fusion process may range from two to infinite. The objects formed by fusion of atoms are called *skandhas* i.e. aggregates or composite bodies. Two or more aggregates may also unite to form one larger object. Sometimes only a few atoms may unite with an aggregate.⁵⁵

In the process of fission, the aggregates of atoms break up to form various other combinations. These newly formed combinations may be smaller or bigger aggregates relatively to one another. Sometimes even a single atom may form a complete whole.⁵⁶ An aggregate composed of four primary atoms may break up in the following four ways:

Table No. 5



Laws of Fusion

Out of the four innate qualities, viz. touch, taste, smell and colour, only the first one i.e. touch is responsible for the process of fusion.⁵⁷

The Jain Acharyas by their profound knowledge of the structure of *Pudgala* have established that the process of fusion of atoms and production of aggregates follow some definite rules which have been mentioned in the scripture like *Paṇṇavanā*,⁵⁸ *Gommaṭasāra*⁵⁹ etc. The later works also discuss these rules in detail.⁶⁰

All forms of matter including atoms possess the quality of viscosity (negative charge) or dryness (positive charge) which vary in their degrees of intensity, such as, one-degree to numerable, innumerable and infinite-degrees. In fact, these two tactile qualities are only responsible for the integration of atoms. Though different views are found in Jainism regarding the problem of combination yet, one thing that is unanimously accepted is that there cannot be integration of atoms that possess only one degree of viscosity or dryness. According to the commentaries of *Tattvartha*, the implications of this condition are that atoms of two or more degrees can integrate with each other whether both of them are of the same quality or different qualities.⁶¹

The commentary of *Tattvārtha* also points out that one-degree atom can integrate with a two-degree atom of different quality. However, this is rejected categorically in *Sarvārthasiddhi*. Accordingly, one-degree atoms cannot integrate under any conditions.⁶² Further, the *Sabhāṣyatattvārthā-*

digama, a commentary on Tattvārth, illustrates this law by making some difference between the integration of the same quality and that of the different qualities. It presents the example of two wrestlers of equal strength in which neither will win. So two equally viscous atoms or equally dry atoms cannot integrate with each other. However, the Digambar tradition interprets the law to mean that there cannot be integration of atoms of the same degree even if one is dry and one viscous.

Moreover, two atoms of similar quality cannot integrate if there is only difference of one-degree between them. This is not the condition for the atoms of different qualities. It means if there is a two-degree viscous atom on one side and a three-degree dry atom on the other, they can combine together.

However, according to the Digambar tradition,⁶³ integration only occurs between atoms, whether similar or different in quality, if their intensities differ by exactly two degrees e.g. a two-degree viscous atom can integrate with a four-degree atom, either viscous or dry.

One thing to be noted, here, is that in integration, the atom with equal or higher degree of viscosity or dryness transforms the intensity of the dissimilar atom to its own though it is not possible to predict which will transform the other. So far as similar atoms are concerned a higher degree raises a lower degree to its own level.⁶⁴ Here also the Digambar tradition⁶⁵ differs. Thus, in integration, the atom with greater degree of intensity transforms into the atom that is two degrees less to be like it.

In toto, clusters of matter are produced in three ways: by integration, disintegration and by a combination of integration and disintegration (see Table-4). While an atom is always produced by disintegration.⁶⁶

The following tables show the permissible or otherwise combination of atoms with that of different degrees of dryness and viscosity.

Table No. 6
Atomic Integration According to Shvetambar Tradition

| <i>Degrees of Intensity</i> | <i>Same Quality</i> | <i>Different Quality</i> |
|--|---------------------|--------------------------|
| One + one | No | No |
| One + two | No | No |
| One + three | No | No |
| One + four or more | No | No |
| Two or more + equal number | No | Yes |
| Two or more + one degree higher | No | Yes |
| Two or more + two degrees higher | Yes | Yes |
| Two or more + three or more degrees higher | Yes | Yes |

Table No. 7
Atomic Integration According to Digambar Tradition

| <i>Degrees of Intensity</i> | <i>Same Quality</i> | <i>Different Quality</i> |
|--|---------------------|--------------------------|
| One + one | No | No |
| One + two | No | No |
| One + three | No | No |
| One + three or more | No | No |
| Two or more + equal number | No | No |
| Two or more + one degree higher | No | No |
| Two or more + two degrees higher | Yes | Yes |
| Two or more + three or more degrees higher | No | No |

Finally, according to the Bh.S;⁶⁷ the process of fusion can be classified from various standpoints as under:

Fusion is two-fold:

- (a) Natural and (b) produced by effort

From another point of view it is two-fold,⁶⁸

- (a) Partial union and (b) total union

Natural fusion is again of two types—(i) with beginning and (ii) without beginning. There are three causes for the former.⁶⁹

- (a) Fusion caused by *bandha pratyayika* i.e. the viscous and dry properties of the constituents.
 (b) Fusion caused by the *bhajana pratyayika* i.e. contents of a common container.
 (c) Fusion caused by *Parinama pratyayika* i.e. maturation.

Infinity of Pudgala

The material atoms and their clusters are numerically infinite. Hence, substantially, *Pudgala* is stated to be infinite.⁷⁰

The maximum extension of *Pudgala* is universe (cosmos).⁷¹ *Pudgala*, fills the cosmos and pervades its total space. In other words, infinite atoms exist, independently or in combinations, in cosmic space only. There is not a single point in space where there is neither an ultimate atom nor a composite body.⁷² The whole space is occupied by *pudgala*. Nature abhors a vacuum.

Another thing worth noticing is that the non-absolutist Jain thinker does not find any contradiction in the basic unity and the infinite multiplicity of an existent. In this case, the reality of infinite diversity of the physical

existence does not contradict its inherent unity since, it is composed of ultimate atoms. Atom is the indestructible physical reality⁷³ and in this respect there is only one or single class of *Pudgala*.

Interaction and influences upon Psychic Order

The Jain seers have evolved a very penetrating theory to explain the riddle of the process of life by formulating the relation between psychical and physical levels of existence. Both have a capacity for mutual interaction. They act and are acted upon by one another. According to the Bh.S, matter has propensity for being attracted by conscious substance.⁷⁴ Each living organism in its empirical existence interacts essentially with eight types of *Pudgala* such as, *audārika vargaṇā*, *vaikrīya vargaṇā*, *ahāraka vargaṇā*, *taijas vargaṇā*, *kārmaṇā vargaṇā*. In addition, there are three types of *Pudgala* i.e. *svasocchvasa*, *bhasa* and *mano vargaṇā* which are associated with the *Jīve* to carry on the vital functions such as breathing, speaking and thinking.⁷⁵

Out of these, the group which interacts ceaselessly with living beings is *karmana vargana* i.e. karma particles. Among the living and karmic-particles there is no such thing as prior or posterior,⁷⁶ since, for all practical purposes they appear to be identical and inseparable in the context of worldly existence. Conscious substance also is always dynamic, changing and persisting.⁷⁷ But this nature is governed by mostly by the nature of the karmas associated with it. Again, the nature of the karmic particles is fully determined by the passions and perversions (*kaṣāyas*) of living beings and their intensities are again determined by the nature of the karmic particles.

Karma particles (*dravya karma*) and, passions and perversions (*bhava karma*) work as cause and effect respectively.⁷⁸ Karma misleads the soul and imports more mass and momentum to it. But at the highest and purest stage, there is no effect of karmas. The self is imbued with all its natural attributes including *ananta-catustayas*, viz. unlimited power, bliss, wisdom and knowledge. Free atoms do not interact with the psychic order.⁷⁹ The, Bh.S thus delineates their relations through many synonymous words and finally proves that they are mutually interdependent.

Mutation and Incessantly Active

Pudgala has the propensity for being dynamic or active. All forms of *Pudgala* whether atom or compound—do not just sit around doing nothing. In the Bh.S⁸⁰ and other scriptures,⁸¹ the terms *paryāya*, *pariṇāma*, *kriyā*, *Bheda* and *Bandha* are used to show various aspects of the dynamic nature of matter. They are meant to indicate that various kinds of energies inhere in it and are potentially available in the different states of matter and each change of state is accompanied with release or transformation of energy.

Activity of matter can be seen mainly of two kinds—

- (i) *Pariṇāma* i.e. maturation which does not involve motion in space.
- (ii) *Kriyā* i.e. which involves movements in space as motion, vibration, oscillation etc.

The word '*Pariṇāma*' denotes the change of one state into another. Nothing is absolutely permanent or absolutely destructible.⁸² According to the Jain thinkers, transitory and permanent attributes both co-exist in a substance.⁸³ This is the primal nature of the entire real existence. Thus, change is a universal quality of all the substances. According to Rājavārtika, *pariṇāma* is mutation of an entity, natural or otherwise, without affecting its own fundamental identity.⁸⁴ In the view of Siddhasena Gaṇi, *pariṇāma* is mutation other than vibration etc.⁸⁵

The five *pariṇāmas* that are listed in the Bh.S are nothing but the main attributes of pudgala i.e. colour, taste, smell, touch and shape.⁸⁶ Paṇḍavānā Sutra mentions ten types of *pariṇāma*.⁸⁷ Five of the ten are the same as found in the Bh.S and the rest are: fusion, fission, motion, sound and *agurulaghu*, the quality of being massless.

Temporally, mutation is two-fold: (i) without beginning and (ii) with beginning. There are a lot of mutations of Pudgala, which have a beginning. The Bh.S discusses it at length.

As it is quite clear, the Jains do not accept absolute permanence and total cessation as a fundamental nature of any object. According to them, everything is both existent and non-existent at a time. Each substance is eternal and immutable, if one examines it from the standpoint of *dravya* i.e. its underlying unity.⁸⁹ On the other hand, it is incessantly changing, if looked at from the viewpoint of *pariyāya* i.e. its transitional attribute that establishes its mutability.⁹⁰ Since all objects possess both the attributes i.e. permanence and impermanence simultaneously and are therefore permanent as well as changing. In short, they are subject to the doctrine of permanence-through-modification.

Modification is a primal property of Pudgala. That is why, it is always changeable. Since change have no limit and in result modifications have no end. They can, however, be subsumed under two categories:⁹¹

- (i) *Artha pariyāya* i.e. implicit mode.
- (ii) *Vyanjana-pariyāya* i.e. explicit mode.

The former is the intrinsic change of Pudgala. It is momentary, continuous (without pause) and incessant (timeless). It is recognised as continuous flow of an object.⁹² It is totally self-interactive and not caused by anything external.⁹³ This implicit mode is neither perceivable nor explicable.⁹⁴

On the other hand, explicit mode is both intrinsic as well as extrinsic. It has a duration.⁹⁵ It is, in fact, an event in the object at a particular time.

Besides, the molecular integration and disintegration, that occur every moment in a physical object, have a determinate state of existence. For example, we can take a table that exists in its table-form for certain duration of time. This state of being a table is an explicit modification of Pudgala.

Thus, both modes have different attributes. The explicit mode is gross, lasting for some time and can be expressed at the verbal level. While the implicit mode, on the other hand, is subtle, lasting for only one unit of time and inexpressible.

From another angle the modes are of two types:⁹⁶

- (i) *Svabhāva-paryāya*—that is due to self-interaction.
- (ii) *Vibhāva-paryāya*—that is due to interaction with other substances.

Implicit mode comes into the category of *svabhāva paryāya*, while explicit mode is *svabhāva* and *vibhāva* both.

Mutations and Motion

Mutation (*Parināma*) and motion (*kriyā*) are not different but two facets of the dynamic nature of physical object. The latter differs from the former in a subtle way, because it involves movement of some kind or other.⁹⁷ Actually, both are manifestations of dynamism and therefore as earlier pointed out, *gati* i.e. motion has been enumerated as one of the ten *Parinamas*. However, motion in which *kriyā* is involved is gross as well as subtle, while mutation involves various kinds of motions which explain *Pudgala* as being incessantly active.

According to the Bh.S and other works, *Pudgala* and conscious are active (*kriyāvan*) substances.⁹⁸ It means that out of the six substances, the medium of motion, the medium of rest and space are completely devoid of any kind of motion. In fact, soul is dynamic only due to its association with karma particles and its interaction with matter and not by itself. It becomes clear when a living being attains emancipation, its association with physical order of existence comes to an end once for all. In its pure state, conscious becomes motionless.

In this way only *Pudgala* is dynamic. Motion is its inherent attribute. But it does not mean that the entire physical existence is active everywhere and at all times and under all conditions. The Bh.S while describing atomic structure indicates that a physical body is sometimes in motion and sometimes at rest.⁹⁹ According to the text, *Pudgala* remains at rest at a single point for sometime before moving. In short, the dynamic state of it is not continuous, but there are periods of intermittent rest.¹⁰⁰

Vibratory motion is one type of dynamic activity, being an inherent attribute of *Pudgala*.¹⁰¹ In other words, it releases or absorbs energy because of its own competence to vibrate and is, thus, dynamic in its own right.¹⁰²

There are many types of activities (*kriyā*) and primarily each activity is different from the other. As we know, transformation of energy of any type

is *kriya*. The nature of *kriyā* exerts pressure and produces energy. So, different types of energy manifestations can be grouped together on different bases. On the basis of causality, there are two types of *kriyā*.¹⁰³

1. **Spontaneous** : i.e. natural. The spontaneous release of energy is caused by its own innate capacity.
2. **Activated** : i.e. by effort. External forces cause the action.

In another way, *kriyā* is of two types: [1] motion and [2] fusion - fission. Again the motion may be vibratory or migratory.

Vibrations are again of two types: [1] simple and [2] complex.

The migratory motions are of two types: [1] without changing direction i.e. in a straight line. [2] With change of direction.¹⁰⁴

In the Bh.S, a few examples of different kinds of motions are given.¹⁰⁵ Thus, motion may be spontaneous or caused by outside forces. It is not an eternal quality of a substance that is why matter is sometimes in motion and sometimes at rest. It sometimes vibrates, and also rotates and so on until it changes its mode. The word 'so on' here indicates that along with simple and complex vibrations, there are many other types of motion but which are those is really a matter of research.

But according to modern scientists like Einstein, matter is essentially active, dynamic and not the least static.¹⁰⁶ The universe was subjected to the regorus scientific explanations that formulated the laws of mechanics. The scientists found that motion of matter gave rise to the concepts of forces, pressures and tensions that are of the nature of gravitation and Electromagnetism. The shape and size of any body comprises elastic forces and particles of matter. The whole matter is composed of electrical particles.

To explain the mechanics of dynamic material universe, one requires the following condition—distance in space, time and mass. An elaboration is necessary here—space and time are not ambiguous and mass means not mere heaviness but property of matter or resistance to a change of state. In classical physics, the mass of any body is fixed and unchanging property. But Einstien¹⁰⁷ established the relativity of mass. He asserted that the mass of a moving body increases with its velocity according to the following equation:

$$M = \frac{MO}{1\bar{n}\left(\frac{v^2}{c^2}\right)}$$

Here, **MO** is the mass of a body at rest,

M is its mass when moving,

V is the velocity of the body and

C is the velocity of light.

The sum total of the arguments advanced by scientists is that matter and energy are not different elements. Matter is energy and energy is matter was explained in the previous pages. The dualism of matter and energy is not accepted by quantum theory.

Both matter and energy are the same as the Jain concepts of *paryāya*, *Parinama* and *kriyā* etc. These are the characteristics of all the material clusters and atoms. The energy of electromagnetic radiation and particles ejected from radioactive substances are but two different forms (*paryāyas*) of the same attribute, i.e. *kriyāvattva*.¹⁰⁸

Now, we come to the conclusion that the process of fusion and fission that are the basic features of *Pudgala* are inevitable results when energy is released in its various forms.

Pudgala : Classification

Classification means grouping of similar things in accordance with some system of aspect. The infinite varieties of material objects constituting the physical order of existence can be classified in various ways, and from various aspects, both systematic and arbitrary. As we have already seen, the Jain philosophy describes the character of an object through fourfold determinants: substance (*dravya*), space (*kṣetra*) time (*kāla*) and attributes (*bhāva*).

Thus, to emphasize infinitely infinite multiplicity of the physical substance, it is described as under:

- [i] **Substance-wise**—*Pudgala* is infinite. It means there is infinite number of atoms (*Paramāṇu*) existing either independently (in free or unattached state) or in combination making infinite composite bodies (*skandhas*).¹⁰⁹ Conversely, infinite composite bodies break up into infinite smaller components or infinite ultimate atoms.¹¹⁰
- [ii] **Space-wise**—Each and every space-point of cosmos is occupied by infinite number of ultimate atoms and composite bodies.¹¹¹ There is not a single space-point where there is neither an ultimate atom nor a composite body. According to Jain Cosmology, there is no vacuum anywhere in the cosmos. That is, the entire cosmic space is 'plenum'. It is only the (tarns-cosmic space) which is totally vacuum.¹¹²
- [iii] **Time-wise**—The physical existence is eternal and indestructible, not a single new ultimate atom is created nor destroyed. In spite of infinite fission and fusion occurring at every time-point, the total existence persists; it has neither a beginning nor an end.¹¹³
- [iv] **Quality-wise**—*Pudgala* is a substratum of infinite qualities. Each of these qualities undergoes infinite mutations and transformations. Because of this multiplicity of changing each substance in itself is infinite.¹¹⁴

(A) Mono or Single Type

We have already seen that non-absolutist Jains do not find any contradiction in the basic unity and the diversity of an existent. This is the reason why in regards physical reality, infinity of the diversity of its quality and modes do not contradict its inherent unity. It is in the sense that all the physical reality is composed of atoms. Thus, there is only one or single class of Pudgala i.e. atom.

Here, it should be remembered that this unity is substance-wise (*dravyārthika*) and not modification-wise (*paryāyārthika*). Jains do not accept the concept of 'absolute monism' in which all atoms are absolutely one.¹¹⁵

(B) Two Types

Paramanu is the ultimate building block of the physical reality. It can exist in a free state and because it has innate capacity to combine with other atoms, it unites with others and produces composite bodies that are called *skandha*. Every modification takes place because of fission or fusion of atoms. On this basis the physical reality is classified into following two ways:

[i] *paramānu* i.e. freely existing ultimate atom

[ii] *Skandha* i.e. aggregate composed of two to infinite number of atoms

Composite aggregates are again of two types: (i) *catusparśi* and (ii) *astasparsi*.¹¹⁶ Catusparśi, as the name indicates, has only four kind of touch, viz., hot or cold, dry or viscous. Astasparsi bodies, on the other hand, have in addition heaviness or lightness and hardness or softness (or roughness or smoothness). This means that catusparśi bodies are *agurulaghu* i.e. neither heavy nor light. In other words, they are massless. The quality of mass is acquired when the material bodies become astasparsi clusters.

From another point of view Pudgala can be classified into two categories, viz; (I) *sukṣma* i.e. subtle and (ii) *bādara* i.e.gross.¹¹⁷ One type of Pudgala that cannot be an object of sensory perception is subtle. While those aggregates that are perceivable by the sense organs are called gross. It should be noted here that the former is not devoid of sense data, but it is so miniscule that normal sense organs are incapable of being stimulated by them. For example, catusparśi bodies and atoms are out of sense organs' power of perceiving and therefore they fall in this category i.e. subtle. Again, all aggregates composed of two to innumerable atoms are also under this category if they are subtle. The aggregates that are composed of infinite particles and astasparsi are both gross as well as subtle.

Pudgala is, again, classified into two categories on the basis of capability of being associated with *jīva* i.e. consciousness. There are some groups Pudgala, which interact with *jīva* and become associated with it. Thus, there are two types of Pudgala—(i) capable of interaction or association and (ii) incapable of interaction or association.¹¹⁸ All atoms in their free state

fall in the second category. So far as the composite bodies are concerned, some of them interact with Jiva and some do not.

(C) Three Types

Pudgala can be classified into three types in respect of the cause of transformation viz:¹¹⁹

- [i] **Substance-wise**—*Pudgala* is infinite. It means there is infinite number of atoms (*Paramāṇu*) existing either independently (in free or unattached state) or in combination making infinite composite bodies (*skandhas*).¹⁰⁹ Conversely, infinite composite bodies break up into infinite smaller components or infinite ultimate atoms.¹¹⁰
- [i] Transformed by consciousness (*prayoga-pariṇata*)
- [ii] Transformed by consciousness in post and itself at present (*misra-pariṇata*)
- [iii] Auto-transformed (*visrasā-pariṇata*)
- [i] The Pudgala that is taken in and transformed by conscious substance is *prayoga-pariṇata*. Bodies of all categories of living beings and those that are being transformed by their vital processes are instances of this class.
- [ii] The Pudgala that was associated with conscious substance in the past, but is now abandoned by it and therefore is no longer being transformed by the agency of vital processes, and which undergoes auto-transformation is *miśra-pariṇata*. Shoe-leather is an instance of this class. Transformation that is partly under the influence of conscious substance and partly auto-transformation is also *miśra-pariṇata*.
- [iii] The matter that undergoes auto-transformation and has no interaction with conscious substance is *visrasā-pariṇata*. Clouds, rainbow, meteors, etc. are instances of this class.

(D) Four Types

From structural viewpoint, physical reality can be classified into four types:¹²⁰

- [i] Aggregate (*Skandha*)
- [ii] Conceptual part of an aggregate (*Skandha-deśa*)
- [iii] Conceptual unit of an aggregate (*Skandha-pradeśa*)
- [iv] Atom (*Paramāṇu*)

These are the four basic structural modification of *Pudgala*, out of which infinite modes are produced.

- [i] *Skandha*—*Skandha* is defined as an individual aggregate formed by combination of ultimate atoms of small composite bodies. The smallest *skandha* is a '*dvipradeśīya skandha*' (diatomic aggregate)¹²¹ produced by the combination of only two atoms and the largest is '*accitta*

mahāskandha which is the material body extending over the whole cosmos.¹²²

[ii] *Skandha-deśa*—*Deśa* means a fraction and not a whole.¹²³ A *skandha* is divisible, because it is made up of number of parts. Thus, if a *skandha* is conceptually divided, any fractional portion (1/2, 1/4 and so on) is *skandha-deśa*. This is an example of physical division. Chemically a substance may be a compound of two or more elements. In this case, each element is a *skandha-deśa*. For example, a molecule of water is a compound of two elements, viz. hydrogen and oxygen. A molecule of water is a *skandha*, while atoms of hydrogen and oxygen units are *skandha-deśa*. This is an example of chemical division. It should be remembered that division is merely conceptual. On the other hand, When a *skandha* breaks up physically or chemically into fragments, each fragment becomes a whole aggregate i.e. *skandha* and not *skandha-deśa*.

[iii] *Skandha-pradeśa*—*Pradeśa* means an indivisible undetached part of a cluster.¹²⁴

The smallest *deśa*, which is further indivisible, is thus a *pradeśa*. Like *deśa*, *pradeśa* is also merely conceptual. In other words, a *pradeśa* is an attached part of a thing whose dimension is equal to that of an atom. Another term used for *pradeśa* is *avibhāgi paricheda* (i.e. indivisible fragment). An atom, however, being a separate entity is different from a *pradeśa*. The former is an objective entity whereas the latter is only an ideal construct.

[iv] *Paramāṇu*—The word is made of '*parama*' and '*āṇu*'. *Parama* means the 'ultimate' and *anu* means 'atom'. According to Jain Microcosmology, *paramāṇu* is the eternal and indestructible ultimate unit and also the primary constitutive cause of the entire physical universe. Thus, the infinitesimally small, indivisible and free i.e. unattached to another particles of matter is *paramāṇu*. *Paramāṇus* are the ultimate building blocks that by mutual combination produce the whole of physical universe. So long as it is considered to be a portion of an aggregate, it is *pradeśa*, while in its free i.e. unattached state, it is *paramāṇu*.¹²⁵

(E) Six types

Generally, largeness is equated with grossness (*sthaulya*) and smallness is equated with subtlety (*saukṣmya*). However, size is not the criterion in this classification. Gross is that which prevents other substances to pass through and which cannot occupy the space already occupied by others or which cannot pass through others and which does not allow others to occupy the space occupied by it.

Conversely, subtle is that which does not hinder others and cannot be hindered by others (or which can occupy the space which is already occupied by others or can pass through others).

From the point of view of penetrability *Pudgala* is divided into six classes:¹²⁶

- *Bādara-bādara*—means gross-gross, i.e. very gross. This kind consists of very large solid aggregates of *Pudgala* such as mountains, rocks, wood, etc. which do not unite by themselves when broken or divided, and also such bodies which can be physically transported without a container.
- *Bādara*—means gross. This kind consists of large aggregates of *Pudgala* in liquid-form, such as, water, oil, milk, juice, etc. which do themselves unite again when broken or divided and which have to be carried in containers.
- *Bādara-sukṣma*—means gross-subtle. This kind consists of aggregates which can neither be cut nor broken, nor can they be physically transported, but are visible, such as, light, shadow, image, etc.
- *Sūkṣma-bādara*—means subtle-gross. This kind consists of aggregates that are not visible but can be perceived by other four senses—ultra-visible but infra sensual, e.g., gases.
- *Sukṣma*—means subtle. This kind consists of aggregates that are *ultra-sensual*, i.e., they are not perceivable by any sense organ. However, they interact with conscious substance and are transformed by it in the form of thought, speech and *karma*, etc.
- *Sukṣma-sukṣma*—means extra-subtle. This kind consists of aggregates that are so subtle that they do not interact with conscious substance. They include the aggregates that are composed of less than infinite to two number of atoms.

Eight Types

The most important types of physical order of existence (*Pudgala*) are those, which interact with psychic order of existence. There are five types of *Pudgala* that are associated with conscious substance in the form of body.¹²⁷ In addition, there are three types of *Pudgala* that are associated with the conscious substance to carry out the vital functions of life, viz., breathing, speaking and thinking. In toto, there are eight types of *Pudgala* known as eight *vargaṇā* which interact with the conscious substance.

The word '*vargaṇā*' means a category that applies to the group having the same definable attributes-in-chief. The eight groups are as follows.

(i) *Audārika Vargaṇā* (A class of gross matter)

The word *audarika* can etymologically be explained in two ways: [i] *udarana* meaning gross, *audārika* means 'constituted by gross matter' and [ii] *udara* meaning womb, *audārika* thus means 'what is produced from the womb'. All organic bodies—human, animal and vegetable are *audārika*.

All physical compositions, large and small, which are/can be made perceivable by sense organs belong to this category. All organic material

which make the cells (blood, bone, skin, etc.) comprising the bodies of all living (including the entire vegetable kingdom) and dead organisms and inorganic atoms, molecules and compounds, in short, almost all things, encountered by us in everyday life belong to *Audarika Vargna*.

(ii) *Vaikriya Vargaṇā* (A class of protean matter)

The term *vaikriya* means “protean” body, i.e. ‘what is capable of transformation at will’. The term *vaikriya* implies transformations (of the body), which are associated with a divine being or deva who can transform the body from, minute to huge, and *vice versa*. Celestial bodies of the inhabitants of heaven (*devas*) and hell (*narakis*) are composed of the material of this group which is very much more subtle than the previous category.

(iii) *Āhāraka Vargaṇā* (A class of matter related to the communication body)

The structure of this category is subtler than the preceding ones. Ascetics who have acquired special powers to create a unique subtle body called *aharaka sarira* use it. The learned sage uses this type of body for visiting omniscient persons at far off places, for the purpose of clarifying some doubts about intricate facets of truth. The subtle body stretches out so as to be in communication with the omniscient (*kevali*) from whom the information sought for, is secured. Thus, *aharaka sarira* means—communication body.

(iv) *Taijas Vargaṇā* (A class of matter related to Luminous Body)

The material belonging to this group is used by the soul to make a subtle body, which always accompanies the soul in its mundane existence i.e., until it achieves emancipation. The body forms an essential link between the soul and its *karmana sarira*. The taijas body provides energy required by the vital processes of the living organism such as effulgence and digestion.

(v) *Kārmaṇa or Karma-Vargaṇā* (A class of karmic matter)

Matter of this group also called *karmic* matter is responsible for contaminating the soul and keeping it in bondage. Minutest activity of a living being—physical, mental or oral—attracts the karmic matter that unites with the soul and is then transformed into *kārmaṇa sarīra* that is the basis of the mundane existence (in bondage) of the soul. Every worldly living being roaming through the cycles of births and deaths (*saṃsara*) carries the *karma-sarīra* with itself until it is finally emancipated.¹²⁸

Out of the above five bodies, the first alone is perceptible by the sense organs and the others are subtle and imperceptible bodies. Each succeeding one is minuter than the preceding one in order.¹²⁹

(vi) *Svāsocchvāsa or ānāpāna Vargaṇā* (A class of matter belonging to Respiration)

Svāsocchvāsa means respiration, as indicated by its name, matter in this group is what all living organisms need and use for the vital function of breathing.

(vii) Bhāṣā Vargaṇā (A class of matter belonging to sound)

Bhasa means speech. Living organisms that are capable of producing speech give voice to their feelings. The matter of this group is essential for this process.

(viii) Mano or Manas Vargaṇā

Mana means mind. According to Jains, mind is an instrument of thinking, which a soul makes for itself out of material bodies and becomes capable of thinking through its agency. The material in this group fit for this purpose is *mano vargaṇā*.¹³⁰

It is to be noted that a composite body of the group successively consists of greater number of atoms that are more compactly packed and thus occupy less space. Thus, a body of *āhāraka vargaṇā* is more compact and occupies less space than a body of *vaikriya vargaṇā* which itself is more densely packed in comparison with a body of *audarika vargaṇā*.

Twenty-Three Types

In Jain Canonical literature, its commentaries, and other literature, most of the above eight important categories are generally included in twenty-three types. Beginning from most minute atom and ending with the largest *achitta-mahāskandha*, there are infinite numbers of groups of *Pudgala*. But it is possible to reduce the number of *vargaṇās* to twenty-three by grouping them together from certain aspects.

1. In the first category, there are free [unattached] solitary atoms, which form "*aṇuvargaṇā*".¹³¹
2. The second category contains composite bodies (*skandha*) which contain from two atoms to the limit of "numerable atoms".¹³²
3. We then come to the category of composite bodies made up of "innumerable atoms".¹³³
4. Next comes the category of composite bodies constituted by "infinite (*ananta*) atoms".¹³⁴

All these four categories are incapable of being attracted, assimilated and transformed by the psychic order of existence. It has been emphasized that it is an immutable physical law of the universe that the quality of associability is forever absent in the composite bodies constituted by less than infinitely infinite (*anantānanta*) atoms. Only when the number of constituent ultimate atoms exceeds the threshold of non-associability, then and only then they could be used by the psychic order of existence. This does not mean that all the composite bodies with larger number than mentioned above possess this attribute. Some of them can be associated and some of them cannot be, as mentioned below.

5. *Āhāraka-varḡana*

The fifth category is the first one, which crosses the above-mentioned threshold of associability. In this category, fall the groups of *audārika*, *vaikriya*, *āhāraka* and *svāsocchvāsa*. *Āhāra* literally means association. Hence, *ahara varḡana* stands for the category of *Pudgala* endowed with associability.

6. *Prathama agrāhyu* [i.e. First unassociable category].
7. *Taijas* [Luminous]
8. Second unassociable category.
9. *Bhasa* [Matter essential for function of speech].
10. Third unassociable category.
11. *Manas* [Matter essential for the function of thinking].
12. Fourth unassociable category.
13. *Karmana* [Matter responsible for contaminating souls]. This is the subtlest category of *Pudgala* that has no practical significance.
- 14-22. These categories are of little practical significance and are merely of academic interest.
23. The 23rd category of *mahāskandha* i.e. The largest aggregate that pervades the entire cosmic space.

Thus, the Jain thinkers have propounded the theory of physical substance in detail. They have disclosed tremendous but scientific, realistic and rationalistic theories of physical world. For example, the Bh.S describing physical substance as a whole indicates that matter never loses its quantity. In science with comparison to this, we find the principle of conservation of Mass and that of Energy. The Bh.S mentions the dynamic nature of the physical substance right from atom to the largest aggregate known as *accittu mahāskandha*. They are not dynamic all the time, sometimes they are at rest. Modern physics gives parallel concept of dynamism of atomic and sub-atomic world through quantum and relativity theory. Besides, so far as the position of the physical substance is concerned in space and time, it has also been dealt with uncertainty. Sometimes an atom is in one space-unit and the next moment it is found in the next one space-unit. Similarly, in one moment, it is of one-degree black and the next moment, it is of two-degree or of more degree black. It is not in the least static. Quantum theory supports the philosophical dualistic approach to describe anything. According to the quantum theory, a particle does not have just a single history, as it would in a classical theory. Instead, it is supposed to follow every possible path in space-time, and each of these histories there are associated a couple of numbers, one representing the size of a wave and the other representing its position in the cycle (its phase). Likewise, there are many other facts found in Jain literature that necessitates scientific study.

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11. (i) Jayachārya; Bhagavatī-Joḍa; 18/6/117
(ii) Jīva-ajīva; p.76
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14. (i) Vaiśeṣika Darśana; 2/1/1-4
(ii) Nyaya Darśana; 1/1/14; 3/1/67
15. Bh.S; 2/10/129—Ōse samāsao pañcavihe paṇṇatte, taṃ jahā—davvao, khettao, kālao, bhāvao, guṇao.
davvao ṇaṃ poggalatthikāe aṇaṇṭāim davvaṃ,
khettao loyappamāṇamette,
kālao na kayāi na āsi, na kayāi, natthi, na kayāi na bhavissai
bhāvao vaṇṇamante
guṇao gahanaguṇe.
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Goyamā! loe loyamette loyappamāṇe loyaphude loyam ceva phusittā ṇaṃ ciṭṭhai.
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26. Bh.S; 25/4/148—egapadesogādhā ṇaṃ bhante! poggalā kiṃ saṅkhejjā? asaṅkhejjā? aṇatā? evaṃ ceva. evaṃ jāva asaṅkhejjapadesogadhā.
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29. N.M. Tatia; That Which Is; p.127
30. Bh.S; 13/4/55—egeṇa vi se puṇṇe, dohiṃ vi puṇṇe sayam pi māejjā / kotḍisaṇa vi punne, koḍisahassam pi māejjā //
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40. Bh.S; 1/4/191-196
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42. Bh.S; 1/4/191-196
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5

Theory of Atom

The concept of Paramāṇu (atom) has been the fundamental of Philosophy and Science. All the Eastern and Western thinkers have thought a lot of the basic elementary particles of the physical world. Consequently different theories have originated and flourished. Some of them have been indicated in the present chapter. In the field of science, many astonishing researches and experiments on material world have been made. The first three decades of our century changed the whole situation in Physics radically. Two separate developments—that of relativity theory and Quantum physics—shattered all the principal concepts of the Newtonian world view: the notion of absolute space and time, the elementary solid particles, the strictly causal nature of physical phenomena, and the idea of an objective description of nature. None of these conceptions could be extended to the new domains into which Physics is now penetrating. So far as the philosophical worldview is concerned, it keeps some different as well as identical conceptions with those of Modern Physics. The identity and difference have been shown on the basis of the Bh.S here.

The Origin of Atomic Theory

According to the Jain Metaphysics matter exists in two forms—atom (*paramāṇu*) and clusters (*skandha*). So far as my knowledge goes and evidences are found the discussion on paramāṇu is seen firstly in the Jain canonical literature. In the literature, an elaborate treatment about nature and the properties of Paramāṇu is given. According to Jain philosophers, whatever differentiation and non-differentiation, integration and disintegration take place in the world, all of them are possible due to the different combinations of atoms and that of the physical substance with the conscious one.

Some of the Western philosophers are of the opinion that the atomic theory mentioned in the context of Indian thought has been borrowed from the ancient Greek philosophy. In the Greek thought Democritus was the first founder of the atomic theory.¹ He appears to have lived in the 5th century B.C. The idea of the smallest, indivisible, ultimate building blocks of matter came in connection with the elaboration of the concepts of being and becoming, which characterized the first epoch of Greek philosophy. But these explanations are not satisfactory, as there is no evidence for this. In fact, Democritus propounded the atomic theory much later. The Jain doctrine of paramāṇu is undoubtedly much more ancient than the Greek atomists. Bhagavān Parśvanātha (B.C. 877-777) and Lord Mahāvīra (B.C. 599-527) propounded paramāṇu as the ultimate indivisible unit. Secondly the Jain canons elaborate and present detailed discussions on nature, structure and behavior etc. of matter in general and paramāṇu in particular.

Although the Greek atomism has certain similarities with the Jain atomism, yet, there are certain fundamental differences between the two. Whereas Western philosophers are of the view that atoms are conscious and unconscious both. According to the Jains, atoms are devoid of consciousness. Moreover, all the atoms of Democritus are of the same substance, but have different sizes and shapes. They are eternally unchanging, impenetrable and indivisible.³ Atoms themselves have neither color nor smell nor taste. The sensibility of the material objects is produced by the motion and arrangement of atoms in space. "Sweet and bitter, cold and warm as well as the colours; all these things exist in thought but not in reality, what really exist are unchangeable particles, atoms and their motions in empty space" wrote Democritus.⁴ So far as the Jain concept is concerned it is quite different which shall be discussed later on in this chapter.

Sivadatta Jnani regards that atomism is especially propounded by the Vaishesika.⁵ It is also not true. Atomic concept of Vaishesika was not before the Jain concept of atom and unlike the Jain theory, Vaishesika has not given any specific details of its nature and motion etc. The term *aṇu* is used in Upaniṣadas. There it is stated—"*aṇoraṇiyān, mahato mahīyān,*" but there is also no mention of paramāṇu as such, nor *aṇu* has there been discussed in detail.

Dr. Jacobi is of the opinion that the mention of the atomic theory in the Upaniṣadas and in its philosophical literature is very little. In Vedant philosophy, there is seen a total refutation of the atomic concept as it was supposed in the Upaniṣadic time.⁶ Sankhya and Yoga philosophy also do not accept the atomic theory and they claim to be as old as the Vedas. Thus, in the view of Jacobi the Jain theory of atom is very ancient because Jainism has based its theory of atom on the theory of matter.⁷

Modern philosophers also have the same view that the atomic theory was first presented in a systematic form by the Jains.⁸

Paramāṇu in Jain Physics

Matter exists in two principal forms: indivisible elementary particles and their combinations. In the technical terms of Jainism, the indivisible elementary particles are called *paramāṇu*⁹ (atom) and the combinations of these particles are known as *skandhas*¹⁰ (cluster). Here we should not mind some minute differences between the word atom of modern science and technical term *paramāṇu*. *Skandha* (cluster) is defined as an aggregate of atoms. It possesses gross form as well as subtle and undergoes processes of association and of dissociation.

The full name of atom is *paramāṇu pudgala*¹¹ or *paramāṇu*,¹² but it is generally called '*paramāṇu*'. Etymologically, the word *paramāṇu* is made up of two terms '*parama*' + '*aṇu*' i.e. extreme unit. The extreme limiting unit of the process of division of any object is *aṇu*. Such ultimate *aṇu* is *paramāṇu*. Thus, *paramāṇu* is an ultimate or primary atom.¹³ In this chapter the word 'atom' is used in the sense of *paramāṇu*. Here, the thing worthy to note is that the atom is a form of matter; therefore, it must possess the four material qualities, viz; colour, taste, smell and touch. According to the Bh.S, it is endowed with one of the five primary colors, one of the two smells, one of the five tastes and two of the four touches, i.e., either hot or cold and either dry or viscous.¹⁴ Four other touches i.e. hard, soft, light and heavy are not found in it. Atom is the smallest particle of matter or ultimate "building block" of the physical world. It is indivisible, indestructible, impenetrable, incombustible and imperceptible to sense-organs.¹⁵ It cannot be split or destroyed by any means whatsoever. The sharpest instrument cannot divide it into two likewise the highest temperature cannot melt it.¹⁶ Atom does not become wet even if it is drenched by the deluge clouds. Its existence or identity will not be lost even if it enters a drop of water or whirlpool of water.¹⁷ Thus, in Jain view 'atom' is different from the atom accepted in Physics, which is destructible and divisible.

In the *Tattvārtha Rājavārtika*,¹⁸ an atom is defined as the smallest material particle. There is nothing smaller than the atom. According to the *Pancāstikāya-sāra*, the substance that has a single taste, a single colour, a single smell and two kinds of touch, which is the cause of sound while unsounding itself, this is different from molecules though constituting them, is called an atom.¹⁹

Since atoms are the ultimate building block of physical universe, the four fundamental attributes of matter as mentioned above, are always associated with them. The properties of hardness and softness, heaviness and lightness are never associated with atoms. Because they are result of the different proportion the basic four touch and therefore they are qualities of molecules, not of the individual atoms. These properties are generated by the loose or compact aggregation of atoms and because all the atoms are massless, there is no room for the question of whether they are light or heavy,

hard or smooth.²⁰ The difference in mass is found only in molecules, which are the aggregates of atoms.

Atoms are not always found in a free state; only some of them are found as separate entities and some are in combined form. Atoms are produced only by division of molecules and not by the process of union or combination of any particles, because there are no particles smaller than atoms.²¹

Moreover, an atom is a single point. It has no parts, i.e. it has no half-portion, no middle portion and no end. It has no length, no breadth and no depth. It is dimensionless and has neither beginning nor end.²² It is truly infinitesimal. Its beginning, the middle and the end are identical with the whole of itself. Hence, the seers have observed: "that of which the start, the center and the end is the same, instead of having sensual qualities which is not perceptible, and that which is indivisible is called atom."²³

Two Forms of atom

As we have already seen an atom is indivisible and indestructible, it cannot be seen, burnt or divided into parts. The description of these qualities might create some difficulty in our minds, because modern science has shown that atom is not indivisible, it can be split.²⁴ Accordingly, an atom of a chemical element is rather a complicated system of smaller units such as protons, neutrons, electrons, etc. which are now called sub-atomic particles. The number of such sub-atomic particles has now crossed the figure of 250. Moreover, it has been established beyond doubt that atoms of various chemical elements are very much similar to our solar system, with a number of negatively charged particles (electrons) rotating round the central nucleus in the form of standing waves, which in itself is composed of a number of positively charged particles (protons) and electrically neutral particles (neutrons). Protons and neutrons are much heavier than electrons; the nucleus made up of the former two contains 99.97% of the total atomic mass.²⁵

The number of protons, neutrons, and electrons is different in different elements but the atom on the whole is electrically neutral because the total charge of all the negatively charged particles equals the total positive charge. The simplest and lightest atom is the hydrogen. It is composed of single proton as the nucleus and a single electron orbiting round it. Its diameter is 10^{-8} centimeter and mass 1.64×10^{-23} grammes. The distance between the nucleus and the rotating electron is such that the atomic diameter is 100,000 times greater than the diameter of the nucleus. The uranium atom is the heaviest natural element, in which there are as many as 92 protons and 146 neutrons in the nucleus and 92 electrons rotating round it in different orbits.²⁶

Later on theoretical physicists branched into two schools. One of these branches continued their search for the elementary building blocks, since it

was not satisfied that sub-atomic particles such as protons, neutrons, etc. were indivisible: while the other one abandoned this search. Although no one has found the particles that compose the protons, theoretically it has been established that protons are composed of quarks. The hunt for quarks is going on. Whether they actually exist or not, a new area of research: 'what quarks are made up of' has emerged.

Regarding the problem whether an atom is divisible or not, a satisfactory solution can be found in the *Anuyogadvara*, a Jain canonical text. The text postulates two types of atoms, viz; transcendental atom (*sūkṣma paramāṇu*) and empirical atom (*vyavahāra paramāṇu*).²⁷

Description of the atom as indivisible, indestructible etc. refers to the transcendental atom. Empirical or practical atom consists of infinite number of the transcendental atoms.²⁸ The noticeable thing here is that, in spite of being a composite body, empirical atom is too subtle to be cognized when it is single. It can only be cognized through effects of collective action of a group of them. Its interactions and mutations are very subtle and so it is known as an atom. We can compare a sub-atomic particle or an atom of modern physics with this empirical atom.

The transcendental atom, as defined previously, is a truly indivisible fundamental unit of matter. It is not composed of any particles. Hence, it is indivisible and dimensionless. Like a true geometrical point, it has no length, no breadth, and no thickness; its center is identical with its end. Thus, it has no extension and occupies only a single space-point. It has no shape and mass. However, it is not an abstract entity deprived of qualities of colour, smell etc. unlike the atom of Democritus. In spite of it, a transcendental atom is not perceivable by sense-organs and can only be cognized by inference through effects of collective actions or by direct experience of a transcendental knowledge.²⁹ This contradictory feature of being an object of sensuous qualities on the one hand and yet not being an object of sensuous cognition on the other, is easily resolved by the explanation of quantum phenomena and the principle of uncertainty. Quantum physicists do not concern themselves with the properties of an individual electron because it is impossible to ascertain them. On the other hand, electron's behavior can be accurately defined when dealt with collectively in great numbers (Schroedinger's wave equation). The individual electron is indeterminate and the indeterminacy is not a sign of immature science but an ultimate barrier of nature.

An atom in its free state is as real as an atom of material cluster and the qualities of colour, etc. are as real in a free atom as they are in an attached one. A free atom when captured by an aggregate loses its free state and is converted to a component of the aggregate. Similarly, its qualities also undergo changes of intensity. Thus, the same atom that is possessed of one unit of blackness can become infinitely black. The Bh.S refers to a number of such atoms.³⁰

Two or more atoms mutually combine to produce composite bodies and this process composes the entire physical world. The clusters composed of atoms have shape and extension. On the contrary, atoms are devoid of shape and have no extensions. It is quite natural to ask here how can a mass less and shapeless atom produce an aggregate, which has mass and shape as well? In this case, of course, the principle '*ax nihilo nihil fit*' fails to operate. But the question seems quite superficial as we go into the depth of the problem. Mass and shape are the results of the combination of two different qualities of atoms i.e. dryness and viscosity in a determined proportion. The more is the proportion of dryness the more is the lightness. The more is the proportion of viscosity the more is the heaviness. Likewise, the other properties such as shape, length etc. are the consequences of the combination of two different qualitative atoms. Thus, the atoms have mass and shape potentially, which appear in the relation of other different atoms. In modern science, the sub-atomic particles are presumed to be spherical in shape.³¹ Their diameters, though very small are measurable and therefore their extension in space covers innumerable space-points. According to the Jains, the sub-atomic particles of science, viz; protons, electrons, etc. are not atoms in its true sense. They are divisible because they are composed of innumerable transcendental atoms.

As discussed above, theoretical considerations in modern physics have already established that protons and for that matter all particles are made up of quarks and the question 'what are the quarks made up of?' looms large before the physicists. In conclusion it can be stated that the sub-atomic particles are not the ultimate constituents of matter but are only a gross form of it.

Four Types of Atom

The term 'paramāṇu' is another name of *bhāva paramāṇu* or *paramāṇu pudgala*, as already stated. But it has also been indicated that other substances have their minutest parts which are intellectual constructs and also known as paramāṇu. In this sense, Bh.S enumerates four types of atoms. They are as given below:³²

1. Substantial Atom [*dravya paramāṇu*]—paramāṇu in the physical sense
2. Spacial Atom [*kṣetra paramāṇu*]—the indivisible unit of space i.e space-unit [*Ākāśa-pradeśa*]
3. Time-Atom [*kāla paramāṇu*]—the indivisible unit of time technically known as time-unit.
4. One unit of intensity of any quality [*bhāva paramāṇu*]—the indivisible unit or quantum of intensity of sensuous qualities, viz; colour, smell, taste and touch.

Thus, an atom is a direct unit of physical substance (*Pudgala*) and also the indirect unit of space, time and modification. The quantitative difference in matter-space-time as well as the qualitative difference in physical objects

may ultimately be traced to the constitution of an atom. Thus, being the constituent element of physical composite bodies, an atom may be considered to be the determinant of the difference between clusters, and for the same reason, it is also their substantial cause. By its own motion (vibration, oscillation, etc.), it becomes the measure of time i.e. a time-unit (time-point) corresponds to a unit shift of an atom from one position to the next immediately. It should be remembered that time itself is quantified, and a time-unit is a quantum of time and therefore indivisible.

Since its associated space-point is the constitutive element of space, it is indirectly the cause of quantitative difference of space (*kyetra-saṁkhyā*).

Since its motion from point-to-point corresponds to duration of time, it is also the basis of quantitative difference of time (*kāla-saṁkhyā*).

Again, because it is the basis of modification of physical objects through combination or separation, it is also the condition of the quantitative difference of modes (*bhāva-saṁkhyā*).³³

Ultimately the whole physical universe is an atom. As we have seen in the preceding chapter, atoms have the innate capacity of uniting with one another to form composite bodies. The union is subject to certain definite rules, since, all types of atoms are not eligible to participate in the union. The rules have been dealt with at length in the preceding chapter. The composite bodies are liable to the process of disintegration (again subject to rules) and the united atoms may become free atoms and thus, the association and dissociation go on eternally.³⁴ The atom is the ultimate cause (*kāraṇa aṇu*) as well as the ultimate end-product—(*antya aṇu*).

The following verse succinctly summarizes the fundamental nature of *paramāṇus*:

**karanameva tadantyaṃ, sūkṣmo nityaśca bhāvati paramāṇuḥ/
ekarasa-gandha-varṇo, dviṣparśaḥ kāryaliṅgaśca //³⁵**

1. It is *kāraṇa* i.e. the cause of the creation of the physical universe.
2. It is *antya* i.e. the ultimate end product of the physical universe.
3. It is *sūkṣmo* i.e. infinitesimally subtle.
4. It is *nitya*, i.e. indestructible. It does not lose its individuality even when participating in a union.
5. It possesses one taste, one smell and one colour.
6. It is *dviṣparśī* i.e. it possesses two touches—dryness or viscosity and hot or cold i.e. it is either dry-cold or dry-hot, or viscous-cold or viscous-hot.
7. It is *kāryaliṅga* i.e. it can be cognized by inference only through the effect of collective actions.

Qualities and Modes of Atom

Atom is eternal (*nitya*), indestructible (*anaśvara*), non-transmutable (*avasthita*), and indivisible (*avibhājya*).³⁶ An atom, in its true sense, cannot be split or scattered or fissured nor can it be composed or created by fusion.

When it was said that the word *Pudgala* is derived from the properties of fission and fusion, it meant that the formation of material clusters by the natural association of number of atoms is fusion and the splitting of aggregates into its components is fission. Atom itself, though subject to mutation, is unfissionable and maintains its individual existence permanently.

The atom of a chemical element as well as its constituents, the sub-atomic particles - electrons, protons etc., are on the other hand, fissionable and fusionable. Radioactive elements emit alpha and other particles, and lose energy by radiation. Protons and neutrons are mutually transformable by losing or acquiring a positive charge. Other elementary particles get transformed into electromagnetic waves and radiation. Thus, according to the Jain view, the elementary particles are not fundamental units of matter but masses composed of infinite number of transcendental atoms.

The totality of atoms in the universe is incomprehensible and inexplicable in terms of numbers, since, an atom can neither be destroyed nor created. Totality of atoms in the universe remains unchangeable. This is comparable to the law of conservation of matter and energy, which states that the total amount of matter and energy in the universe is constant and unchangeable. Modification of this law is mooted as a result of some very recent advancement in science that is discussed in the succeeding paragraphs.

It is clear to us now that colour, taste, smell and touch, etc. are intrinsic qualities of all material objects. An atom being the fundamental unit of matter must also possess each of these qualities.

Regarding some of the intrinsic qualities of atom there may be something confusing, therefore, it would be better to clarify their true sense.

Colour (*Varna*)

Here, it is necessary to be clear about the meaning of the statement 'an atom possesses one colour'. As it is quite clear from the Bh.S, an individual atom by itself never become an object of sensuous cognition and it is also mentioned that atoms are cognised in their collective form or by their behaviour only.³⁷ What, then, do we mean by saying that only one out of the five primary colours can be associated with an atom? In this context the Bh.S answers that atom is not an object of sensuous cognition yet, it can be cognised by omniscient or clairvoyant-persons of the highest category. They are able to perceive its lowest degree i.e. one degree of colour.³⁸ Possession of one colour simply means that an atom will reflect a precisely single wavelength corresponding to a single primary colour due to its own characteristic quality. The colour of a composite body is determined by the resultant of the multiple wavelength corresponding to multiplicity of colours of its components.³⁹ Thus, atom must manifest itself as having a single colour to a super-normal faculty as stated above. Whether it is actually so constituted as to behave in that fashion, it is for the physicists to determine.

Similarly, of the five different tastes and the two different smells, an atom will manifest itself possessing only one of each.

Touch (*Sparsā*)

Another important characteristic quality of an atom is touch. The Bh.S mentions two types of composite bodies—(i) *catuḥsparśī* i.e. those with four kinds of touch and (ii) *aṣṭasparśī* i.e. those with eight kinds of touch.⁴⁰ The former are possessed of four kinds of basic touch :

- [i] Viscous
- [ii] dry
- [iii] Cold
- [iv] hot

The latter have four additional kinds of touch :

- [i] Light
- [ii] heavy
- [iii] Soft
- [iv] hard

In fact, atoms have only two kinds of basic touch. They are:⁴¹

- [i] either viscous or dry
- [ii] either cold or hot

Similarly, the heaviness and lightness are to be identified with mass. An atom has no mass but it must possess either a positive electric charge (*snigdhātva*) or a negative electric charge (*rukṣātva*). All *catuḥsparśī* compositons have no mass. In other words, *paramāṇu pudgala* and all *catuḥsaparśī pudgala* are neither heavy nor light. They are massless.

When physicists listed all the known particles by the order of their masses, from the lightest to the heaviest, they discovered that sub-atomic particles fall roughly into three categories—(i) the light-weight particles (lepton), (ii) the medium-weight particles (meson), and (iii) the heavy-weight particles (baryon).

Some of sub-atomic particles compared with Jain Physics by Muni Mahendra Kumar are given in the following table:⁴²

Table No. : 5

| Name of the particle | Mass | Electric charge | Touch |
|----------------------|------|-----------------|---------------------------------------|
| Electron | A | negative | dry, light |
| Positron | A | positive | viscous, light |
| Proton | C | positive | viscous, heavy |
| Neutron | C | neutral | viscous, dry, heavy |
| Photon | O | neutral | viscous, dry, neither heavy nor light |
| Pion positive | B | positive | viscous, light |
| Pion-negative | B | negative | dry, light |
| Pion neutral | B | neutral | viscous, light, dry |

A = light [lepton] B = medium [meson] C = heavy [baryon]

Thus, electron one of the lightest particles, is a lepton and proton, the lightest of the heavy ones is a baryon. However, a few particles do not fit into the lepton-meson-baryon framework. Some of them are well-known like the photon while others have been theorized but not discovered yet like the graviton. All of them have, in common, the fact that they are massless particles. A particle that has; zero rest-mass is a massless particle. All its energy is energy of motion. Though physicists know exactly what they mean by 'massless' in a mathematical structure, in the view of J.S. Zaverly and Muni Mahendra kumar, it is difficult to describe it in non-mathematical language because the very term 'particle' means 'some thing that has mass'.⁴³

There is a remarkable similarity in the views of the Jains and physicists regarding massless particle. Not only a transcendental atom, the smallest indivisible particle, is massless but all *catuḥsparśī* compositions also are massless. The quality of mass is found only in gross *aṣṭasparśī* material compositions.⁴⁴

The above description of the characteristic qualities of an atom would naturally introduce qualitative difference between atoms. But the difference is only qualitative, that is, in the phases of different atoms. From the point of view of substance, every atom is identical to every other. This is the law of Non-absolutism.

Motion of Atom

Mechanics and mathematics of atom as discussed in the *Bh.S*⁴⁵ show that both the activities and movement of atom are complex, inexplicable and unpredictable. It is particularly emphasized that there is an element of uncertainty in the activities of the atom. The text describes various kinds of motion of an atom resulting from its dynamic nature. The alternate periods of rest and motion to a certain extent agrees with quantum mechanics.

Differences of the motions of atom are showed by different terms, such as, *eyati*, *veyati*, etc.⁴⁷ Some of these terms indicate simple vibratory motion, whereas some others denote simple migratory motion. While still others indicate complex mixture of vibration, oscillation, emission, absorption, spin and wave-propagation in space. By the word 'so on'⁴⁶ it is understood that besides these, there are many other kinds of motion also. It is extremely difficult to interpret each of these terms into modern scientific terminology. However, Muni Mahendra Kumar has attempted to clear them in the following way⁴⁷—

- 1] Simple vibrations (*eyati*)— Here an atom simply vibrates.
- 2] Simple motion (*veyati*)— Here it migrates from one space-point to another.
- 3] Complex motion (*calai*)— It vibrates and migrates simultaneously.
- 4] Complex vibration (*phandai*)—It vibrates and spins simultaneously.

- 5] Oscillation (*ghaṭṭai*)— Here it oscillates.
 6] Collision (*khubbhai*)— It collides with other physical substance.
 7] Forceful penetration (*udirai*)—It penetrates forcefully into the physical substance, and so on, i.e., it is emitted, absorbed etc.

Besides, the above-mentioned motions, revolutionary motion or standing wave in a space-point are possibilities. It probably means linear motion accompanied with vibratory motion or state of vibration with changing frequency.

Linear motion of an atom means moving about from one space-point to another. This motion or change of motion may take place under the influence of outside forces exerted by another atom or an aggregate or it may be spontaneous.

While discussing the movements of an atom as described in the *Bhagavatī Sūtra*, it becomes clear that in some respects movements of an atom follow definite rules, in many other respects they are indeterminate and uncertain.⁴⁸ The same is declared through the Principle of Uncertainty which is also a scientific dictum enunciated by an eminent physicist Werner Heisenberg in 1927. By that time, quantum physics had defined with great accuracy the mathematical relationships governing the basic units of radiation and matter. But it had failed to reveal the true nature of either. Werner Heisenberg and other eminent physicists declared that there is an element of caprice in particle behaviour which stems from the very nature of matter and cannot be blamed on man's crude implements.⁴⁹ They further added that there is an element of indeterminacy about the events of the atomic universe which cannot be dispelled by the refinement of measurements, and hence, it is futile to hope that the invention of more delicate tools may enable us to penetrate further into the microcosm. A physicist can give an accurate account of electron behaviour so long as he is dealing with a huge number of them collectively, but he cannot locate an individual electron in space in respect of its position and momentum (velocity x mass). The Principle of Uncertainty asserts that it is impossible to determine the position and velocity of an individual electron at the same time, because the very act of observing its position, changes its velocity; and conversely, the more accurately its velocity is determined; the more indefinite its position becomes.

Types of Motion of Atom

According to the Jain view, the motion of atom in space is not arbitrary. It also follows some rules. There are two types of motion—motion without change of direction (*anuśrenī*) and motion with change of direction (*viśrenī*).⁵⁰

Anuśreṇī motion, according to J.S. Zavery and Muni Mahendra Kumar,⁵¹ literally means straight line but it really means the minimum distance between the two space-points. If the geometry of the cosmic-space is Euclidian, then it will be a straight line, but if this geometry is non-Euclidian as asserted by General Theory of Relativity, then the minimum distance may be a curved line. Since the space of cosmos is accepted to close upon itself, the latter alternative is a greater possibility. According to the rules and propagation of radiation in space, light also travels in a straight line if it is free from the influence of external forces. But because the modern cosmology accepts the geometry of the space as non-Euclidian i.e. it closes upon itself), the path of light also will be curved. Motion of an atom under the influence of external forces may also be in *viśreṇī* i.e. with change of direction. But if the time of motion is one time-point only, the motion is always in *anuśreṇī*.⁵²

Laws of Motion and Principle of Uncertainty

No doubt, an atom has a propensity to become dynamically active. This does not mean that all atoms are active everywhere and at all times and under all conditions. There is an element of uncertainty in the origination and cessation of the dynamic activity of atom. An atom can remain at rest on a single space-point for sometime. Maximum period of inactivity is innumerable time-units, after which it must move.⁵³ On the other hand, maximum period of activity is innumerableth of fraction (*asaṁkhyātamśa*) of an *āvalikā*.⁵⁴ Minimum period of activity and inactivity is one time-unit. In short, the dynamic activity of an atom is not continuous, that is, there are alternate periods of rest and motion.

The Bh.S, as already indicated, describes the variety of dynamic actions of an atom. Some of them are as follows :—

- | | |
|------------------------|-------------------------|
| 1] <i>Siya eyati</i> | 5] <i>Siya ghaṭṭai</i> |
| 2] <i>Siya veyati</i> | 6] <i>Siya khubbhai</i> |
| 3] <i>Siya calai</i> | 7] <i>Siya udirai</i> |
| 4] <i>Siya phandai</i> | and so on." |

Thus, more than one type of motion could be simultaneous. Temporally, all these motions may be regular or irregular.

An atom may be self-activated i.e. may undergo self-interaction without any external influence. It may also be acted upon by other atom or composite bodies.⁵⁵

At what speed does an atom move? At what frequency does it vibrate or if it revolves, at what rate? In this respect Bh.S clearly mentions that an atom can move from one end of the cosmos to the other in one time-point.⁵⁶ This is the maximum velocity of an atom. Its minimum velocity is one time-point for its linear motion from one space-point to the adjacent one.⁵⁷

Whether it moves to an adjacent space-point or crosses the whole cosmos from one end to the other, if the time taken is a time-unit, the motion will be in *anuśreṇī* i.e. straight and without changing the direction. If there is a turning, the time will be more than one time-unit. Turning is always due to external forces.

From the above it is clear that in some respects activity and motion of an atom follow definite rules, while in other respects they follow the principle of uncertainty. The definite rules can be summarised as under:

1. Unless acted upon by external forces an atom moves in a straight line (*anuśreṇīgati*)
2. When acted upon by external forces an atom may change direction and speed.
3. Conscious substance has no direct influence on the motion of atom.
4. Minimum and maximum distances travelled by an atom in one time-unit are space between two adjacent points and the entire length of the cosmos respectively.
5. Maximum period of inactivity (rest) is innumerable time-unit.

Maximum period of activity is innumerableth of fraction of an *āvalikā*.*

In Jain atomism, the principle of uncertainty as mentioned earlier governs the following conditions:

1. It is uncertain, after what interval of time an atom at rest will become dynamic (release energy). This time-interval may be from one time-unit upto innumerable time-units. However, after an interval of innumerable time-units, it will become active for sure.
2. Similarly, it is uncertain upto what duration of time a dynamic atom will continue to be active. It (the duration) could be from one time-unit to an innumerableth portion of an *āvalikā* but it will surely cease to be active after this maximum interval.

* *Samaya* is the indivisible quantum of time. A comparatively larger and more practical unit of time, which is measurable is called *āvalikā* and is equal to 1.7×10^4 seconds. One *āvalikā* covers '*Jaghanya-Yukta-Asamkhyāta*' *samayas*. This number is impossible to be expressed in numerical figures, but it shows to have definite measurable value and its lower limit can be calculated. Jain mathematics expresses this numbers as greater than x where (see '*Viśva-Praheḷikā*' by Muni Mahendra Kumar, p.255-270)

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| x = y | | and y = 10 |

3. It is uncertain which direction an atom will take at the commencement of motion. It can move in any possible direction.
4. It is uncertain what type of dynamic activity will be commenced by an inactive atom. It may just vibrate or rotate or migrate or do all these things simultaneously.
5. It is uncertain again what will be the intensity of an atom's dynamic activity, what will be its velocity—minimum or maximum or intermediate.

Restricted and Non-restricted Motion (*Pratighāti* and *Apratighāti*)

An atom is generally *apratighāti* i.e. it cannot be stopped, retained or hindered by anything except under the conditions mentioned hereafter. At the same time, it does not cause hindrance to others. This means that :

- [i] the motion and activity of an atom cannot be stopped or restrained by another body material or conscious. An atom in motion is capable of penetrating and passing through any type of obstruction in its way.⁵⁸
- [ii] an atom can occupy a space-point which is already occupied by others (atoms or composite bodies or conscious entity), without losing its free state.⁵⁹
- [iii] an atom can commence and continue its own motion and activities irrespective of the other occupants of the same space.⁶⁰
- [iv] an atom can leave the occupied space without any restraint from the other occupants.⁶¹

In spite of possessing the unique quality of '*apratighātitva*' as defined above, the atom is subject to *pratighāta* (hindrance) under the following conditions:⁶²

1. *Upakārābhāva pratighāta* (restriction due to the absence of media)—It cannot penetrate the boundaries of cosmos and cross over the transcosmos. This is because there is no medium of motion in transcosmos and without the aid of the medium of motion nothing can move. And so the atom on reaching the boundary of universe is stopped and may be thrown back.
2. *Bandhana-pariṇāma- pratighāta* (restriction due to association)—It loses its free state and the capacity for independent activity for the time when it is united with other atoms i.e., so long as it remains a constituent of a composite material body.
3. *Ativega- pratighāta* (restriction due to high velocity)—Collision between two self-activated atoms moving at a high velocity may cause restriction in the motions of both.

It is obvious that the mass is not an intrinsic quality of atom, mass, according to the Jain view, is one of the four pairs of touch, such as, (i) hot-cold (ii) viscous-dry (iii) heavy-light and (iv) hard-soft atoms (and even material clusters of some groups though composed of innumerable and even

infinite atoms of physical substance are neither heavy nor light. It means that they have no mass).⁶³

If we accept the value $m_0 = 0$, i.e. an atom has no mass, then the equation of the increase in mass with velocity becomes inapplicable, and therefore it can travel at a speed higher than that of light.

Super-luminal Speed of an Atom

In modern science, some particles such as photon, muon, etc. are postulated as massless. But, according to Muni Mahendra Kumar and J. S. Zaveri,⁶⁴ the word 'massless' probably does not mean that they are actually possessing no mass. In their opinion 'A massless particle' is an awkward translation from mathematics to English. Physicists know exactly what they mean by a 'massless' particle. A massless particle is a name they give to an element in mathematical structure. What that element represents in a real world, however, is not easy to describe and in all probabilities does not mean that the particle is completely devoid of mass.

It is well-known that light is affected by gravity and bends when it passes near a massive star. It is also known that light cannot escape black holes and is, therefore, positively affected by gravity which means photons have mass.

In the Jain view, atom, has a different situation altogether. Not only it must have zero rest mass but the energy of its motion must be such that it can travel with a speed much higher than that of light, which has been acceptable to Jains long ago. This may appear, quite contrary to the fundamental inference of relativity theory that nothing can travel faster than light. But relativity itself permits the hypothetical existence of particles called tachyons* which came into existence, already travelling faster than light. In the formalisation of the special theory of relativity, tachyons have an imaginary rest mass. Unfortunately, no one knows what an 'imaginary rest mass' means in physical terms, or what the interaction forces could be between tachyons and the ordinary particles of real rest mass.

But, there is a fundamental difference between the particles such as tachyons and the real atoms. Where tachyons transfer energy and momentum through space, in case of Jain atom there is no transport of momentum at all but pure energy only. Since momentum is a function of mass, there is no question of transport of momentum in the case of atom.

* "There are particles, which at rest, would have no mass at all, a rest mass of zero. Light is made up of 'photons' & particles that have a proper mass of zero. Other particles such as 'neutrinos' and 'gravitons' also have a proper mass of zero. Particles with zero mass mean that their inertia is zero and they can be accelerated to any velocity up to infinite. In 1967, physicist Gerald Feinberg, in discussing these, faster-than-light particles called them 'tachyons', from a Greek word meaning speed." (—Isaac Asimov, 'SPAN' magazine, 16th July 1993).

Motion Without Passing Through Space (*Aphusamāna Gati*)

Quantum physics has discovered the planetary model of the atom in which negatively charged electrons revolve round the positively charged nucleus. It has been established that electrons settle in orbits in such a way that there is an optimal balance between the attraction of the nucleus and the repulsion of the orbiting electron. The atomic orbits, however, are very different from those of the planets in the solar system, the difference arising from the wave-nature of the electrons. Also whenever an atom absorbs energy, its electrons jump to one of the outer orbits and later return to the inner orbits by emitting the energy absorbed earlier. Since the electrons are never found anywhere between the orbits, they appear to keep jumping from one orbit into another, without passing through the intervening space.

“Without passing through the intervening space” means that electrons, changing the orbit, cannot occupy any space between the two orbits even while going from one orbit to another.

This is explained by the quantum mechanics with reference to ‘position-momentum’ of the sub-atomic particles. This explanation involves the Uncertainty Principle or the discrete solutions of the quantum mechanics wave-equations. The latter is more difficult to understand than the former.

This type of motion is also described in the Jain Physics by the term ‘*aphusamāna gati*’⁶⁵ which means motion from one area of space to another without passing through the intervening space.

Synthesis of Atoms into Composite Bodies

It is quite clear from the preceding chapter that there are various forces in atoms. Which are responsible for the disintegration and integration of material objects by interaction between material particles.

In modern physics, the forces of interactions between the matter-particles are also supposed to be carried by other particles. Out of the four types of forces found in nature, the gravitation force, which is the weakest of the four, has practically no effect in the sythesis of sub-atomic particles into composite bodies. The electro-magnetic attraction between negatively charged electrons and positively charged protons in the nucleus binds together the constituents of an atom and is responsible for the stability of each atom. This force also binds together atoms of different elements into complex molecules of innumerable chemical compounds.

There is a weak nuclear force which is recently unified with electromagnetic force. Followed by the strong force which is many times greater than the electromagnetic force and which acts as the cosmic cement that binds together the sub-atomic particles of the nucleus of an atom and prevents its breaking up.

As far as Jain view is concerned, The two basic touch i.e. viscous and dry, play the most important role for the formation of smaller and larger molecules of matter.⁶⁷ The intensity of these two primary qualities varies from a single or one degree to infinite degree in different—that is, at a given moment, some atoms have a single degree of viscosity—some are with two units, some with three and so on and so forth upto infinity. At the same time, there will be some atoms with a single degree of dryness, some with two degrees and so on upto infinity.⁶⁸ A summary of the rules discussed in the fourth chapter, in respect of the synthesis of different atoms, is given below:

1. Synthesis of atoms having single units of dryness or viscosity is not possible either with one another or with atoms of higher intensities.
2. Synthesis of atoms having two or more units of dryness is possible with other dry atoms provided there is a difference of two or more units between them. Similarly mutual synthesis of viscous atom is possible only if the difference of their intensities is two or more units.
3. Synthesis of atoms having two or more units of dryness with all viscous atoms (except those with a single unit) is possible.

The following points of similarity between the Jain view and modern science emerge from above:

The dryness and viscosity have been equated by Jains with negative and positive electric charges of elementary particles respectively.⁶⁹ The interaction of the electronic shells of neighbouring atoms in a molecule, which creates the chemical bond necessary to keep them united, is then equivalent to the interaction and union between atoms of same type of touch i.e. touch equivalent to the negative charge. The first completed shell consists of two electrons. The minimum difference between the uniting atoms of similar touch is two units. The quality of mass or heavy-light touch does not play any significant role in the process of synthesis of the sub-atomic particles or atoms in their true sense.

Dual Nature

At this stage there may rise some fundamental questions, what is the true nature of a particle? Is it a particle or a wave? Is it matter or energy (radiation)? Does it have an electromagnetic field or a gravitational field?

In fact, an atom has the property to be unrestricted, it means that an atom is capable of penetrating and passing through any type of obstruction. Now, we know that the penetrating power of an electromagnetic radiation is inversely proportional to its wave-length i.e. shorter the wave-length of the radiation, higher is its penetrating power. From the stand-point of Physics, the only difference between the long radio waves at one end of the electromagnetic spectrum, and cosmic rays at the other end lies in their wave-length.⁷⁰ Visible light can 'pass through' only a few substances like glass. The wave-length of red light is .00007 cm and that of violet light is .00004

cm. X-rays which are shorter (10^{-6} to 10^{-8} cm) than visible light can pass through many more substances which are opaque to light waves. Shorter than x-rays are gamma rays (10^{-8} to 10^{-13} cm) or radium etc. which can penetrate several feet of cement concrete. The shortest known electromagnetic radiations are cosmic rays with wave-lengths of 10^{-10} to 10^{-13} cm which can penetrate even harder substances. Now if a particle is accepted to possess infinitely more penetrating power than the gamma rays or even cosmic rays, it must be regarded as radiant energy with an infinitesimally small wave-length. This aspect, then, compels us to postulate a particle as energy of infinitesimally small wave-length.

Thus, it becomes necessary to postulate an atom, the ultimate unit of *Pudgala*, to be an individual particle. In the view of J.S. Zaveri and Muni Mahendra Kumar,⁷¹ the properties attributed, in Jain Philosophy, to an atom compels us to visualize it as a particle, or a corpuscle rather than a wave. For instance, it has been stated that atom is sometimes at rest and sometimes in motion. What is the meaning of 'at rest' here? Does it mean a stationary wave in space or a stationary particle? Thus atom, has both the characters—that of a particle and a wave. In some context, it manifests itself as a particle, while in some other context as a wave. It has, therefore, a dual character, and there is no conflict between the two.

Light, for example, is classically regarded as electromagnetic-waves and the difference in various colours is explained by the difference in their wave-lengths; an electron, on the other hand, is commonly regarded as a particle with a negative electric charge. While, certain peculiar effects of light could be explained only by assuming that it is composed of particles or grains of energy called photons, it has been proved by experiments that electrons actually do exhibit wave-characteristics. It has been established that not only electrons, but whole atoms and even molecules produce wave-patterns under certain conditions.⁷²

Another dualism of the physical order of existence is the concept of two forms, matter and energy,—the former inert, tangible and massive and the latter active, invisible and without mass. The two fundamental forces exerted by physical reality—gravitation and electromagnetism—are yet another aspect of the deep duality of physical universe. Almost all the phenomena of physical universe, are produced by these two primordial forces. While the gravitational forces dominate such phenomena of macrocosm as the motion of planets and stars, the electromagnetic forces are predominant in the microcosm i.e. heart of atom.

Einstein's famous equation $E = mc^2$ has shown that matter and energy are mutually transformable. The paradox presented by the waves of atoms and particles of light has been resolved by a new mathematical equation that permits accurate description of quantum phenomena, either in terms of waves or in terms of particles, as one wished. Today the whole complex of

the physical universe is almost resolved into homogeneous fabric⁸² in which matter and energy are indistinguishable;⁸³ various forces found in nature, viz; the electromagnetic and weak nuclear forces have been unified; a grand unified theory combining the strong nuclear force with these two forces is under way; the abyss between macrocosm and microcosm is almost bridged; and there are hints of how the theory of quantum mechanics and general relativity might affect each other—a glimpse of the shape of a quantum theory of gravity is yet to come.

Thus, the Bh.S discusses the atomic conception in a descriptive manner. The various phases of an atom compel us to study them in the light of Modern Physics. The dynamic and changable nature of atoms, the highest speed and the different rules pertaining to the combining forces of atom can be easily comprehensible in comparison to the newly invented atomic theories of Modern Physics. In some respects the Bh.S' view differs from that of Modern Physics. It clearly declares that the notion of elementary particles as the primary units of matter has to be abandoned. The reason is, the number of particles increased from three (Electron, Proton, and Neutron) to six by 1935, then to eighteen by 1955, and today we know more than two hundred 'elementary' particles.⁸⁴ They illustrate convincingly that the adjective 'elementary' is no longer very attractive in such a situation. As more and more particles were discovered over the years it became clearer that not all of them could be called 'elementary' and today there is a widespread belief among physicists that none of them deserves this name. On the other hand, the Bh.S strictly declares that there are infinitely infinite atoms throughout the cosmos, which are separate, indivisible, indestructible and imperceptible. Unlike Science, Jain Physics accepts that two atoms of the same quality (charge) can interact and combine together. Likewise questions such as the number of directions from which the atoms come to occupy space-units, needs further probing.

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6

Biological Issues in the Bh.S

The concept of soul or Atman has been one of the fundamental doctrines of almost all Indian philosophies. Some of the Indian schools treat Atman as the Primordial element of the universe. According to them, the whole cosmos has emerged from one entity i.e. the Supreme Being (Paramātman or Brahman). The Jain philosophy regards that the world of our experience is either a living entity or the entities left by the living ones. It is, according to Jainism, because earth, water, air, fire etc. are not devoid of consciousness.

Jain philosophy describes conscious substance from several points of view, such as, metaphysical, cosmological, spiritual, psychological and biological, etc. In Jainism, due to this multi-dimensional character of conscious substance many important theories have come into being. All of them cannot be dealt with within one chapter. In present work only a few biological issues have been taken-up. Besides, some important concepts that had been longstanding problems before the Eastern and Western philosophy as well as Psychology, have been discussed with reference to the Bh.S in particular.

Arguments for the Existence of Soul

The complicated problem of the existence of soul has baffled almost all the thinkers of the world. There have been philosophers who did not believe in an independent existence of the soul, like the Carvaka¹ in India and Thales,² Anaximander,³ Anaximenes,⁴ Heraclitus⁵ etc. in Greek. During the time of Lord Mahāvīra such thoughts were not altogether absent. According to Sūtrakṛtāṅga,⁶ 368 schools of thought were prevailing at that time. Some of them were not in favour of the existence of soul. They raised many cross-questions regarding the concept of soul. Lord Mahāvīra was one of the greatest founders of this concept of his time. Most of his philosophy

is devoted to the discussion of soul in different contexts. He has attempted to prove its existence as an independent reality. The Bh.S expresses his view at various places in a very lucid and convincing manner.

In the text, we find two types of views regarding the existence of soul—non-materialistic about the emancipated (pure) being and materialistic about the worldly being.⁷ Acārāṅga, the first Jain canon, suggests four ways to know the existence of soul: [i] doubt about it, [ii] the realization of 'I', [iii] substratum of consciousness and [iv] its manifold functions.

From the metaphysical point of view Sthānāṅga Sūtra⁸ and the Bh.S⁹ clearly accept the separate existence of two entities, viz, the living and non-living. Both are independent and eternal. Acārāṅga, the oldest canon expresses the same view through animistic approach.¹⁰ It states that all the things like earth, water, fire, air and vegetation are primarily living entities, changed into non-living only by weapon-operation on it.¹¹ Apparently it gives the idea 'the visible non-living world originates from the living ones due to weapon operation on them or death', which is very close to the terminal Upanisadic and Vedantic thoughts.¹²

The Bh.S displays the view of the opponent Kalodāi, Shelodāi etc. who did not accept that something which is not visible could exist.¹³ Indrabhuti Gautama sees the same thinking in Viśeṣāvaśyaka-Bhāṣya¹⁴. Though the self cannot directly be seen through the senses yet, it is expressed through the sense experiences to a common man. It can be inferred only through its effects. The essence of the discussion that took place between Madduka and Lord Mahāvīra is that by the effects we can realize the existence of soul.¹⁵ There are so many things in the world that are not visible, such as, the atoms, the air, the smell and so on, but do we not agree with their independent existence? The same is applicable to the soul. On the other hand, the soul is directly and fully perceptible to one who is free from all passions and whose knowledge is unobscured.¹⁶ Refuting all the opposite views about the existence of soul the Lord answered in the following manner—"O Gautama! The soul is indeed directly cognizable to you as well. Your knowledge about it, which consists of doubt etc., is itself the soul. What is proved by your own experience need not be proved by other means of cognition. No proof is required to establish the existence of happiness, misery etc."¹⁷

Another argument is that—

"If there is no soul, how do you realize 'aham' (the feeling of 'I')? How can there be a doubt whether soul is or is not? Or, if there is a doubt, in which case is this 'ahampratyaya' (the knowledge of 'I') justifiable."¹⁸

This argument is applicable only in the case of the beings who have mind.

The problem of doubt and of doubter is rather ontological. Just as the Samkhya system provides the logical arguments for the separate existence of *puruṣa* (soul) on the ground of *adhiṣṭhāna*,¹⁹ Lord Mahāvīra proved the

existence of soul on the ground of doubt. Mahāvīra said,—“If the object about which one has doubt is certainly non-existent, who has a doubt as to whether I do exist or I do not exist? Or, Gautama! When you yourself are doubtful about yourself, what can be free from doubt?”²⁰

The thing to be considered here from metaphysical point of view is that substance cannot exist without qualities and qualities have no place absolutely independent of substance.²¹ It means if the qualities are experienced, the experience of the substance is obvious. The Bh.S,²² describes number of such qualities that are related to soul only. For example—right and wrong knowledge, perception, memory, etc. are quite evident to prove the isolated existence of soul. Soul is the agent of all the actions of every being, for without it, eighteen types of sinful acts (act of killing upon perverted attitude), and the act of desistance from them, different states of the soul, such as, desire to know, determination, retention, exertion, action, strength, energy, effort, vigor and developed and undeveloped or underdeveloped consciousness of being do not take place. All these psychological functions are centered in a conscious and sentient entity. Besides, feelings of pleasure and pain, various types of emotions, such as, anger, greed, pride, deceit, hate, attachment etc. are not possible unless we regard the existence of spiritual entity as the source of all these phenomena.²³

Consciousness as a Defining Characteristic

The definition of soul becomes clear by the attribute of *Jīvāstikāya* mentioned in the Bh.S. Among the five fundamental entities one is *Jīvāstikāya* i.e. conscious substance or soul. The word *Jīvāstikāya* represents all the living entities. Its fundamental quality is consciousness.²⁴ Hence, it is quite obvious that the soul is consciousness and consciousness is invariably the soul. The synonymous words,²⁵ such as, cognizant, (*vinnu*), knower (*veya*) prove the fact. *Acārāṅga Sūtra*²⁶ makes no difference between the soul and the consciousness. It is written—*je āyā se viṇṇāyā*. In later works, this quality is denoted by the word ‘*cetanā*’.²⁷ It is *cetanā* (consciousness) alone which cannot exist in any other substance than the soul. Hence, the main line of demarcation between soul and non-soul is consciousness (*cetanā*). Nandī sūtra clearly states that all living beings, howsoever, even in the lowest possible stage of development, possesses an infiniteth part of omniscient knowledge.²⁸ If that part of omniscience is covered by the karmic particles, it would become non-living, but such a contingency never arises.

Consciousness consists of knowledge (*jñāna*) and intuition (*darśana*).²⁹ In the *Tattvārtha Sūtra* and other Jain literature the definition of soul in the terms of ‘*upayoga*’ is very common “*uvaogalakkhaṇo jīvaḥ*.”³⁰ Knowledge is inherent, according to Jain philosophy, but does not shine because it is obscured by the veil of karma. The Bh.S³¹ mentions five kinds of knowledge,

viz., *mati* (sensuous), *śruta* (scriptural), *avadhi* (clairvoyance); *manaḥ-paryaya* (mind-reading) and *keval* (pure and perfect knowledge or omniscience) can arise with the removal of the corresponding karma-veil. Four types of intuitions and three types of perverted knowledge are also prescribed in living beings.³²

The four intuitions are visual, non-visual, clairvoyant and omniscient. The first three kinds of knowledge are mentioned above. Which means that the first three type of knowledge can be pure as well as impure.

Biological Characteristics of Soul

The liberated being has no connection with body, speech, and mind. It is only pure and perfect consciousness. In mundane form, it associates with all these.³³ Therefore; some characteristics, which are the outcome of the soul associated with physical substance, are discussed in some detail here. From the biological point of view they are of paramount importance. Three of them are related to the physical aspect and one is related to the mental aspect. The mental aspect implies (i) Upayoga or functional consciousness and it involves volitional activities, the manifest symptoms of consciousness or upayoga. The physical aspects include—(ii) Bio-energy or *prāṇas* (iii) Bio-potentials or *Paryāptis* and (iv) Instincts or *Samjñās*.

{A} Upayoga or Functional Consciousness

The term 'Consciousness' is considered a misleading term and is very much disliked by some Metaphysicians. They consider "self-consciousness" as a psychological impossibility and strongly object to the use of the expression.

Neuroscientists also use the term consciousness in a very limited sense to specify the state of a person in which the activating programs of brain allow experiencing and thinking, that is, the state, which is diametrically opposite to unconsciousness. In saying that one is conscious, we mean that one is awake and aware and open to receiving and giving out information and the capacity to do this depends upon the operation of a system in the head, called the brain. Thus conscious experience is entirely dependent on the activity of the brain. Sleep, drugs and brain damage alter the condition of consciousness. Consciousness, therefore, is the name that is applied to the condition that is experienced. Our language is capable of describing our knowledge and our experience, but we get into serious difficulties when we try to use the language to describe the *knower*. And the difficulty becomes insurmountable because the 'knower' is not accepted by neuroscience as an eternal non-physical entity.

On the other hand when we consider the Theory of karma we find that the soul—the eternal, non-physical conscious substance—is the ultimate,

'*knower*'. Knowing and experiencing are inherent in the soul.³⁴ Knowledge is born or rather emerges, with or without the help of sense-organs and the mind which are only external instruments, in the different states of the soul as their spiritual counterparts. The soul could never be bereft of consciousness. Even one-sensed beings such as plants, fire, air, water and earth do possess the feeling to touch and can experience pain.³⁵ These beings are *asamjñī*. they do not possess brain or mind. But by suitable electronic apparatus, not only the pain but also their awareness and expression of the pain can be recorded and studied.

Thus, the Bh.S and all the other works maintain a unitary view about consciousness as essential quality of the living. Due to consciousness alone soul differs from other entities. Conscience is twofold:³⁶ knowledge and intuition. All the latter Jain thinkers whether they are Umāswāti or any one else, like the Bh.S, mean both knowledge and intuition by the term 'upayoga'. Kundakunda has used the word *cetanā* in the sense of 'upayoga'.³⁷ Akalaṅka clearly gives different meanings of these two terms. He opines that *upayoga* is the manifestational form of consciousness and *cetanā* is a capacity factor.³⁸

The literature reveals some difference regarding the meaning of the term consciousness itself. To Umāswāti, it means only knowledge and intuition. Akalaṅka adds bliss and strength also saying that all living beings exhibit a group of four qualities implying bliss, strength, knowledge and intuition. The term, thus, represents the generality of attributes distinguishing the living from the non-living.

{B} Vitalities or Prāṇas

The text Ācārāṅga mentions four synonyms of soul³⁹—*prāṇi*, *Bhūta*, *Jīva* and *sattva* to indicate living beings in general, without differentiating them. The same words are found in the Bh.S⁴⁰ with their etymological meanings. The Bh.S has defined them accurately. However, the Bh.S and the commentator Śīlāṅka⁴¹ have indicated that each term represents different classes of living beings as shown in the following table. The point to note here is that all these terms exhibit observable, physical qualities of the living entities.

In the Bh.S. twenty- three synonyms have been given for soul (*jīva*) and in *Dhavalā* twenty synonyms. Everywhere, however, the four-words—*prāṇi*, *Bhūta*, *Jīva* and *sattva* are commonly used for soul.

Besides, in the Bh.S⁴² and also in other works we do not see any difference between *jīva* and *prāṇi*. *Jīva* also means vitality (*prāṇa*) because *jīva* lives on account of it. We find the same meaning in *Pravacanasāra*⁴³, also it has clearly been stated that one who lived, lives and will live due to four kinds of *prāṇas*, which are physical in nature, are known as *jīva*.

Table: 4
Meaning of the Synonyms of the Living Being

| Terms | Bh.S | Śhilānka Commentary |
|------------------|---|--|
| 1. <i>Prāṇa</i> | that which has the capacity of breathing in and out or inhaling and exhaling. | Two to four sensed living beings (mobiles) |
| 2. <i>Bhūta</i> | that which existed, exists and will exist. | One-sensed beings (plants etc. or immobiles) |
| 3. <i>Jīva</i> | that which lives and experiences life and life-span karma. | Five-sensed beings |
| 4. <i>Sattva</i> | that affected by auspicious and inauspicious karma. | All the living beings |

The existence of vitalities is the most important property of the living beings. That is why the text *Dhavalā*⁴⁴ refers to vitalities as the cause or instruments of livingness.

In fact, '*prāṇa*' is translated as life principle, life force, life-wind, vital air and vitality. The canons in general⁴⁵ and the Bh.S in particular⁴⁶ mention briefly four kinds of vitalities, viz., (i) strength, (ii) senses, (iii) respirations and (iv) duration or life-span or age. The four are sub-classified into ten types: (i-iii) three strengths of physique, speech and mind, (iv-viii) five senses as known popularly and (ix-x) the last two are respiration and duration of life-span. The lowest class of living beings has at least four vitalities out of the ten. The number of vitalities increases according to the development of the living beings. This is shown in the following table.

Table: 5
Vitalities and Paryāpti among Living Beings

| The Living Being | Names of Vitalities | No. of Paryāpti |
|------------------------------------|--|-----------------|
| 1. One-sensed beings | 4, sense organ of touch, power of physique, respiration, life-span | 04 |
| 2. Two-sensed beings | 6, 2 senses, physical and vocal power, respiration, life span. | 05 |
| 3. Three-sensed beings | 7, 3 senses, 2 powers, respiration and life-span | 05 |
| 4. Four-sensed beings | 8, 4 senses, 2 strengths, respiration, life-span | 05 |
| 5. Five sensed beings without mind | 9, 5 senses, 2 powers, respiration, life-span | 05 |
| 6. Five-sensed beings with mind | 10, 5 senses, 3 powers, respiration, life-span | 06 |

| | | |
|---|--|----|
| 7. Five sensed beings bio-potential not- completed | 7, 5 senses, physique-power, life-span | 06 |
| 8. Four-sensed-beings with bio-potential not-completed | 6, 4 senses, power physique, life-span | 05 |
| 9. Three-sensed beings with bio-potential not-completed | 5, 3 senses, power of physique, life-span | 05 |
| 10. Two-sensed beings with bio-potential not-completed | 4, 2 senses, power of psyche, life-span | 05 |
| 11. One-sensed beings with bio-potential not-completed | 3, 1sense, physique strength, life-span | 04 |
| 12. Beings of 13 th spiritual stage | 4, physique and vocal strength, respiration, and life-span | — |
| 13. Beings of 14 th spiritual stage | 1-3, (i) life-span only (ii) respiration and life-span (iii) respiration, life- span, strength of physique | — |

{C} Bio-potentials or Paryāptis

The Bh.S presents a long list of the living beings divided on different bases. In short, they are of two forms—with developed bio-potential and without developed bio-potential or underdeveloped. Technically they are called 'paryāpta' and 'aparyāpta'.⁴⁷ Whether an organism born in a particular state of existence is developed or underdeveloped depends on the bio-potentials. The development or underdevelopment of a being, thus, would depend on the complete or incomplete development of the corresponding bio-potential as indicated. The remarkable thing here is that the bio-potential is also required for livingness.

The concept of bio-energy (*prāṇa*) is seen in the early literature of the Indian thought but the concept of bio-potentials i.e. *paryāpti* is unique to the Jains. It is found in Bh.S.,⁴⁸ *Jīvābhigama*,⁴⁹ *Ṣaṭkhaṇḍāgama* and the like⁵⁰ which are the representative works of the Jain philosophy.

Bio-potential means the building up of material forces at the very beginning of rebirth.⁵¹ The bio-potential is six-fold,⁵² viz., aliment, body, sense-organ, inhaling- exhaling, speech and mind. The alimentary bio-potential mean the production of material capacity for functioning as appropriation, transformation and elimination of alimentary matter.⁵³ The bio-potentials of body etc. also work in the same way. All the six bio-potentials come into existence at the time of rebirth but the development of

the alimentary bio-potential takes place in one instant and the rest within one *muhūrta* (48 minutes) gradually.⁵⁴

In the words of Dr. N.L.Jain,⁵⁵ these six bio-potentials are nothing but a gradual development of the living in six stages: (i) embryo that takes food for building or running life. (ii) Food is that which causes the body to develop, which results in (iii) the development of physical senses depending on the class of the living. With the development of senses the development of (iv) respiration (v) speech and (vi) mind. According to Dhavalā, these bio-potential are the cause of corresponding different Vitalities.⁵⁶ It defines them as the formation or perfection of different organs or energetic aggregates of the body, which has been modified as the cause of such formations. *Pujyapāda*⁵⁷ and *Akalaṅka*⁵⁸ also support the definition. But later on, many authors presumed it to be an acquirement of energy for these formations. This seems to be a cause-effect formalization.

In regard to the Jain concepts of *prāṇa* and *pariyāpti*, according to Dr. Nathamal Tatia, there are special considerations in the light of the modern conception of life as 'an energy, capable of organizing matter gathered from outside into the body of a living organism'.

In modern terms *pariyāpti* means the power of "organization" of material from the environment into a special pattern. The fact becomes clear from the following passage:⁶⁰

"All living things are 'organized', even, if, like a virus, they consist of little more than protein and nucleic acids..... This 'organization' is a highly improbable state for matter to be in. All inanimate matter—and dead matter are disordered and randomly scattered. A physicist knows this, as the tendency to increase 'entropy', for entropy is simply a measure of disorder. To counter this probable tendency energy is required, so living things can only retain their organized state of low entropy by respiration and the production of energy."

Dr. Nathmal Tatia further writes⁶¹ that the Jain conception of *prāṇa* and *pariyāpti* comes very near the modern idea of 'energy' mentioned in the above quotation. On the basis of Acharya Tulsi's aphorism⁶²—"the bio-energy is *prāṇa* needed for *pariyāpti*," he indicates that the bio-potentials are brought to their proper functioning by the power of *prāṇa*, in the absence of which they are incapable of attaining their maturity.

It is seen that these six bio-potentials correspond to ten of the bio-energies as shown below. The last one *prāṇa* i.e. life span is, according to Acharya Mahapragya,⁶³ is the consequence of the first bio-potential. Like the *prāṇas*, the lowest living ones have only four *pariyāptis* in appearance.⁶⁴ Higher ones show all the six. In the case of godly life it is found that it has five bio-potentials, Vth and VIth bio-potentials taken as one.⁶⁵

Table 6: Paryāptis and Prāṇa

| <i>Bio-potentials</i> | <i>Bio-energy</i> |
|-----------------------|--|
| Aliment | 10 Life-span |
| Body | 7 Physical power |
| Sense-organs | 1-5 Sense of taste Sense of smell Sense of sight Sense of hearing Sense of touch |
| Inhaling and exhaling | 8 Respiration |
| Speech | 7 Vocal power |
| Mind | 6 Mental power |

Bio-potential, in the view of Dr.N.L.Jain,⁶⁶ are of rather physical nature than supra sensual as Akalaṅka⁶⁷ has pointed out because their names represent the formation of various organs to perform different functions—internal and external. For example, the respiratory bio-potential, according to him, should mean development of nasal-organ, heart and nervous systems. Any system requires energy, normally supplied by food intake during its digestion and metabolic transformation for working. In absence of a respiratory system, the above processes will become difficult. Even the development of various systems will not be possible. Actually, the inhaling and exhaling is perceptible in all normal and special cases. In a sense, they seem to be grosser than vitalities. The physico-chemical or physiological processes occurring in various organs are known to generate energy to give power and energy. Hence, bio-potentials are primary physical processes of developing a body and its various organs and supplying the necessary caloric energy or force for different bio-energies to grow and function. He further writes⁶⁸ that this view is in conformity with the cause-effect relationship between the two. This view will support Sikdar's suggestion of protoplasmic (enzymic or nucleic acidic) nature of bio-potentials though this critical analysis could not be assumed during the canonical and pre-canonical periods. However one can realize that the Jain thinkers were keen observers of physical and functional aspects of the living.

{D} Instincts or Saṃjñās

Instinct is a widely discussed topic in Jain psychology. The *Nandī*⁶⁹ cannon mentions three kinds of instincts i.e. saṃjñās, viz 1. *kālikopadeśikī*, 2. *hetupadeśikī*, 3. *dr̥ṣṭivādopadeśikī*. These three are of cognitive nature.

According to the Jains, every living being has some natural instincts, or drives or desires which have been called 'saṃjñās' being physiological or psychical. Instinct is the natural manifestation of a being, which is used by

the stimulus from the outside world of sensation, according to the condition of soul. It involves the process of an inter-linked chain of actions in the direction of some definite and distant object, which is conducive to self-preservation, etc.

There are various meanings of the word '*saṃjñā*', such as, knowledge, desires, thinking capacity to differ between good or bad. According to the theory of karma, *saṃjñas* are due to pre-maturation and subsidence-cum-destruction of deluding karma and feeling producing karma and also due to many types of inherent sensitivity in the living beings. Hence, there may be a variety of their numbers.

In the Bh.S,⁷⁰ ten instincts have been enumerated. They are—the instinct of hunger, fear, carnality, possession, anger, pride, deceit and greed, instinct as discursive cognitional activity and instinct as intuitive activity. The detailed description about them is not found in the Bh.S. The commentary on *Sthānāṅga Sūtra*⁷¹ throws light on the nature of the instincts. According to it, they are not only cognitive in nature but are mainly of emotive nature. According to modern psychology they can be known as of affective nature. The commentary defines *saṃjña* as consciousness (both emotive and cognitive) due to the rise of the sensation - producing karma and deluding karma, and the suppression-cum-elimination of the knowledge-covering and intuition-covering karma. Of the ten instincts, the first eight are emotional, and the remaining two cognitive. The commentator has explained the practical aspects of instincts, which can be compared with the behavioral psychology as shown in the following table.

Table: 7

| Instinct | Physical-mental Behaviour and Changes |
|----------------------------|--|
| 1. Āhāra <i>saṃjñā</i> | Picking up the morsel of food by hand, mouth, etc; movement of the mouth, search for the food. |
| 2. Bhaya <i>saṃjñā</i> | Emotion of fear creating timid out-look, change in voice, horrification, etc. |
| 3. Methuna <i>saṃjñā</i> | Amorous glances, touch, shivering, etc. |
| 4. Parigraha <i>saṃjñā</i> | Avaricious acquisition of things and their hoarding. |
| 5. Krodha | Redness of the eyes, snapping of teeth and trembling of lips, etc. |
| 6. Māna | Egotism and hardening of the body. |
| 7. Māyā | False speech out of affliction, act of hiding etc. |
| 8. Lobha | Acquisition and hoarding out of greed. |
| 9. Loka | Discursive cognitive activity. |
| 10. Ogha | Intuitive cognition. |

Of the ten instincts, *Ogha* and *Loka* these two are discussed extensively by the commentator, Śīlānka and Siddhasenagani. According to former *Ogha* means commonplace activity and *Loka* means specific activity. The first represents the intuitive cognition and the second one demonstrates active knowledge. Siddhasenagani explains *Ogha samjñā* as cognition without the sense organs and mind. Such cognitive activity is available even in plants. The plants intuit the distant and future events by means of vibration in the atmosphere. The instinct due to popular tradition and inheritance is called *Loka samjñā*. The commentary observes that these instincts are clearly describable in five-sensed beings. In the one-sensed being, they are simply due to rise of karma.⁷² Modern scientists have studied these instincts in plants with the help of instruments, so it is now possible to find them in one-sensed beings. This experiential consciousness is found in all living beings while "knowledge" is found in the higher living ones. Hence, the 'samjñā', here, should be taken as natural or innate instincts found in all living beings.

It appears that originally there were only, at first, four instincts and six more were added later to the list of the original four with the subsequent development of psychology. This fact is also proved by the *Sthānāṅga Sūtra*;⁷³ etc. and the Digambara scriptures like *Dhavalā*⁷⁴ etc. The commentator Śīlānka adds six more instincts including the ten above, viz; pleasure, pain, disgust, sorrow, delusion and religion.⁷⁵ If five cognitional instincts, according to *Niryukti*, are added the total number of instincts will be twenty-one. Thus, there are sixteen experiential and five cognitive instincts. As far as Acharya Mahapragya's opinion is considered, the last two instincts, represent knowledge and conation and not the conventional meanings.⁷⁶ Ratnakara has referred to these instincts in a different way and classified them into three types—(i) long-timed and memorial (uterine born ones), (ii) logistic (2-4 sensed beings) and (iii) poly-viewing (right faith ones).⁷⁷ They seem to be related to the living beings with developed mind. The view of Dr. N.L.Jain⁷⁸ regarding the possession of the instincts by different categories of beings, requires critical examination. Moreover, with reference to traditional instincts, there seems to be some ambiguity in two cases—(a) libido and sex and (b) greed and belongings.

The classification of instincts into ten categories agrees with that of the modern psychology as advocated by the psychologists like McDougall.⁷⁹ Accordingly, there are fourteen kinds of instincts, including laughter etc. which belong to human beings, viz; [1] parental or protective, [2] aggression combat, [3] curiosity, [4] food-seeking, [5] instinct of repulsion (avoidance or disgust), [6] escape, [7] gregarious, [8] instinct of self-assertion, [9] submission, [10] mating, [11] acquisitive, [12] constructive, [13] appeal and [14] laughter.

Till now, we have discussed some specific characteristics, which are

nothing but the different phases of the basic quality of sensitivity, irritability or consciousness. Out of the four characteristics mentioned above the instincts are merely an extension of the quality consciousness. The concepts of bio-energy and bio-potentials are, however, some suggestions of the material approach for the living entity. Thus consciousness is a specific quality and the rest of the properties are suggestive of material nature of the living being.

The Concept of Soul-units (Ātma-pradeśa)

The Bh.S mentions something more as the characteristic of the living beings. Accordingly, living entity is said to contain innumerable soul-units.⁸⁰ If all the soul-units spread, they can occupy the whole cosmos. But as far the Jain view is concerned, it, unlike the Nyaya-Vaisesika philosophy, agrees with the concept that soul spreads in limit i.e. the body, it occupies. Our experience also proves that a soul lives in the body it occupies. According to Jain view even emancipated souls occupy limited space-units as we have seen in the third chapter. On the other hand, other philosophies keep different views regarding the expansion of the soul. So it is natural to ask what is the size of the soul actually? Is it cosmic or limited? Secondly, if the soul limits itself upto the body it occupies; the next question arises what is the relation between both of them. Philosophically and psychologically these questions have been discussed widely. The resulting answers are not unanimous. The Bh.S also deals with these questions in its way under the following discussions.

Size of the soul

According to Jainism, the soul is eternal but not all pervasive. Though it has a capacity of pervasion throughout the cosmos yet, it pervades the body, it occupies except the condition of *Samudghāta* (Astral projection).⁸¹ The medium of motion, the medium of rest, cosmos and a soul occupy the equal number of space units.⁸² The medium of motion, the medium of rest and cosmos are not receptive and they do not act or react with any external force. Therefore, there is no external effect on them. On the other hand, the soul existing in worldly stage receives physical substance at every moment and acts with its help. Consequently, there is no uniformity in the activity and the effects of the soul. It is capable of expansion and contraction in accordance with the body, it occupies. Therefore, the soul is stated to be of *madhyama-parimāṇa* i.e. intermediate size.⁸³

The capacity of the soul of pervading the entire body it occupies is compared with the capacity of the light of a lamp⁸⁴ which pervades the entire room big or small. Similarly the soul in its worldly existence pervades the entire body big or small. The soul, which pervades a huge body like an elephant's, is also found in the smallest body, the body of *kunthu* (insect).

This fact is shown in the Bh.S in the context of the equality of the soul.⁸⁵ In every part of the body the presence of soul can be realized. The question was raised whether a soul prevades the whole body of tortoises, alligators, cows, men, buffaloes, etc. even if their inner parts were cut into two or more pieces. the reply given by Lord Mahāvīra was affirmative.⁸⁶

This characteristic of the soul is meant indirectly to refute the view of the *Upaniṣadas*, *Naiyāyikas*, *Vaiśeṣikas*, *Sāṃkhya*s, *Mīmāṃsaka*s and the like who hold that the soul is omnipresent.

There are different views about the size of the soul (psychic entity) in *Upaniṣadas*. It has been said that the soul which is *manomaya* is within the heart and is of the size of a grain of rice.⁸⁷ One view describes the size of soul as equal to the thumb.⁸⁸ According to another view the soul is considered to be pervading the whole body.⁸⁹ There is also a view which accepts that soul is all-pervading.⁹⁰

The Buddhists have not said anything precisely about the size of the *citta* (mind) or *viññāna* (consciousness), but the *haday vatthu* (heart) is said to be its locus in some Buddhist works.⁹¹ To admit a soul to be equal in extent to its own body is an isolated conception of Jainas.

The concept, which regards soul as all pervasive, i.e., present everywhere is contrary to our experience. A thing must be located where its qualities are found. For example, a book exists where its form exists and not elsewhere. The measure of a soul is only as much as that of the body it occupies. Hence, there is no soul outside the body it occupies, for its attributes are realized only in that body.

One or two main logics are presented by the *Nyaya* system to prove the veracity of all pervasive nature of soul. Accordingly unless an *atman* (soul) was all-pervasive (*vibhu*), how could it draw the particles of the body in which it has to dwell in the next life?

The *Naiyāyikas* give a further argument: if a soul is accepted as body-sized, it would be *sāvayava*, i.e., with parts just like the body itself. In such a condition soul cannot be said to be internal. The Jain's answer is this that soul has by nature innumerable units (*pradeśas*), and they are parts (*avayavās*) but not in an ordinary sense. The specialty of these soul-units is that at all time they are connected with each-other, by no means can they be separated.⁹² If a body is cut, its parts continue to throb and retain the soul in them. After that, they rejoin the soul of the body from which they are cut. The fact behind it, is that the soul-units retain their connection with the soul as the threads of a lotus-stick remain united even when the stick is cut into two pieces.⁹³

Thus, it becomes quite obvious that Jainism is the only school of Indian philosophy, which holds that the soul is body-sized. Though, as indicated before, the attributes of expansion and contraction do not really belong to the nature of the soul. Only due to the accretion of karmic particles, a

mundane soul occupies a particular size corresponding to the body. Hence, in the liberated state these characteristics are absolutely absent.

Relation between Soul and Matter

The problem of soul-body relationship is discussed in many ways sometimes as the relation between soul and matter and sometimes as mind-body relationship. Metaphysically if we think of soul and matter, we find that the soul and matter are absolutely different entities. The soul is sentient while matter is non-sentient. As the *Sthānāṅga Sūtra*⁹⁴ declares that the sentient can never become non-sentient and the non-sentient can never become sentient. Under such circumstances, can there be any kind of relationship between them, eternally independent elements as they are?

The Bh.S⁹⁵ answers to the problem in different contexts at many places. At one place it refers to them as enjoyer and enjoyed respectively. At another place it discusses the problem as the interaction between soul and matter. And yet at another place it deals with the problem as the soul-body relationship.

The relationship becomes clear when it is asked whether a soul and matter can bind each other, contact each other, pervade each other and stick together through mutual attraction and identification.⁹⁶

Lord Mahāvīra replied positively.⁹⁷ There is a close relationship between the two principles: soul and matter. Because of this relationship souls fall in two categories viz., 'associated with matter' and 'disassociated from matter'.⁹⁸ The souls that are mingled with matter are called worldly or bound souls. Souls untouched by matter are called liberated.

How matter attaches to soul is depicted in the Bh.S through an example of a boat full of water. The example presented by Lord Mahāvīra before his disciple Indrabhuti Gautama is as follows:⁹⁹

"Suppose there is a lake that is full, full to the brim, overflowing, ever swelling and evenly full of water like a pitcher.

Now, some person floats a giant boat with hundred inlets and hundred pores. In such situation, O Gautama, does the boat with water constantly flowing in through the inlets and the pores continue to remain full, full to brim, overflowing, over swelling and evenly full of water like a pitcher?

Yes, it does so.

For this reason, Gautama, it is said that the souls and material bodies exist bound with each other, in contact with each other, pervading each other, stuck with each other through mutual attraction and mutual identification."

The souls entangled in worldly life are so intimately mixed up with matter that they cannot be defined independent of it. Due to this close

relationship the Bh.S⁹⁹ mentions that soul can be identified through five types of colour, two types of smell, five types of taste and eight types of touch.

Acharya Siddhasena Divākara¹⁰⁰ has considered the relation between soul and matter from the non-absolutistic standpoint. As he says: Soul and matter intermixed like milk and water, so it is improper to distinguish them as soul or matter. The physical organism, childhood, youth, etc., belong to the body, but it cannot be said that they are not influenced by the soul. Likewise soul has the modes of sensual knowledge, memory etc. which cannot be characterized as uninfluenced by matter. Thus we find relationship between soul and matter, inspite of having very different natures.

The question is whether the nature of the relationship between the soul and matter is 'material' or 'non-material'? In its worldly career, the soul is not absolutely non-material. According to the Bh.S this relation is bilateral. It is not exclusively due to the soul or due to the matter. Soul and matter are involved as co-operative partners. This follows from the phrase "*aṇṇamaṇṇasinehapadibaddhā*."¹⁰² It means that the soul has affection which attracts and assimilates, and matter has an affection which gets attracted and assimilated. This bilateral 'affection' establishes intimate relationship between the two. The relationship has been conveyed through the five expressions: bondage, contact, pervasion, affection and identification.¹⁰³ According to Acharya Amṛtacandra the mode of affection that occurs in the soul is due to its beginning less association with matter.

Mind-body Relationship

We can also discuss this problem under the mind-body relationship, which have haunted philosophers as well as psychologists since ancient times.

We find two words 'Psyche' (*citta*) and 'Mind' (*manas*) as synonyms. It is only the Jain philosophy which regards psyche and mind as two different principles. The former is sentient and while latter is non-sentient.¹⁰⁴ In common parlance, we use 'mind' for 'psyche' considering it as sentient. Thus, in some regards the word 'mind' stands for sentient and the word 'body' stands for non-sentient. Now the problem is how mind and body influence each other and what is the exact nature of their mutual relation. The Jain philosophers are clearer about the view that the soul in its worldly existence is not absolutely different from the material body, though in its true nature it is pure unadulterated sentience. They have mutual relation from the time immemorial¹⁰⁵ and therefore interaction with influence upon each other.

In Western philosophy, the subject of mind-body relation has been a perennial problem. Descartes added a new meaning to the concept of mind. Before him, the philosophers accepted mind and body as two aspects of the same principle, but he considered mind as distinct from the body. Descartes

accepted the independent existence of both. Body is the substance which is the immediate subject of local extension, while mind is the immediate resistance of thought according to Descartes. The influence of mind on body and body on mind occur, according to him, through a little gland situated at the base of the brain' (the pineal gland).¹⁰⁶ Now, according to modern medical science or physiology, it is the hypothalamus through which communication between the limbic system and the brain takes place. Hypothalamus is believed to be the junction of neuro-endocrine system.

For Spinoza, the mind is a finite modification of God, considered under the attribute of thought, and the body is the very same modification of God, considered under the attribute of extension. Mind and body, thus, are the same thing viewed under two different aspects, and both are modifications of the one and same substance, i.e. God. The body is always influenced by the external objects and appears to have new forms without stop. The mind is conversant with these changes. The mind knows the influences of the external objects from the body exactly as they appear and not as they really are. This proves that the body does not influence the mind and vice-versa.

If the difference of soul and body is granted, their union can be explained, according to Leibniz, without the vulgar hypothesis of influence, which cannot be understood, and without the hypothesis of the occasional cause, which calls in a God from the machine (Deus ex machina). For, God has from the beginning fashioned the soul as well as body, with so much wisdom and so much artifice, that from the first constitution or concept itself of either one, everything that happens in the one corresponds perfectly to everything that happens in the other (Pre-established Harmony). Leibniz called this 'the hypothesis of concomitance'. This is true in all substances of the whole universe, but it is not perceptible in all, as it is in the case of mind and body.

The View of Psychology

Psychology also concedes the influence of body and mind on each other. The same question arises there whether body influences the sentient or the sentient influences the body. In modern psychology, the idea of the soul (sentient) is no longer important. In its place has come the notion of self or the 'center of interest'.¹⁰⁷ Often the problem is discussed under the title of mind-body relationship. The thing to be considered is, the nature of relation between the two. According to psychology, they influence each other and cannot be separated from the other. Body and the sentient principle cannot be accepted as absolutely independent. Their relation and mutual influence can be explained only by admitting their relative independence.

The Enjoyer and the Enjoyed

The Sankhya system maintains that *purusa* is not a doer but enjoyer.¹⁰⁸

The whole *prakṛti* (nature) manifests itself for his enjoyment.¹⁰⁹ The question found in the Bh.S. is whether the soul enjoys matter or matter enjoys soul? The reply that was given is—soul enjoys matter and not matter vice-versa.¹¹⁰ Without taking the help of matter, soul in its worldly state cannot move even a single step. Whether it is breathing or thinking or anything else everything is regulated with the help of matter. The sentient principle has the mode of 'enjoyer ship', and the non-sentient has 'enjoyedness'. Because of these modes, relation is established between them. We eat, work, have sensual experience, respiration, speech, thought—all this is the influence of the non-sentient principle on the sentient. We have sensation and knowledge with the help of the brain. The non-sentient body becomes sentient due to the influence of the sentient upon it. The appreciation of the *modus operandi*, according to Acharya Mahapragya, of the relationship between the soul and matter has not only a philosophical value, but it also has a spiritual importance. It is only after the appreciation of this relationship the spiritual discipline, which transcends relation, is thought and mutual influence of objects is feasible.¹¹¹ Concluding the discussion it can be said that-

1. From the non-absolutist viewpoint, the sentient and non-sentient principles are not absolutely different; so a relationship is possible between them.
2. In worldly life, the existence of soul is not free from matter. The worldly soul is not pure, but a mixture of spirit and matter.
3. The problem of relationship becomes complex and insolvable, if the sentient and non-sentient principles are regarded as absolutely incompatible, and the worldly soul as absolutely pure.
4. The spiritual discipline that discriminates between the sentient and the non-sentient principles is possible only on the recognition of the relative relationship between the sentient and the non-sentient.

Thus, both the principles—soul and matter mind and body co-exist and are able to affect one another. If we do not agree with the dualism we have to face some problems, which have been indicated by Muni Mahendra Kumarji as follows:

“Those who do not believe in the ultimately real dualism i.e., separate existence of the two systems—the (mechanical) physical system i.e., the *body* and psychical entity or system i.e. the soul—cannot find the connection which subsists, as an actual fact, between body and soul but are forced to invent a connection in keeping with the general scheme of physical and psychological hypotheses.”

The same view is found in the following passage of Avenarius.

“Let an individual M denote a definite whole of 'perceived

things' (trunk, arms and hands, legs and feet, speech movements, etc.) and of 'presented thoughts' as I,..... then when M says 'I have a brain', this means that a brain belongs as part to the whole of perceived things and presented thoughts denoted as I. And when M says 'I have thoughts' this means that the thoughts themselves belong as a part to the whole of perceived things and presented thoughts denoted as I. But though thorough analysis of the denotation of I thus leads to the result that we have a brain and thought, it never leads to the result that the brain has the thoughts. The thought is no doubt, a thought of 'my ego' but not a thought of 'my brain' any more than my brain is the brain of 'my thought'. i.e., the brain has no habitation, seat, generator, instrument or organ, no support or substratum of thought. Thought is no indweller or commander, no other half or side, and also no product, indeed, not even a physiological function or so much as a state of a brain."

The Bh.S, thus, describes many important issues, which are thought-provoking from the biological, psychological and philosophical point of view. In this chapter only a few factors have been presented. There are a lot of things scattered in the Jain philosophy, which can be studied in the light of modern researches and are of paramount importance from biological point of view. In the short compass of this chapter all that could not be dealt with. They require one separate research thesis. Though J.S.Sikdar had thrown light on some of them in his book 'Jain Biology' yet, many subjects remain to be discussed such as, what is the primary undeveloped stage of the living being? How many birth-places (yoni) are there ? How many kinds of births are there? If these problems are studied in the light of modern researches, there may emerge some surprising facts in the field of Biology, Botany etc. For example, the astonishing thing that is coming into light today is the 'cloning system'. The question posed before philosophy, is whether it is possible to create life by a single cell through artificial means? As far as the Jain Biology is concerned, Sthānāṅga Sūtra¹¹³ mentions a kind of birth in which one can be a copy of someone as found under cloning system. Moreover, we cannot create life but we can create conditions in which life emerges.

Scientists only fulfill the required conditions for life to take birth. Thus by 'cloning' they are only creating the place of origination (birth-places) of life. The Jain scriptures mention for categories of three types, birth-places (yoni) viz; animate or inanimate, cold or hot, covered or uncovered as well as endowed with plausible combinations. Besides, the birth can be of three kinds such as vertebrate (garbhaja) spontaneous (upapāta) and accomplished or invertebrate (samūrccchima). As above the Bh.S describes other categories of living beings which are equally important.

References

1. S arvadarśanasāṅgraha; p.7—caturbhyaḥ khalu bhūtebhyascaitanyaṃpajāyate.
2. The Greek Thinkers; p.48
3. *Ibid*; p.53-54-55
4. *Ibid*; p.56
5. *Ibid*; p.63
6. Sūtrakṛtāṅga Niryukti; Gāthā; 117-120
7. B h.S; 8/10/499-500-502—Goyamā! jive, poggale vi. siddhe ṇaṃ bhante! kim poggale? poggalī?
Goyamā! no poggale, poggalī.
8. Sthānāṅga Sūtra; 2/417-419—ke ayam loge? jīvāceva, ajīvāceva. ke sāsayaḥ loe? jīvāceva, ajīvāceva.
9. Bh.S; 1/4/191-99; 18/7/135; 28/2/9
kativihā ṇaṃ bhante! davvā paṇṇattā?
Goyamā! duvihā davvā paṇṇattā, taṃ jahā—jīvadavvā ya, ajīvadavra ya.
10. Āyāro; 1/27-42-73-109-152—jamiṇaṃ virūvarūvehiṃ satthehiṃ vaukamma-samārambheṇaṃ vāusatthaṃ samārambhamāṇe aṇṇe vaṇegarūve pāne vihinsati, etc.
11. Dasaveāliyaṃ; 4/3-9—puḍhavi cittaṃantaṃmakkhāyā aṇṇegajīvā puḍhosattā aṇṇathasatthapariṇaṇṇaṃ, etc.
12. Aitareya Brāhmaṇa; 1/1/1/11-13
13. Bh.S; 18/7/134-142—kesa ṇaṃ tumaṃ Maddhuya! samaṇovāsayaṃ bhavasi, je ṇaṃ tumaṃ eyamaṭṭhaṃ na jāṇasi na pāsasi?
14. Viśeṣāśyaka Bhāṣya; 1559—jīve tuha sandeho paccakkhaṃ jaṃ na ghippai ghaḍovva / accantapaccakkhaṃ ca natthi loe khapupphaṃ va //
15. Bh.S; 18/7/140—jati kajjaṃ kajjati jāṇāmo-pāsāmo, ahe kajjaṃ na kajjati na jāṇāmo na pāsāmo.
16. (i) Bh.S; 8/2/96—uppaṇṇaṇṇadaṇṇadhare..... jāṇai-pāsai,..... jīvaṃ aśarīrapadibaddhaṃ.
(ii) Pravacanasāra; 1/32—...kevalī bhagavaṃ peccadi samantado so jāṇādi savvaṃ niravasesaṃ
17. Viśeṣā; 1554—Goyamā! paccakkhu ceiya jīvo jaṃ saṇsayāi-viṇṇaṇaṃ / paccakkhaṃ ca na sajjhaṃ jaha suha-dukkhā sadehammi //
18. *Ibid*; 1556—kaha paḍivaṇṇamaḥam tiya kimappi natthi tti / sansao kaha nu? sai sansayamma vāyaṃ kassāim paccāo jutto //
19. Sāṃkhyakārikā; 17—saṅghātaparārthatvāt triguṇadviparyayādadhīṣṭhānāt / puruṣo'sti bhoktṛbhāvāt kaivalyārtham pravṛtteśca //
20. Viśeṣā; 1557—jai natthi sansai cciya kimatthi natthi hi sansao kassa / sansac va sarūve Goyamā! kimasansayaṃ hojjā? //
21. (i) Saṃmatitarka; 1/2—davvaṃ pajjavaviuaṃ davvaviutta ya pajjavā natthi/
(ii) Syādvādamañjarī; p.19
(iii) Saḍadarśanasamuccaya; 9—
yatraya yo dṛṣṭaguai sa tatra kumbhadivanniṣpratipak ṣametat /
tathā'pi dehābahirātmataṭṭva-matattvavādāpahatāi pathanti //

22. (i) Bh.S; 8/2/104; 13/4/59—jīvatthikāeṇaṃ jīve aṇantāṇaṃ
ābhiṇibohiyaṇāpajjavāṇaṃ.....
(ii) Viśeṣā; 1558—nānādao na dehassa muttimattāio ghaḍasseva /
tamhā nāṇaiguṇā jasa sa dehāhio jīvo //
23. Bh.S; 18/4/88; 7/1/16-21; 6/10/184; 20/3/20—..... pāṇāvāe jāva savve te
nannattha āyāe pariṇamanti.
24. *Ibid*; 2/10/135; 2/10/128—guṇao uvaogagūṇe.
25. *Ibid*; 20/3/17—..... jīve i vā, jīvatthikāe i vā, pāṇe i vā, bhūe i vā, satte i vā,
viṇṇu i vā, veyā i vā, ceyā i vā.....
26. (i) Āyāro; 5/1/04—je āyā se viṇṇāyā, je viṇṇāyā se āyā / jeṇa vijānati se āyā //
(ii) Bh.S; 6/10/174—Goyamā! jīve tāva niyamā jīve, jīve viniyamā jīve.
27. Samayasāra; 1/49—arasamarūvamagandhaṃ avvattaṃ cedaṇāguṇamasaddaṃ.
28. Nandī; 71—savvajivāṇaṃ pi ya ṇaṃ—akkharassa
aṇantamobhāgoniccuggāḍio.....
29. (i) Bh.S; 19/8/100; 20/3/20—sāgārovaoge, aṇāgārovaoge.....
(ii) Illu. of J.T.; 2/4—sākāro' nākaraśca.
30. (i) Tattvā. Sū.; 2/8—upayogo lakṣaṇaṃ.
(ii) Pañcāstikāya; 27—jivotti havadi cedā upaogavisesido.....
31. Bh.S; 8/2/97—pancavihe nāṇe paṇṇatte, taṃ jahā—ābhinibohiyaṇāṇe, suyaṇāṇe,
ohiṇāṇe, maṇapajjavāṇāṇe, kevalaṇāṇe.
32. *Ibid*; 8/2/174/175; 8/2/99—maiaṇṇāṇe, suyaṇṇāṇe vibhaṅgaṇṇāṇe.
33. (i) *Ibid*; 8/2/176—maṇojogī, vaijogī, kāyajogī vi.
(ii) Sthānāṅga sūtra; 3/13-14
34. Bh.S; 1/5/201-209—tītaṃ aṇantaṃ sāsayaṃ samayaṃ, puḍuppanṇaṃ vā sāsayaṃ
sāmayaṃ..... je kei..... savvadukkhāṇaṃ antaṃ kareṇsu vā, karenti vā,
karissanti vā, savve te..... keval bhavittā tao paccha sijjhanti.
35. (i) Bh.S; 1/5/250—vaṇassaikāiyā jahā puḍhavikāiyā.
(ii) Āyāro; 1/110-113—appege sampamārae, appege uddave.
36. Pravacanasāra; 1/72—uvaogo havadi jivāṇaṃ
37. Scientific Contents in Prakṛta Canons; p.376
38. Āyāro; 4/1—savve paṇā save bhūtā savve jīvā savve sattā.....
39. Acharya Mahapragya, Ācārāṅga Bhāṣyam ; p.47
40. Bh.S 2/1/14/15—
jamhā āṇamai vā, pāṇamai vā, ussasai vā, nīsasai vā tamhā pāṇei tti.....jamhā
bhūte bhāvissati ya tamhā bhūte tti.....
jamhā jīve jīvati āuyāṃ ca kammaṃ uvajivati tamhā jīve tti.....
jamhā satte subhāsubhehiṃ kammehiṃ tamhā satte tti.....
41. Bh.S; 2/1/15
42. Pravacanasāra; 2/55—
pāṇehiṃ caduhim jīvadi jīvassadi johi jīvido puvvaṃ.
43. Dhavalā; pp.257-258; p.313
44. (i) *Ibid*;
(ii) Pañcāstikāya; 30—pāṇehiṃ caduhim jīvadi jīvassadi jo hu..... /
balamindiyamāu ussāso //

45. Amṛta kalaśa; p.321-324
46. Bh.S; 8/1/18-66—pajjattā ya apajjattā ya.
47. Jīvābhigama; chapter, 4,5
48. *Ibid*; 6/4/63—
..... āhārapajjattie, sarīrapajjattie, indiyapajjatie, ānāpānapajjattie..... bhāsā-
manapajjattie.....
49. Jīvābhigama; Chapter, 4,5
50. (i) Ṣaṭkhaṇḍāgama; 1/1/34-35
(ii) Mūlācāra; 1045—
āhāre ya sarire taha indiya āṇapāṇa bhāsāe /
honti maṇo vi ya kamaso pajjatti jīṇakkhādā //
51. Illu, of J.T; 10/3—
bhavārambhe paudgalikasāmṛthyanirmāṇaṃ paryāpatih.
52. Bh.S; 6/4/63
53. Illu. of J.T.; 3/11 Vrtti
54. Mūlācāra; 104
55. Scientific Con.; p.382
56. Dhavalā; p.257-258
57. Sarvārthasiddhi;
58. Tattvārtha Rājavārtika;
59. Illu. of J.T.; p.53
60. Mind Alive; I; p.22
61. Illu. of J.T; p.53
62. *Ibid.*, 3/12—tadapekṣiṇī jīvanaśaktiḥ prāṇaḥ.
63. Jīvājīva; p.23
64. Amṛta-kalaśa, I, p.264
65. Bh.S; 3/117—tae ṇaṃ tisae deve..... pañcavihe pajjattie.....
66. Scientific Con.; p.384
67. Tattvā. Rājavā; II; p.451,471,473
68. Scientific Con.; p.384-385
69. Nandī; 61
70. Bh.S; 7/161—
dasa saṇṇāo..... āhārasaṇṇā, bhāyasaṇṇā, mehuṇasaṇṇā, pariggahasāṇṇā,
kohasaṇṇā, māṇasaṇṇā, māyasaṇṇā, lobhasaṇṇā logasaṇṇā, ohasaṇṇā.
71. Comm. of Sthā. Sū; patra 479
72. Tattvārthādhigamasūtram; 1/4 ṭīkā; p.79
73. Sthānāṅga Sūtra; 4/4/578—
cattāri saṇṇāo paṇṇāttāo, taṃ jahā—āhārasaṇṇā, bhāyasaṇṇā, mehuṇasaṇṇā,
pariggahasāṇṇā.
74. Dhavalā; p.412,415
75. Ācārāṅga;
76. Acharya Mahapragya, Bhagavaī Bhāṣya (unpublished)

77. Scientific Con.; p.386
78. *Ibid*; p.386
80. Bh.S; 7/8/159—
jīve vi..... asāmkhejjehim jīvapadesehim.....
81. (i) *Ibid*; 2/2/74
(ii) Illu. of J.T.; 7/29,30 Vrtti
82. *Ibid*; 1/25—
asāmkhyeyāḥ pradeśāḥ dharmadharmalokākāśaika jīvānām.
83. Bh.S; 7/8/159
84. *Ibid*; 7/8/159
85. *Ibid*; 7/8/154-159
86. *Ibid*; 8/3/222—
duha va tiha va sāmkejhaha va chinnanam je antara te vi ṇam tehim jīvapadesehim
phuḍā?
hantā phuḍā.
87. Upaniṣad; 5/18/1—pradeśamātram.
88. Kāthopaniṣad; 2/3/17
89. (i) Muṇḍaka...; 2/2/7—..... pratiṣṭhito' nne.....
(ii) Taittirīyopaniṣad; 2/3—sarīra ātmā.....
(iii) Chandogya Up.; 3/14/3
(iv) Kāthopaniṣad; 1/2/22—mahanta vibhumātmānam.....
90. (i) Ṛksanhitā; 10/90/2—
puruṣa evaitat sarvaṃ yadbhūtaṃ yacca bhāvyaṃ sa eva hi
sākalalokasargasthitipralayahetuḥ.
(ii) Muṇḍakopaniṣad; 1/1/7—
yathornabhi srjate grhṇṇte ca yathā pṛthivyāmauśadhayaḥ sambhavanti /
yatha sataḥ puruṇāt keśalomāni tathā'kṣarāt sambhavatīha viśvam //
91. Visuddhimaggo; 14/60; 17/163 etc.
92. Bh.S; 8/3/223
93. Tattvārthādhi.; 5/16; p.336
94. Sthānāṅga Sū.; 10/1
95. Bh.S; 25/2/17; 1/7/312; 8/3/158-159
96. *Ibid*; 1/6/312—
atthi ṇaṃ bhante! jīvā ya poggalā ya aṇṇamaṇṇabaddhā, aṇṇamaṇṇapuṭṭhā,
aṇṇamaṇṇamogaḍḍhā, aṇṇamaṇṇasiṇehapaḍibaddhā aṇṇamaṇṇaghadattāe ciṭṭhanti?
97. *Ibid*; 1/6/312—hantā atthi.
98. Tattvā. Sū.; 2/10—saṅsāriṇo muktāśca
99. Bh.S; 1/6/313
100. *Ibid*; 12/6/119
101. *Ibid*; 8/10/499-500
102. Bh.S; 1/6/312-313
103. *Ibid*; 1/6/312-313

104. (i) Bh.S; 13/7/126— no āyā maṇe, aṇṇe maṇe, rūviṃ maṇe,..... acitte maṇe.
(ii) Illu. of J.T.; 2/22—maṇovākkāyapravartakaṃ niścayātmakaṃ jñānaṃ cittaṃ.
105. *Ibid*; 1/10—saṅyogaścāpaścānupūrvikaḥ.
106. Darśanaśāstra kā Paricaya; p.247
107. Some Problems in Jain Psychology; p.1
108. Sāmkhyakārikā; 17,19—
puruṣo'sti bhokṭṛbhāvāt..... akartṛbhāvśca //
109. *Ibid*; 21
110. Bh.S; 25/1/17—
jīvadavvāṇaṃ ajivadavvā paribhogattāe havvamāgacchanti, no ajīvadavvāṇaṃ
jīvadavvā paribhogattāe havvaṃ agacchanti.
111. Acharya Mahapragya, Bhagavaī Bhāṣya (unpublished)
112. Neuroscience & Karma; p.xxviii
113. Sthānā. Sū., 4/642

7

Conclusion

It is not easy to summarize and interpret the philosophical as well as scientific concepts embedded in a staggeringly vast, and exhaustive work, the Bhagavati Sutra, within a short thesis; yet, it is sufficient to interpret the hitherto unknown doctrines and present their relevancy and validity in the context of modern scientific discoveries. I have chosen a few topics, which are ever fresh, and not to be relegated to the background as outdated. The Jain philosophers, Mathematicians, Astrologers, Geographers, etc. had a clear vision of the formation of the Universe. They never accepted the doctrine of any creator or God and held the view that the universe is beginningless and endless. They realized the futility of speculations, and hence concentrated their intellectual power on understanding the mystery of life and existence. In the process of their rigorous thinking, they were never dogmatic but very meticulous and had a scientific analysis of problems besetting life. In each and every chapter, one can discern knotty problems and my efforts at their interpretation. The solutions offered to these problems in the Bh.S. are only scattered and in order to develop an integrated and consistent meaning I had to deal with these problems in a more systematic and objective manner. Psychology, Biology, Geography, Cosmology and Mathematics have been handled objectively.

In this thesis a humble attempt has been made to espouse the doctrines spread in the Bh.S and interpreted them as far as possible in the light of modern scientific theories.

The Eastern spiritual philosophies are concerned with the timeless supra-sensory knowledge which lies beyond logical reasoning and is not amenable to verbal expression. In the Eastern Philosophies, the Jain philosophy is primarily one that is concerned with such knowledge that is beyond the sense organs and mental approach. That's why whatever has been

presented here is not an outcome of a rigorous scientific pursuit but only a product of a hypothesized interpretation of relevant concepts inshrined in Bh.S. vis-a-vis, modern scientific developments that have taken place in Physics, Chemistry, Biology, and Mathematics etc. It is an attempt to see the harmony, to some extent, lying between principal theories and model of modern physics and the views of the Jain thinkers. One motivating factor, which has worked behind this thesis, is to mention something unknown or unpopular regarding the atomic properties, cosmology, matter, universe, the structure of a living organism etc. to the scientists like Physicists. So that they can pay attention to this philosophy and take help from it for their concerning subjects or problems.

According to Non-absolutism every statement has partial truth. Each and every branch of knowledge is nothing but a search for truth. Whether it is scientific view or spiritualistic view all emphasize different aspects of one truth. All are valid and useful in the context in which they arose. All of them, however, are only descriptions or representations of reality and are, therefore, limited. None can give a complete picture of the world.

Fritjof Capra concluding his book 'The Tao of Physics' expressed the difference between the approach and subject of physics and that of philosophy. This is the reason, whatever invented by spiritual experience or 'organic' worldview, as he named, cannot be proved thoroughly by the mechanistic worldview of classical physics. It will be better to refer his view as it is. The view follows:

"The mechanical world view of classical physics is useful for the description of the kind of physical phenomena we encounter in our everyday life and thus appropriate for dealing with our daily environment, and it has also proved extremely successful as a basis for technology. It is inadequate, however, for the description of physical phenomena in the sub-microscopic realm. Opposed to the mechanistic conception of the world is the view of the mystic, which may be epitomized by the word 'organic', as it regards all phenomena in the universe as integral parts of an inseparable harmonious whole. This worldview emerges in the mystical traditions from meditative states of consciousness. In their description of the world, the mystics use concepts that are derived from these non-ordinary experiences and are, in general, inappropriate for a scientific description of macroscopic phenomena. The organic worldview is neither advantageous for constructing machines nor for coping with the technical problems in an overpopulated world. Nevertheless, like non-absolutistic worldview he accepts that both the mechanistic and the organic views of the universe are valid and useful; the one for science and technology, the other for a balanced and fulfilled spiritual life. Beyond the dimensions of our everyday environment, however, the mechanistic concepts lose their validity and have to be replaced by organic concepts that are very similar to those used by the mystics. This is

the essential experience of modern physics that has been the subject of our discussion. Physics in the twentieth century has shown that the concepts of the organic worldview, although of little value for science and technology on the human scale, become extremely useful at the atomic and subatomic level. The organic view, therefore, seems to be more fundamental than the mechanistic. Classical physics, which is based on the latter, can be derived from quantum theory, which implies the former, whereas the reverse is not possible. This seems to give a first indication why we might expect the worldviews of modern physics and eastern mysticism to be similar. Both emerge when one enquires into the essential nature of things—into the deeper realms of matter in physics; into the deeper realms of consciousness in mysticism—when one discovers a different reality behind the superficial mechanistic appearance of everyday life.”

In spite of different approaches of physicists and mystic's one thing that inspires us to study science and philosophy is their method to observe reality. The chief method used by the Eastern philosophical systems is supra sensory or intuition. However, the Jain philosophy lays more emphasis on supra sensory to have the correct vision of Reality. On the other hand, various scientists have used intuition in a different way; for example, Einstein is more explicit in admitting the role of Intuition. Bergen, professor of Biology and Physics, has sublimated the status of Intuition in his philosophy. Scientists like Eddington, James Jeans and Whitehead have assigned the role of insight and intuition to the major discoveries and original writings in the field of science. Undoubtedly Eddington stands as a towering personality in espousing the role of consciousness.

The crux of Eddington's argument is rooted in his conviction that the internal power of 'the mind is the supreme one beyond which there is no other power'. Similarly, James Jeans has accounted for some invisible force behind the mental powers of man. Unlike the views maintained by Western scientists, Eastern mystics with the comprehensive enlightenment could perceive directly and formulate such theories that are wonder evoking and thought provoking.

Yet, most of the schools of philosophy are of the view that speculative daring is necessary to broaden the vision and strengthen the understanding and deepen the knowledge of physical as well as spiritual world. Scientists, mathematicians, Astronomers are of the view that the whole universe is interconnected and inherently coherent system. It is not an exaggeration and myth-oriented humbug. The question arises whether such a coherent system can be an object of experience. The Jain thinkers have made provision for the total grasp of the total reality. The total comprehension of reality or knowledge, in true sense of term must be all embracing.

In the words of Einstein “We can know only the relative truth. The absolute truth is known only to the universal observer.” This comes close to the Jain

doctrine of omniscience (*kevalajñāna*). The perfect knowledge of complete reality seems to be beyond reach for ordinary mortals; but it is a daily and spontaneous experience with the omniscient. The scientific knowledge, on the other hand, interprets the world in ascending (spiral) order of the degrees of truth and reality.

In the Jain doctrine of Logic and Epistemology one can find the exposition almost savagely logical. What the Jains have propounded much of it comes to be validated. The Jain theory of knowledge and reality are complimentary to each other. The theory of *Pudgala* (matter) has been espoused and made the core of Jain doctrine of reality. The 'to reality' approach and its corollary the doctrine of epistemology are well balanced. No where is there any contradiction between these two aspects according to Non-absolutism.

The knowledge of physics and philosophy presupposes an incisive insight into the nature of reality. This gives rise to the problem of unity and plurality. Jain Acaryas have looked upon nature as a system of interconnected events and believed that nothing existed outside this realm. In the words of the German scientist and philosopher the whole universe is one organic unity; as such, nothing lies outside the framework of this grand totality. We find in the absolute systems that the monstrous unity of all the parts of the existence are only postulates. For Hegel, singular parts are not abstract but concrete realities. There is no such thing as the parts torn away from the absolute, but the absolute cannot be thought of in absence of its parts.

Contrast to these views maintained by the absolutists like Bradley, Hegel, Hecke, the Jain non-absolutists emphatically deny the absolute separateness or absolute organic inseparableness. According to the Jain philosopher, the conflicting reals are complementary and supplementary to reality and the world is a systematic whole. It is not a motley crowd (disorganized group) of independent elements; the unity implies the expression of a single element in and through a complex web of constituents' differentiated unity. In a complete system every part has its own significance. The individual elements themselves are nothing but parts of an infinite complexity. The picture of Non-absolutism offers spectacle of unity in which each aspect of reality is in consonance with other aspects. They retain their individuality and persist through their inherent nature. True to their realistic, pluralistic and rationalistic position, the Jain Acharys have presented the theory of Non-absolutism built upon the doctrine of *Pudgala*. But the theory of *Pudgala* itself does not represent the total magnitude of Non-absolutism.

APPENDIX

* *Figures*

* *Bibliography*

The Cosmic Dimension

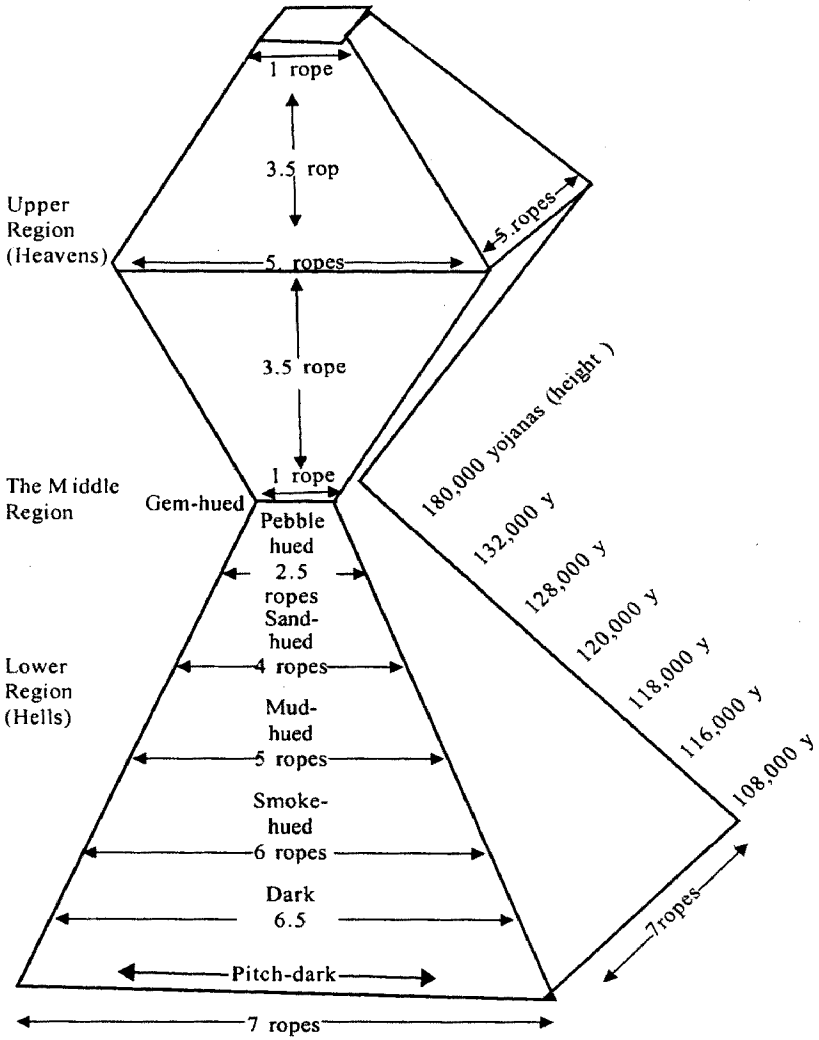


FIGURE-1

Transcosmos

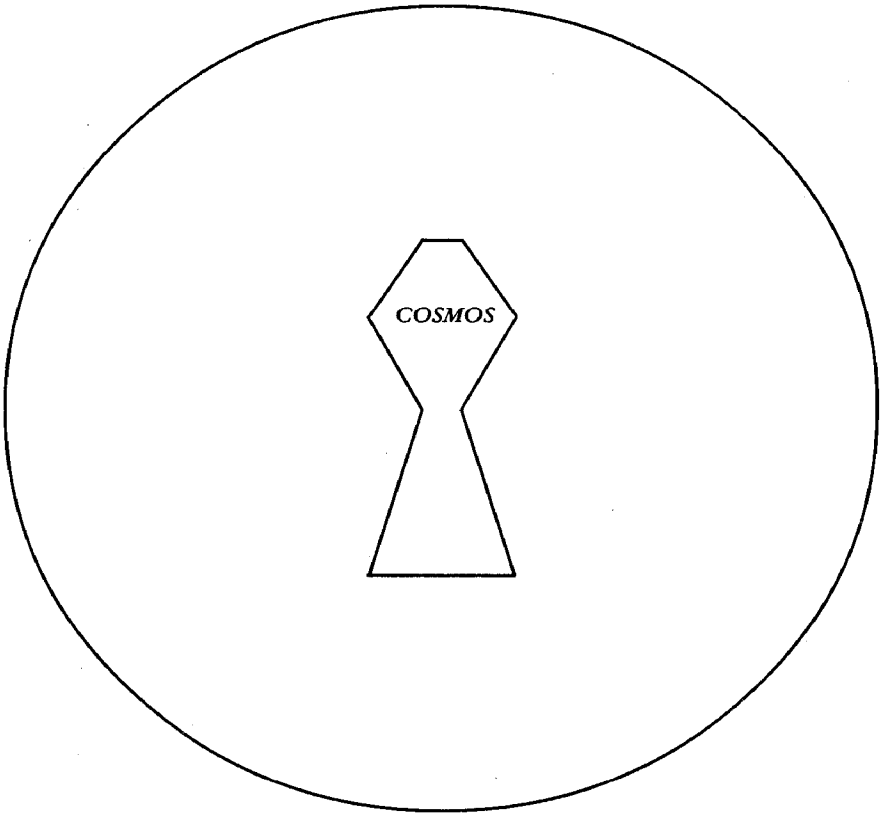


FIGURE-2

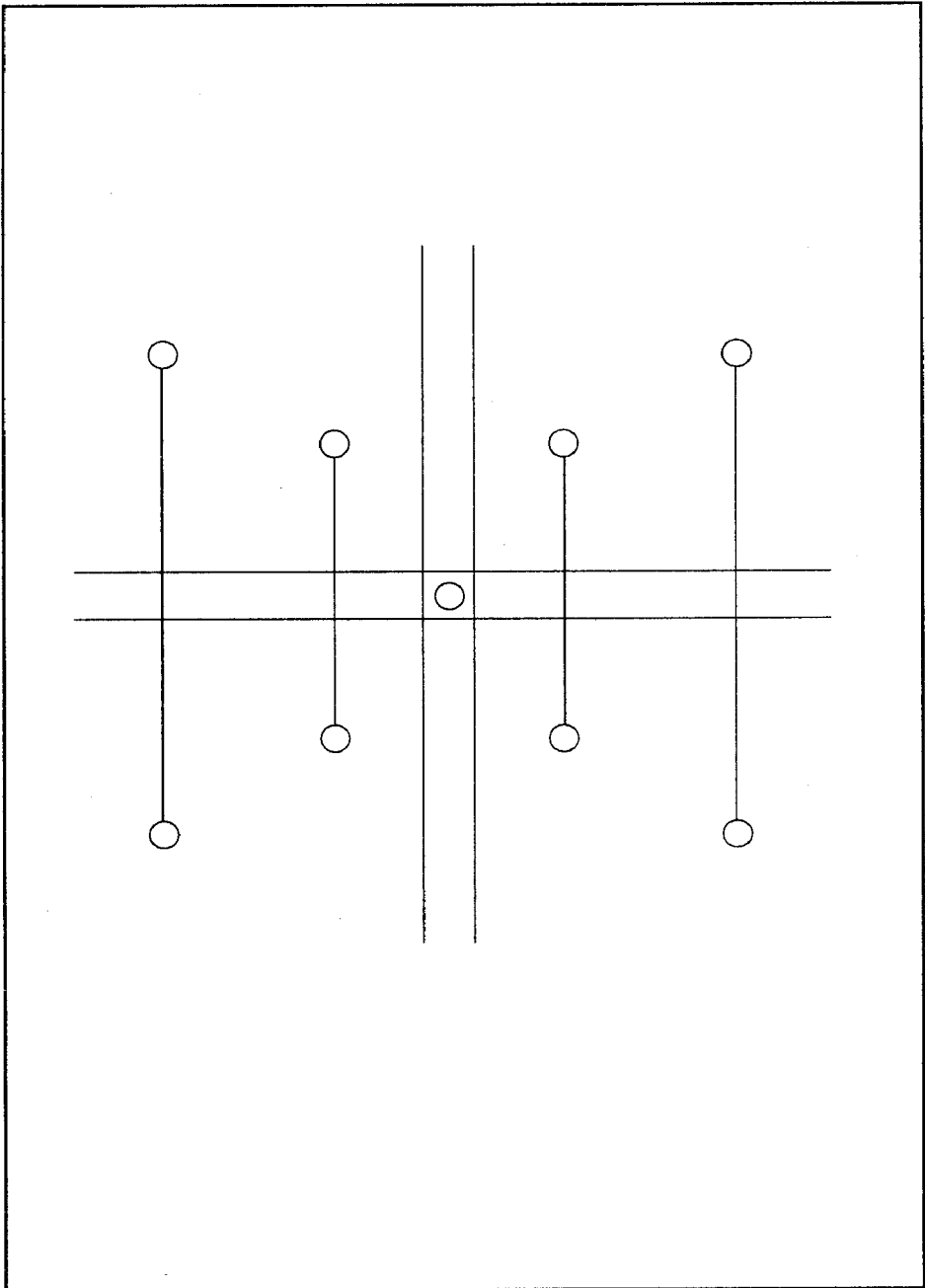


FIGURE-3. Eight-Point Centre (EPC)

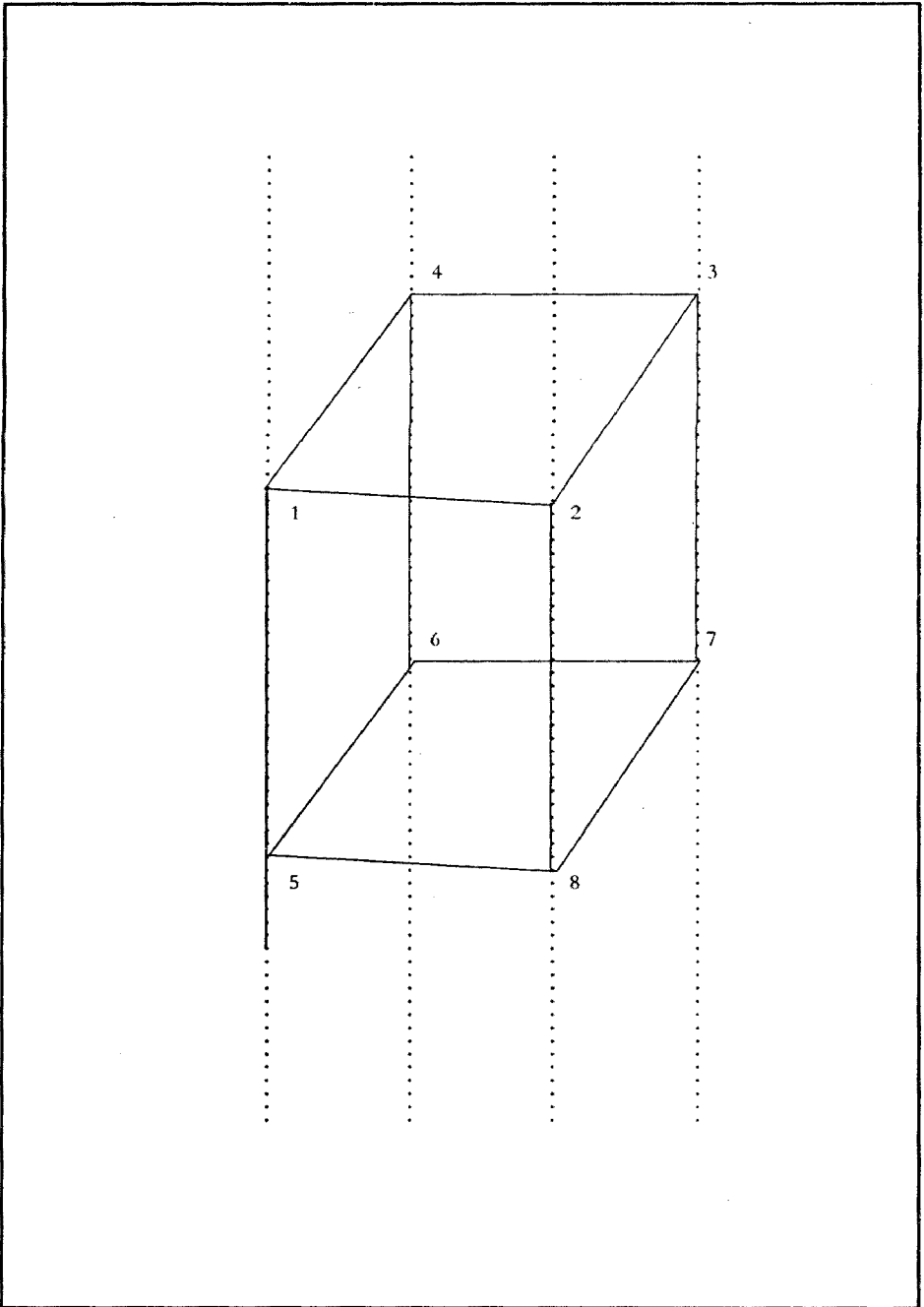


FIGURE-5. Cubical Shape

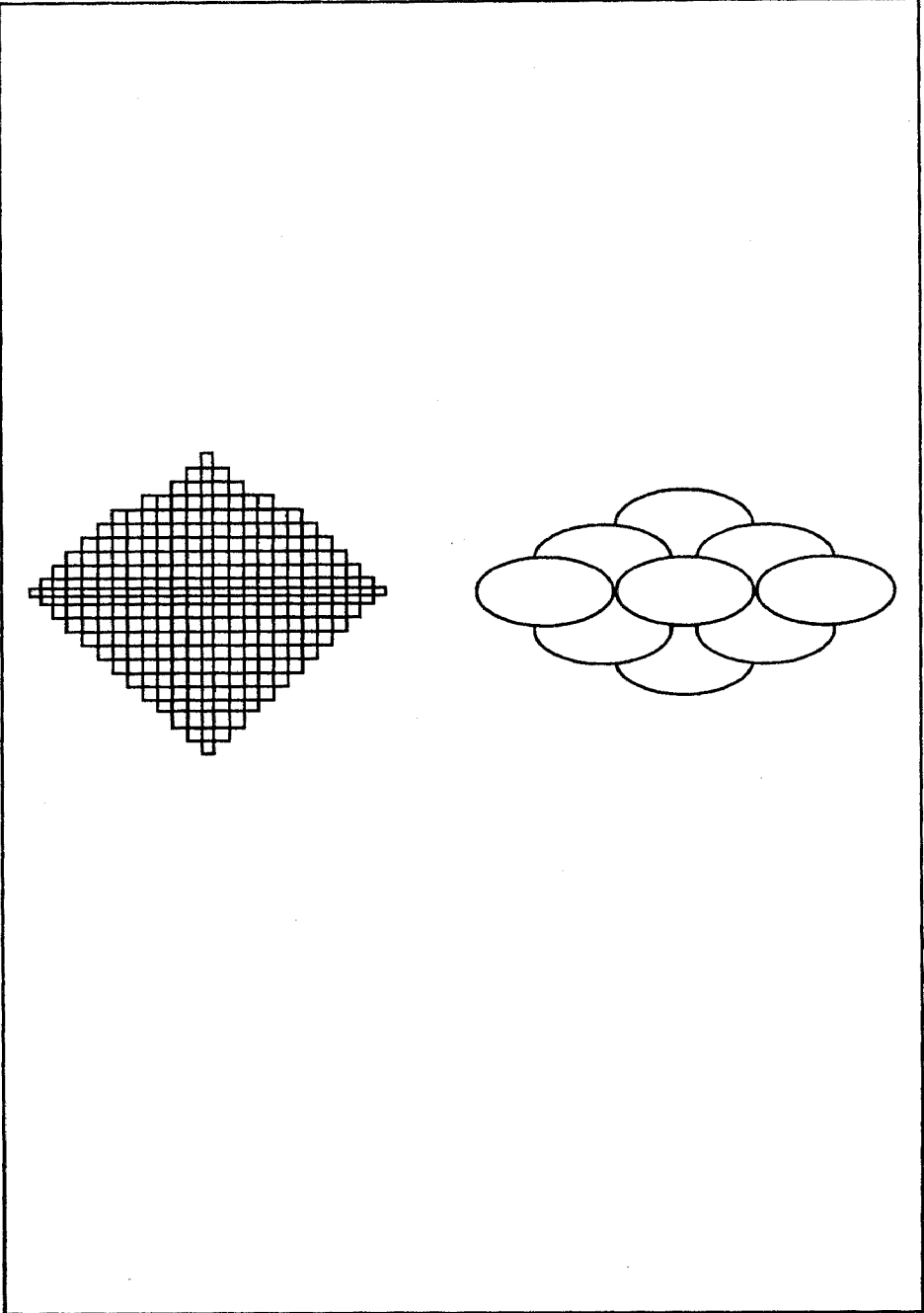


FIGURE-5. Elongation of Main Directions

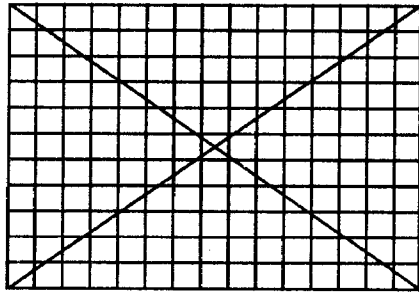


FIGURE-6. Intermediate Directions

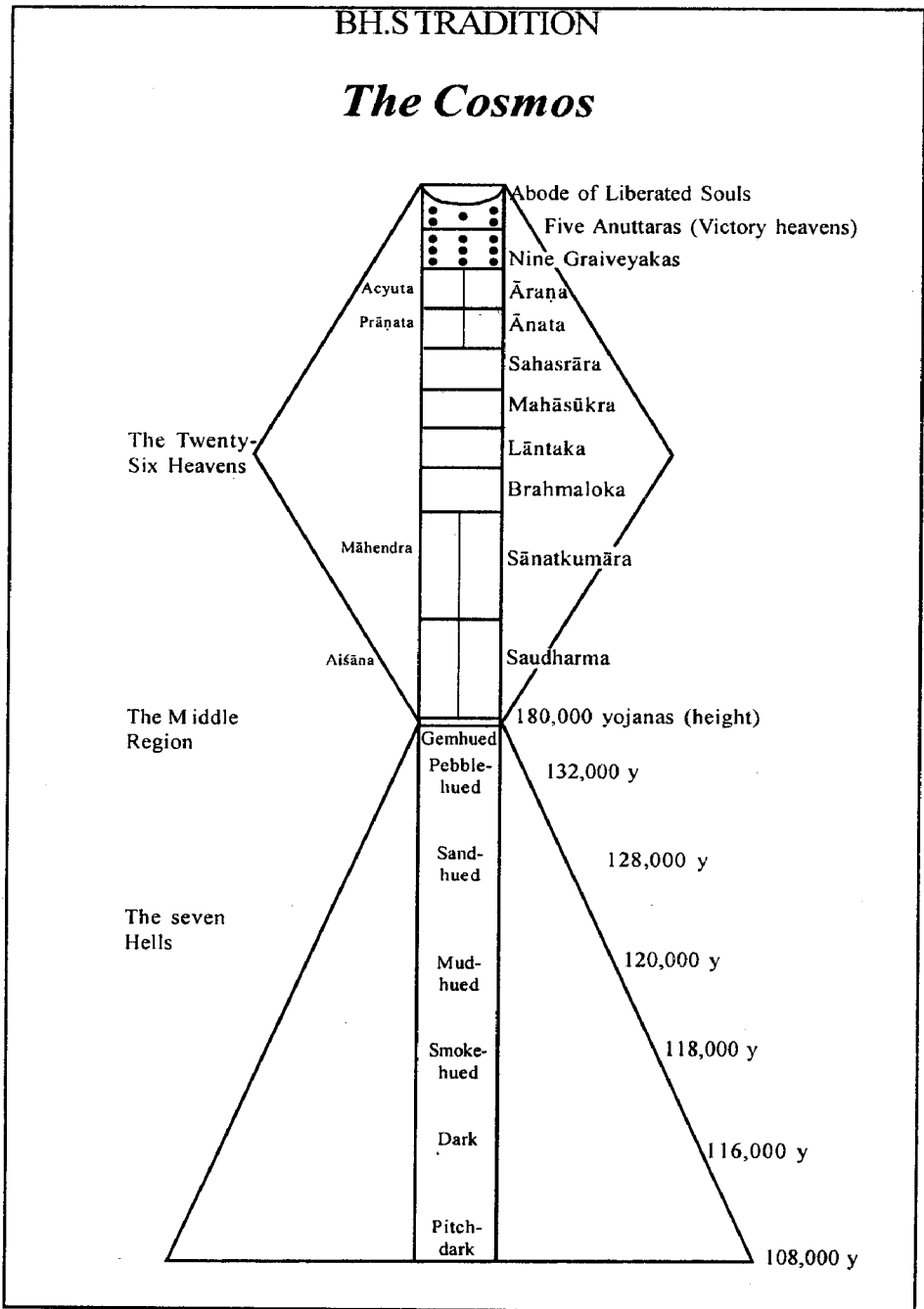


FIGURE-7

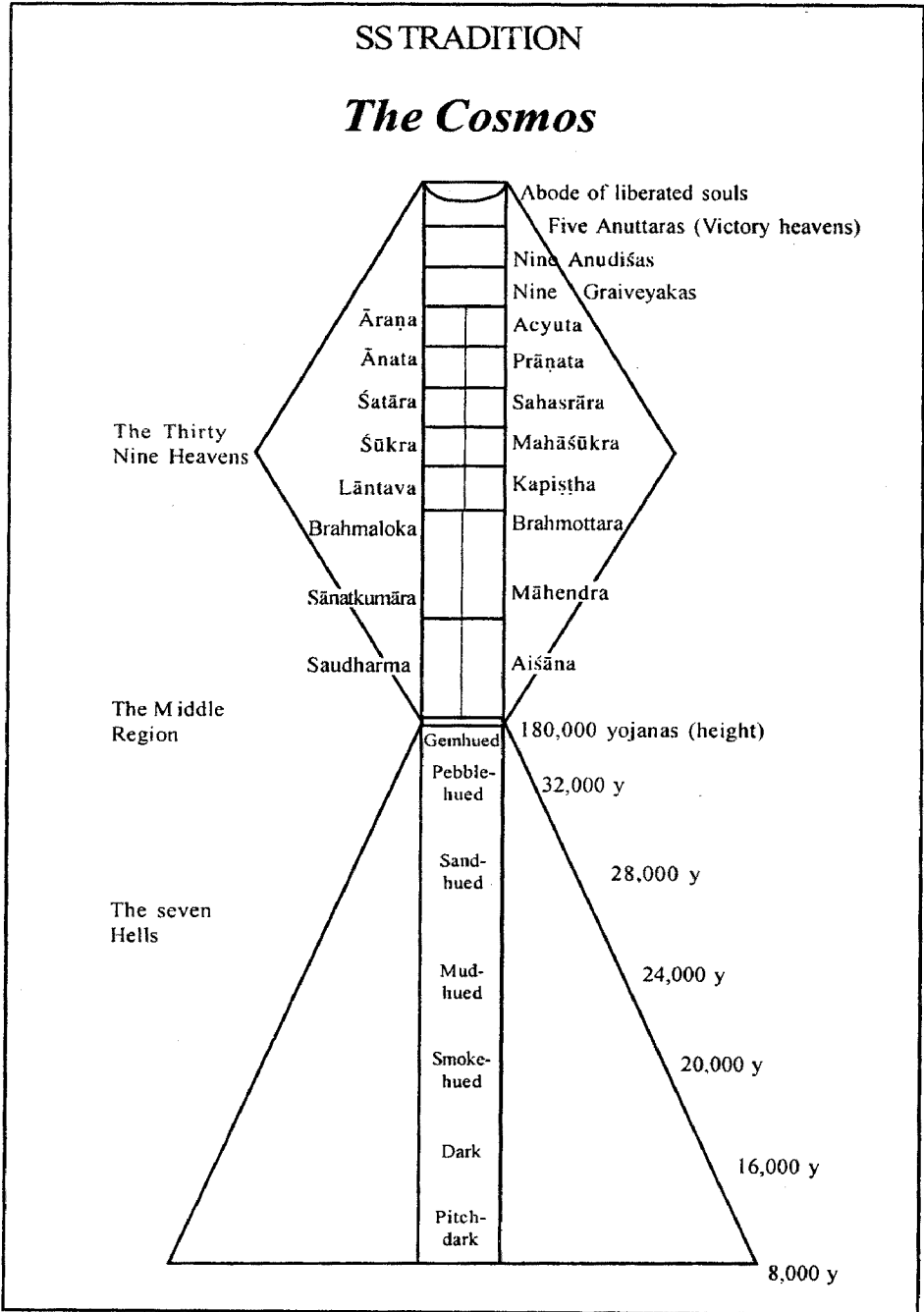


FIGURE-8

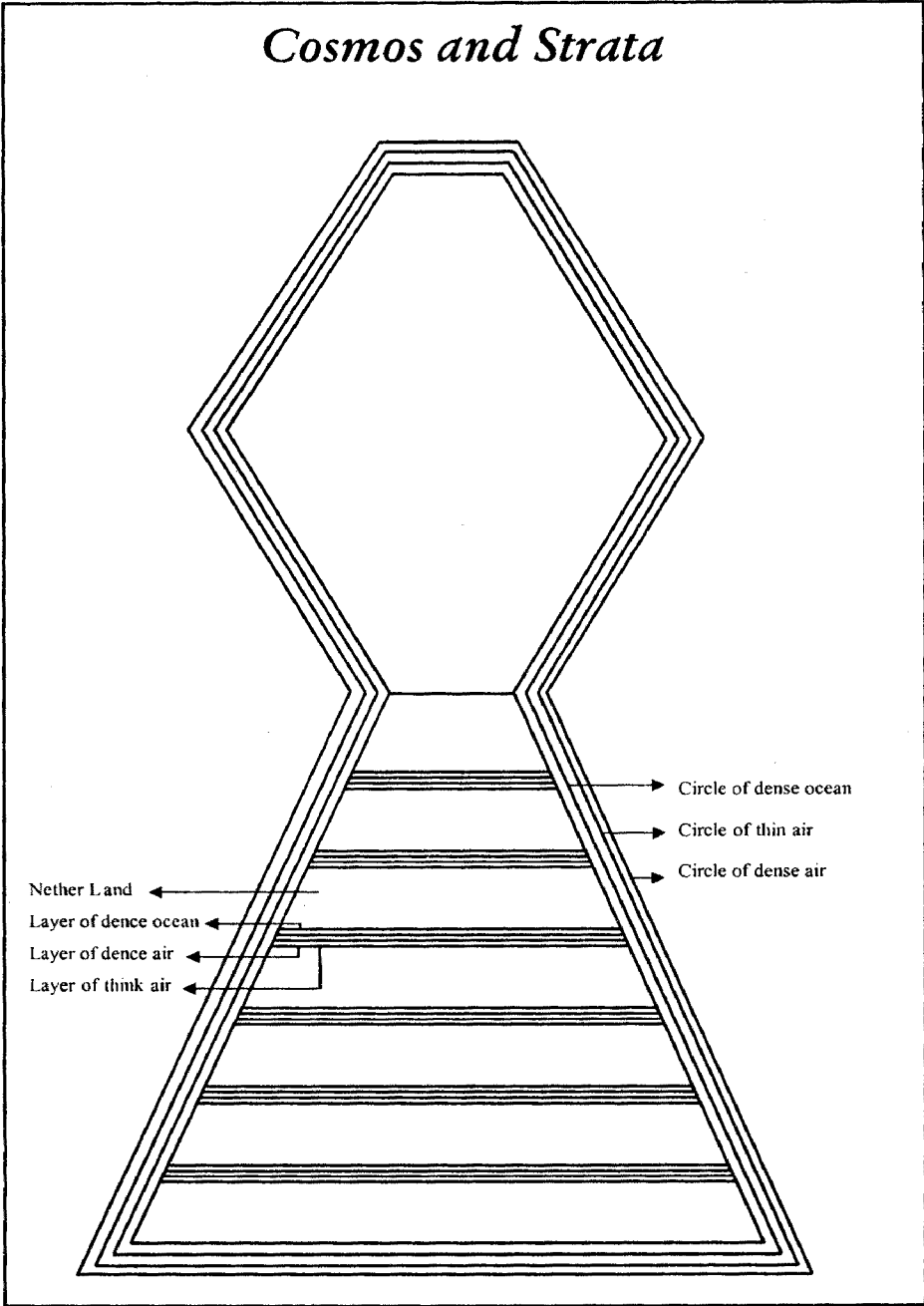


FIGURE-9

*The Islands and Oceans
of the Middle Region*

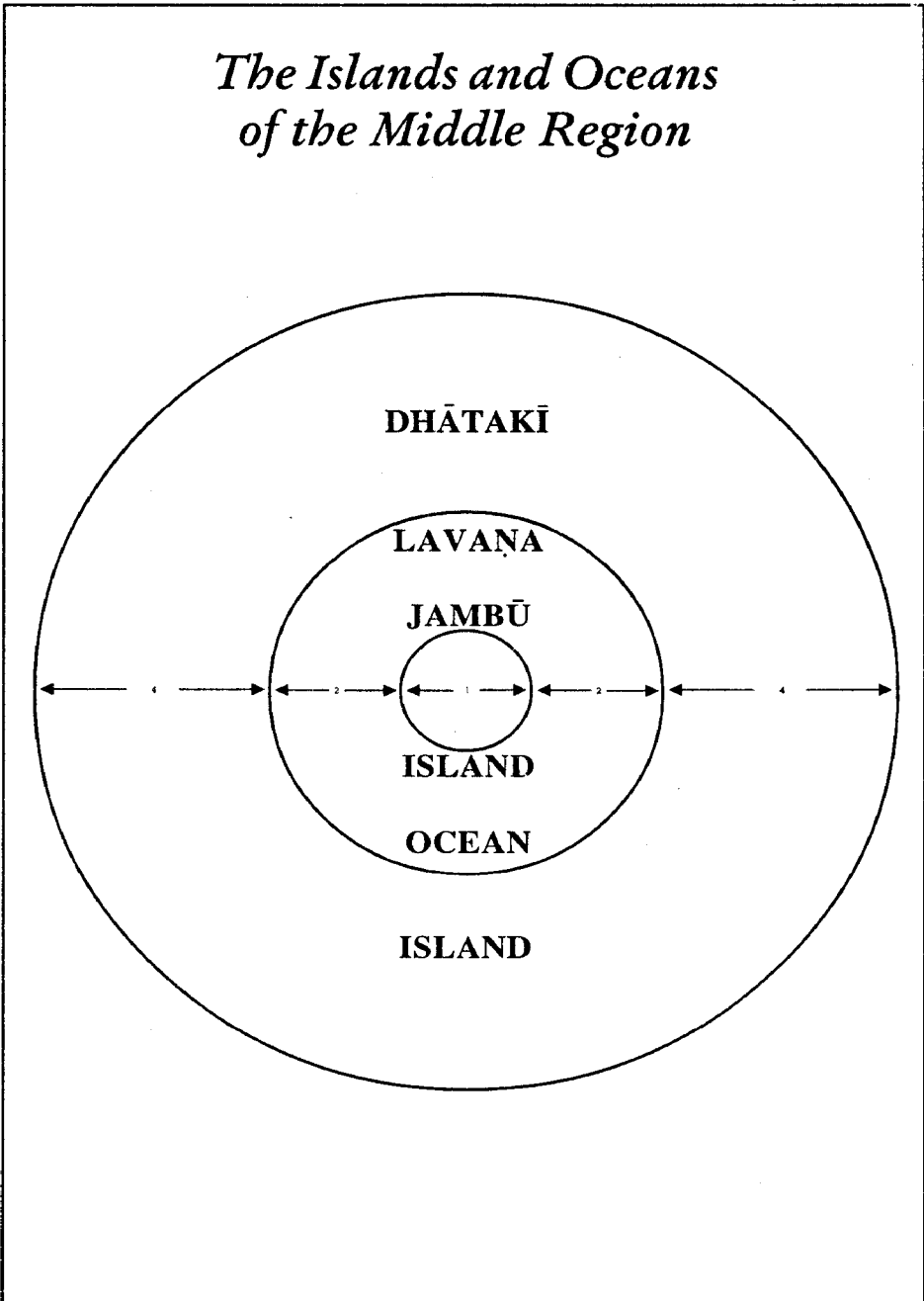
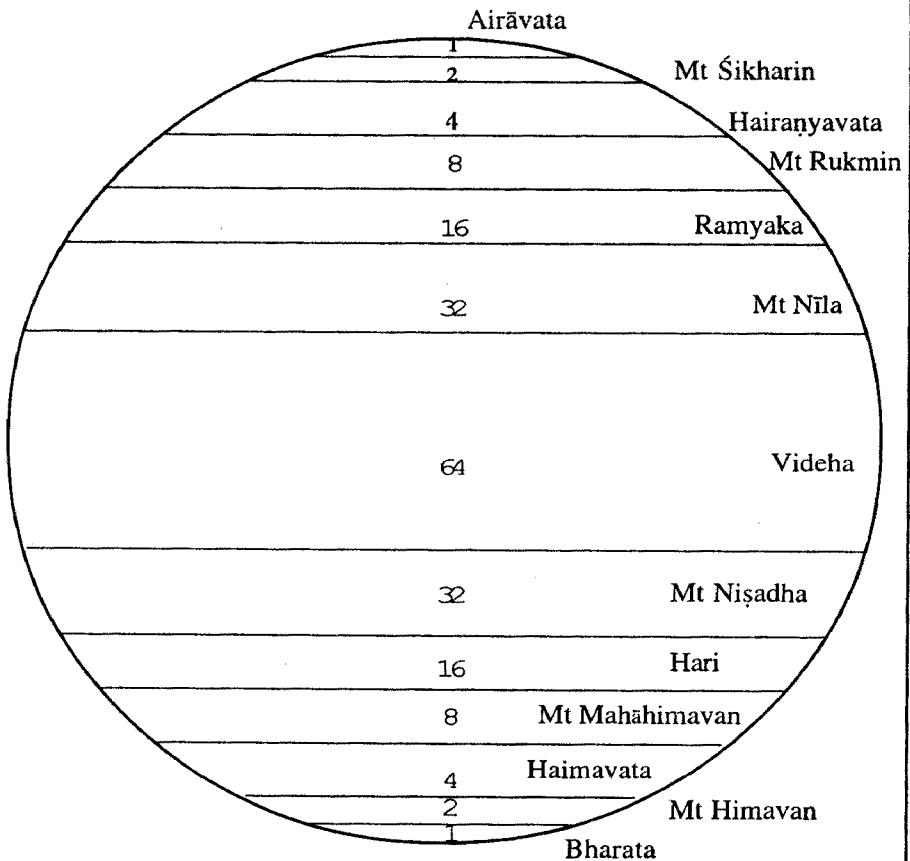


FIGURE-10

The Continents and Mountains of Jambū Island



Mt=Mount

FIGURE-11

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About The Author



Dr. Samani Chaitanya Pragya is a senior disciple of Acharya Mahapragya, the eminent great Acharya of a Jain sect Terapanth and present Anushasta of Jain Vishva Bharati Institute (Deemed University), Ladnun, India. She is practicing Jain nun, devoted to teaching and propagation of Jain Philosophy. At present she is giving her service as an Asst. Prof. (Jainology & Comparative Philosophy and Religion) in JVBI. She has presented many papers in the national and international seminars and conferences. She has got Ph.D. in 1998 in Jain Philosophy. Now she is engaged in the editing and translation of some classic texts such as Sanmati Tarka and Bhiksu Nayaya-Karmika.

She is a member of the Academic Council and Board of Management of the Institute. She is also a member of the Academic Council of 'International Summer School for Jain Studies' organized by World Council of Jain Academies, London.

The scriptures of Lord Mahāvīra are compiled in the “*dvādaśāṅgī*” (the twelve canonical texts of the Inner Corpus). The fifth scripture is titled as “*Viāhapaṇṇatti*” or *Bhagavatī Sūtra*.

The Scripture *Bhagavatī Sūtra* is an exhaustive treatise on metaphysics. It contains an elaborate comprehension of both the realities --- the sentient and the non-sentient. Hence, it is unlikely that any branch of learning would have remained undiscussed, directly or indirectly, in this encyclopedic work. Such a voluminous treatise on the metaphysics is difficult to find elsewhere. It is indeed a tough job even to make a total assessment of all the topics propounded therein. The doctrine of *Anekānta* is applied to every metaphysical issues in the Jain philosophy in general and in *Bhagavatī* in particular.

In Mahāvīra’s time, there were a number of schools of religious philosophy belonging to both the traditions --- the *śramaṇa* and the Vedic. All of them used to preach their own views. Mahāvīra, however, independently expounded those subtle truths, which are not only philosophical but scientific in nature, by him through a long course of austerity (including meditation). For instance, the theories of *ṣaḍjīvanikāya*, *loka-aloka*, *pañcāstikāya*, *paramāṇu*, *tamaskāya*, *kṛṣṇarājī*, etc., propounded by Mahāvīra and discussed in the present scripture are the indicators of independent identity of the Jain philosophy.



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