

How Karma Theory Relates to Modern Science

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INTRODUCTION

The *Karma* theory of the Jain religion is a unique, rational, scientific and complex theory. In its true conceptual form, it is unique to Jainism. It supports the features of the Jain religion which distinguish it from other religions of the world, viz., the concept of independence of each individual soul and the teaching that selfhelp is the means to achieve such independence. The theory of *Karma* is scientific in the sense that it conforms to the basic premises of science. However, it has not been established by modern scientific experiments. The *Karma* theory is complex and thus it is one of the least understood concepts of Jainism. In its simplest form, it is stated : As you sow, so you reap. It is interpreted that *Karma* rewards or punishes us for our past deed. It is construed to imply that all wealthy and powerful people of the world did good deeds in the past and that is why they are what they are. It has been distorted to indicate that *Karma* is powerful, even more powerful than the soul, our future is predestined and whatever has to happen to our soul will happen. On the one hand, people have the impression that one can avoid the consequences of undesirable *Karma* by religious rituals such as prayers, special worship, charitable contribution, etc. On the other hand, sometimes it is said that we should undergo sufferings which might be the consequences of past *Karma* so that we will not have to suffer in the future. A careful study of the *Karma* theory as described in the Jain scriptures, performed with a scientific viewpoint, leads to the conclusion that the above interpretations are only partially true :

STATEMENT OF KARMA THEORY

Material (DRAVYA) and Abstract (BHĀVA) KARMA

There are two types of souls in this universe, the liberated souls (*Mukta Jīva*) which are the pure souls (*Siddhas*) having infinite perception, knowledge and bliss (*Ananta Darśana*, *Jñāna* and *Sukha*), and the worldly (impure) souls (*Saṃsāri Jīva*) which are involved in the mundane cycle of birth and death. The worldly souls have ultrafine particles of matter known as *Karma* particles associated with them. The liberated souls have freed themselves from the bondage of *Karma* particles. There are two basic types of *Karma*, the material (*Dravya*) *Karma* mentioned above which are particles of matter, and abstract (*Bhāva*) *Karma* which are the feelings of pleasure and pain, love and hatred, compassion and anger, etc. The relationship between material *Karma* and abstract *Karma* is that of cause and effect. The material *Karma* give rise to the feelings and emotions (abstract *Karma*) in the worldly souls which in turn cause the influx (*Āsrava*) and bonding (*Bandha*) of fresh material *Karma*. Thus the relationship between the material and abstract *Karma*

can be described as one between plant and seed. It should be remarked that soul is an entity different from matter. Thus the transformations in a soul (abstract *Karma*) occur because of the intrinsic attributes of soul while the transformations (influx, bonding, etc.) in material *Karma* take place because of the intrinsic attributes of matter. Ācārya Kundakunda has written in *Pañcāstikāyasāra* :

*bhāvokammapimitto kamman puṇ bhāvakāraṇaṁ havadi
ṇa du tesin khalu kattā ṇa viṇa bhudā du kattāraṁ*¹

The emotional states of a living being are caused by the *Karma* particles and the *Karma* particles in their turn are caused by the emotional states. However, the soul is not the essential cause and still without essential cause these changes cannot occur.

*kuvvaṁ saraṁ sahāvaṁ attā kattā sagassa bhāvassa
ṇa hi poggalkammāṇaṁ idi jīṇavayaṇaṁ muṇeyavvaṁ*²

Soul which brings about changes in itself is the intrinsic cause of the mental states but the soul is not the intrinsic cause of the changes in the *Karma* particles which are material in nature. This is the teaching of *Jīva*.

*kamman pi saraṁ kuvvadi seṇa sahāveṇa sammamappāṇaṁ
jīvo vi ya tārisao kammāsahāveṇa bhāveṇa*³

The changes in *Karma* particles occur due to the intrinsic nature of material particles. Similarly, the changes in any soul occur due to the intrinsic characteristics of the soul and through its own impure states of thought which are conditioned by *Karma*.

Eight Kinds of Material Karma

The material *Karma* are of eight kinds : Knowledge-obscuring (*Jñānāvarṇī*), perception-obscuring (*Darśanāvarṇī*), feeling-producing (*Vedanīya*), deluding (*Mohanīya*), life-span-determining, (*Āyu*), physique-determining (*Nāma*), status-determining (*Gotra*) and obstructing (*Antarāya*), knowledge-obscuring, perception-obscuring, deluding and obstructing *Karmas* obscure or obstruct the knowledge, perception, intrinsic conduct or bliss (*Sukha*) and power (*Vīrya*) of the soul and thus they are known as destructive (*Ghātīya*) *karmas*. The remaining four *Karmas* are known as nondestructive (*Aghātīya*) because, for most part, they influence the body of living being. The feeling-producing *Karma*, however, may affect the soul like a destructive *Karma*. It operates as a result of knowledge-obscuring and perception-obscuring *Karmas* and with the help of deluding *Karma*. In other words, if one does not have a rational outlook and knowledge (due to perception-obscuring and knowledge-obscuring *Karmas*), and has indulgence (*Rati*) and/or ennui (*Arati*) (due to deluding *Karma*), then feelings of physical pleasure and pain may lead to undesirable thoughts and emotions. Thereby the feeling-producing *Karma* may influence the soul. Thus the feeling-producing *Karma* has been placed between perception-obscuring and deluding *Karmas*. This has been described by Ācārya Nemicaṇḍra Siddhāntacakravartī in *Gommaṭasāra Karmakāṇḍa* :

1. भावोकम्पमिम्तो कम्मं पुण भावकारणं हवदि ।
ण दु तेसि खलु कत्ता ण विणा भूदा दु कत्तारं । — *Pañcāstikāyasāra*, 60.
2. कुव्वं सगं सहावं अत्ता सगस्स भावस्स ।
ण हि पोग्गलकम्माणं इदि जिणवयणं मुणेयव्वं — *Pañcā.*, 61
3. कम्मं पि सगं कुव्वदि सेण सहावेण सम्ममप्पाणं
जीवो वि य तारिसओ कम्मसहावेण भावेण । — *Pañcā.*, 62

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*Ghādimva veyañiyam mohassa baleṇa ghādade jivam
idi ghādiṇam majjhe mohassādimhi paḍhidam tu¹*

The feeling-producing *Karma* by the force of deluding *Karma* destroys the soul like a destructive *Karma*. Therefore it is placed in the middle of destructive and before deluding *Karma*.

*ṇaṭṭhā ya rāyadosā indiyaṇaṇam ca kevalimhi jado
teṇa du sādāsādaja suhadukkham ṇatthi indiyajam²*

Because in the Omniscient (*Kevali*), attachment and aversion, and sensual knowledge are destroyed, therefore in him there is no happiness or misery due to the feeling-producing *Karma* which causes the feelings of sensual pleasure and pain.

Each kind of *Karma* is further divided into a number of subclasses. For example, the feeling-producing (*Sātāvedanīya*) and unpleasant-feeling-producing (*Asātāvedanīya*). Similarly, the deluding *Karma* has been divided into two subclasses : Perception-deluding (*Darśanamohanīya*) and conduct-deluding (*Caritra-mohanīya*). It should be noted that the deluding *Karma* obscures the development of rationalism (*Samyaktva*). As the name implies, it prevents a person from having a rational perspective of reality (*Tattvārtha*). To quote from *Gommaṭa Sāra Jivakāṇḍa* of Ācārya Nemicaṇḍra Siddhāntacakravartī.

*michhodayeṇa micchhattamsaddahaṇaṇam tu tacca atthāṇam
eyantaṇ vibarīyaṇ viṇayaṇ samsayidumaṇṇāṇam³*

Delusion or irrationalism (*Mīthyātva*) is caused by the operation of perception-deluding *Karma*. It consists of not having a rational perspective (*Śraddhāna*) towards reality, i.e., the nature of things (*Tattvārtha*). Irrationalism is of five kinds : One-sided belief (*Ekānta*), perverse belief (*viparīta*), veneration (*Vinaya*), doubt (*Samsaya*) and indiscriminate belief (*Ajñāna*).

Influx (Āsrava) and Bonding (Bandha)

The influx (*Āsrava*) of *Karma* particles is caused by the activities (*Yoga*) of the body, the organs of speech and the mind as described by Ācārya Umāsvāmī in *Tattvārthasūtra* :

Kāyavāṅgmanah karmayogaḥ/ sa Āsravaḥ⁴

It should be noted that all activities, desirable (*Śubha*) and undesirable (*Aśubha*), give rise to the influx of *Karma* particles. It is only the intrinsic characteristic activities, infinite perception, knowledge and bliss (*Ananta darśana*, *Jñāna* and *Sukha*) of the soul which are known as *Śuddhopayoga*, that do not cause the

1. घादिव वेयणीयं मोहस्स बलेण घाददे जीवं
इदि घादीणं मज्जे मोहस्सादिमिह पठिदं तु ॥

—*Gommaṭasāra, Karmakāṇḍa, 19*

2. णट्ठा य रायदोसा इंदियणाणं च केवलमिह जदो
तेण दु सादासादज सुहदुक्खं णत्थि इंदियजं ।

—*Gommaṭasāra, K. K., 273.*

3. मिच्छीदयेण मिच्छत्तमसद्धरणं तु तच्च अत्थाणं
एयंतं विवरीयं विणयं संसयिदमण्णाणं ।—*Gommaṭa, Jivakāṇḍa, 15*

4. कायवाङ्मनःकर्मयोगः । स आश्रवः ।—*Tattvārthasūtra, 6.1-2*

influx of *Karma* particles. The *Karma* particles which come to the soul as a result of influx then become associated with the soul. This process is known as bonding (*Bandha*). The bonding of *Karma* particles has four aspects : Nature (*Prakṛti*), i.e., the kind (knowledge-obscuring, deluding, etc.) of *Karma* quantity (*Pradeśa*), i.e., the number of *Karma* particles; duration (*Sthiti*), i.e., length of association; and, fruition (*Anubhāga*), i.e., the intensity of consequence of *Karma*. The nature and quantity of *Karma* that become associated with the soul depend on the nature and intensities of the activities (*Yoga*) which caused the influx. In other words, the intensity of desire or thought-activity, intentional or unintentional character of activity, dependence of the act upon living and nonliving substances (*Adhikaraṇa*) and one's own position and power determine the kind of *Karma* and the number of *Karma* particles which are attracted towards the soul. This has been described by Ācārya Umāsvāmī in *Tattvārthasūtras* :

Tivramandaññātājñatabhāvādhikaraṇavīśeṣebhyastadvīśeṣaḥ¹

The duration and fruition of *Karma* are determined by the passions (*Kaṣāya*) and the state of mind of the living beings. This has been stated in *Gommaṭasāra Karmakāṇḍa* :

*jogā payaḍipadesā tñidīanubhāgā kaṣāyado hoṇti
aparīṇaduchhiṇṇesu ya bandhatñidīkāraṇam ṇatthi²*

The nature and quantity bonding of *Karma* are caused by thought-activity, and duration and fruition bonding, by passions. In the eleventh stage of subsided delusion (*Upaśāntamoha*), where the deluding *Karma* exists in a passive state and does not operate (i.e., is not subject of modification), and in the twelfth delusionless (*Kṣīṇamoha*) stage and in the thirteenth stage of active omniscient conqueror (*Sayoga Kevalī*), where the passions have been destroyed, there is no cause for bonding. In the fourteenth stage of inactive omniscient, there is no bondage. The fourteen spiritual stages have been described below.

There are thirty-nine different kinds of activities that lead to the influx and bonding of *Karma* particles. These include the activities of the five senses (of touch, taste, smell, sight and hearing), activities involving the four passions (anger—*Krodha*, pride—*Māna*, intrigue—*Māyā* and greed—*Lobha*), activities involving violence (*Himsā*), untruth (*Asatya*), stealing (*Steḍya*), unchastity (*Abrahmacarya*) and worldly attachment (*Parigraha*), and, rational activities (*Samyaktva*), irrational activities (*Mithyātva*), experimentation (*Prayoga-kriyā*), mental pain to oneself or others (*Paritāpikikriyā*), infatuated desire to see a pleasant or unpleasant object (*Darśanakriyā*), etc.³.

The activities of the worldly soul have also been classified in the following manner : There are 3 phases of each activity, determination (*Samārambha*), preparation (*Samārambha*) and commencement (*Ārambha*). Each one of these may involve the activity of mind, speech and body, giving 9 variations. A person can do the act himself, can get it done by others or can just give the approval for the act. Thus we get $9 \times 3 = 27$ types of activities. These 27 types multiplied by 4 different passions (anger, pride, intrigue and greed), yield 108 different shades of activities.

Thought-Activity and Spiritual Stages (Guṇasthāna) of Soul

A worldly soul can have the following five different kinds of thought-activities :

1. तीव्रमन्दज्ञाताज्ञातभावाधिकरणवीर्यविशेषेभ्यस्तद्विशेषः । —*Tattvārtha.*, 6-6
2. जोगा पयडिपदेसा त्तिदिअणुभागा कसायदो होति
अपरिणदुच्छिण्णेषु य बंधट्तिदिकारणं णत्थि । —*Gommaṭasāra Karmakāṇḍa*, 257
3. See Bibliography, Reference No. 2

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1. Subsidential (*Upaśamika*) arising from the subsidence (*Upaśama*) of deluding *Karma*.
2. Destructive (*Kṣāyika*) arising from the shedding of destructive *Karma*.
3. Destructive-subsidential (*Kṣayopaśamika*) arising from the partial shedding, partial subsidence and partial operation of destructive *Karma*.
4. Operative (*Audāyika*) arising from the operation of *Karma*.
5. Intrinsic or natural (*Pariṇāmika*) which are the characteristic thought-activities (*Bhāva*) of a soul. These are not caused by *Karma*. Development of such thought-activity by a worldly soul leads to self-modification.

There are fourteen spiritual stages (*Guṇasthāna*) which are distinguished by the kinds of thought-activities of the soul. These spiritual stages and the corresponding thought-activities are shown in the following table :

No.	Spiritual stage	Thought-activities
1.	Deluded or irrational (<i>Mithyātva</i>)	Operative
2.	Indifferent, neither rational nor irrational (<i>Sasādanā</i>)	Natural or intrinsic
3.	Mixed, partially rational (<i>Miśra</i>)	Destructive-subsidential
4.	Vowless rational (<i>Avirata Samyaktva</i>)	Subsidential, Destructive.
5.	Partial vow (<i>Deśavirata</i>)	Destructive-subsidential
6.	Imperfect vow (<i>Pramāttavirata</i>)	Destructive-subsidential
7.	Perfect vow (<i>Apramāttavirata</i>)	Destructive-subsidential
8.	New thought activity (<i>Apūrvakaraṇa</i>)	Subsidential
9.	Advanced thought activity (<i>Anivṛttikaraṇa</i>)	Subsidential, Destructive
10.	Slight delusion (<i>Sūkṣmasamparāya</i>)	Subsidential, Destructive
11.	Subsided delusion (<i>Upaśāntamoha</i>)	Subsidential, Destructive
12.	Delusionless (<i>Kṣīṇamoha</i>)	Subsidential, Destructive
13.	Active omniscient conqueror (<i>Sayoga Kevalī Jina</i>)	Destructive
14.	Inactive omniscient (<i>Ayoga Kevalī</i>)	Destructive

The spiritual stages have been described in *Gommaṭasāra Jīvakāṇḍa* as follows :

*jehimṃ dulakkhijjam te udayādisu sambhavehimṃ bhāvehimṃ
jīvā te guṇasaṇṇā nīdiṭṭhā sabva darsihimṃ¹⁰*

The thought-activities caused by the operation, etc., of *Karmas* determine the spiritual stages of the soul as has been stated by the omniscient.

*miccho sāsana misso avirada sammo ya desvirado ya
viradā pamatta idaro apuvva añiyatṭhi suhamo ya¹¹*

The spiritual stages are : Delusion, downfall, mixed, vowless rationalism, partial vow, imperfect vow, perfect vow, new thought activity, advanced thought-activity, slight delusion, and :

1. जेहि दुलक्खिज्जं ते उदयादिषु संभवेहि भावेहि
जीवा ते गुण सण्णा णिदिट्ठा सब्बदरसीहि ।— *Gomaṭa., J.K., 8*
2. मिच्छो सासण मिससो अविरद सम्मो य देसविरदो य
विरदा पमत्त इदरो अपुव्व अणियट्ठि सुहमो य ।— *Gomaṭa., J.K., 9*

ubasanta khīṇamoho saṃjogakevalijīṇo ajogī ya
caudasa jivasamāsā kameṇa siddhā ya nādavvā¹

subsidised delusion, delusionless, active omniscient conqueror and inactive omniscient. After the last spiritual stage, the soul becomes liberated (*Siddha*).

The fourteen spiritual stages are steps taken by a worldly soul to gradually change its thought-activities from those caused by *Karma* to its (soul's) natural characteristics ones. The *Karmas* of various kinds undergo subsidence, become inoperative and are destroyed gradually. The process is basically one of attaining rational perception, rational knowledge and rational conduct which ultimately results in salvation (*Nirvāṇa*). This process has been described in the above gāthā. (Also see *Karmakāṇḍa* gāthā 257 cited above).

Stoppage (*Samvara*) and Shedding (*Nirjarā*) of *Karma*

Absence of all desirable and undesirable thought-activities, achieved through self-modification, leads to the stoppage of influx of *Karma* particles. Self-modification, meditation and penance also lead to the shedding of *Karma* particles by the soul. This type of shedding which is shedding without fruition is known as *Avipāka Nirjarā*. The *Karma* particles are shed by the soul after their fruition as well. Such shedding is known as *Savipāka Nirjarā*. It is evident from the discussion of the thought-activities (*Yoga*) that the thought-activities like mental pain to oneself or others (*Paritāpikīriyā*) should be absent during penance, fasting and other religious observances. Otherwise, they will only lead to the influx of undesirable *Karma*. Further, the religious observances should not involve any passion, pride, show, desire to accumulate good *Karma* (*Punya*), fear of undesirable *Karma*, etc.

Pseudo-*Karma* (*Nokarma*)

In addition to the *Karma* particles, there are pseudo-*Karma* (*Nokarma*). These basically constitute the environment and circumstances of a worldly soul such as home, school, temple, book, teacher, economic and political atmosphere, climatic conditions, medicine, etc. Sometimes, these prove to be the determining (*Nimitta*) in certain events in the life of a worldly soul. Some pseudo-*Karma* are part of the environment of a living being that happen to be present just by chance, in many instances. Some are accumulated by the worldly soul as stated in *Gommaṭasāra Karmakāṇḍa* :

deho dayeṇa saḥio jīvo āharadī kammaṇo kamman
padisamayam savvaṅgam tattāyaspīṇḍa ovvajalam²

Due to the association of the body, *Karma* and pseudo-*Karma* are attracted by the soul every moment towards the entire body like a hot ball of iron in water.

The pseudo-*Karma* have been described in detail in *Karmakāṇḍa gāthās* 69-89. The pseudo-*Karma* are not *Karmas* but they appear to play the role of *Karmas*. In other words, sometimes the course of events taking place in the presence of pseudo-*Karma* may lead to the delusion of fruition of *Karma* particles. Thus many events in the life of a living being could be caused just by pseudo-*Karma* and a person may incorrectly assume that such events are the consequences of *Karma*. Let us consider a few examples. In a train accident or a natural disaster, all the people involved may feel that it was caused by their *Karma* which may not be true. A student failing in examination may blame his undesirable *Karma*

1. उबसंत खीणमोहो सजोग केवलिजिणो अजोगी य
चउदस जीवसमासा कमेण सिद्धा य नादव्वा । —*Gomaṭa., J.K. 10*
2. देहो दयेण सहिओ जीवो आहरदि कम्मणो कम्मं
पडिसमयं सब्बं तत्तायसपिण्ड ओव्वजलं । —*Gomaṭa., K. K. 3*

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while it could be just the mood of the examiner which may be responsible for his failure. A businessman making a profit or suffering a loss may feel that the profit or loss is the result of his *Karma* but it could be due to the change in the economic or political factors beyond his control or just by chance. In the case of a person arriving late for an interview and not getting the job, it could be the traffic or rain storm and not his *Karma*. A person may accumulate large amount of wealth as a result of a few intelligent decisions or some favorable chances or some shrewd moves or even some dishonest deals. *Karma* does not have to be necessarily responsible for this. However, it is not possible for us to determine which event is the consequence of *Karma* and which event is caused by pseudo-*Karma* and that happiness is the state of mind which an individual can attain regardless of *Karma* and *Nokarma*. This is stated in *gāthās* 60-62 of *Pañcāstikāyasāra* quoted above. Happiness and grief are the results of thought-activities of the individual self, *Karma* and pseudo-*Karma* are only the external causes. It should be noted that the pleasant-feeling-producing (*Sātāvedanīya*) *Karma* can be changed into unpleasant-feeling-producing (*Asātāvedanīya*) *Karma* and vice versa as described below.

Transformations of Karma

From the above discussion, it is evident that there is an intimate relationship between the thought-activities (feelings, passion and emotions) of an individual and the influx, bonding, fruition, stoppage and shedding of *Karma* particles. The feelings and emotions also lead to the following transformations of *Karma* particles which are in the possession of the worldly soul, as described in *Gommaṭasāra Karmakāṇḍa* :

vandhukkaṭṭhaṇakaraṇam saṅkamamokaṭṭudīraṇā sāttaṁ
udayuvasaṁaṇidhattī ṇikācaṇā hodi padipayaḍī¹

There are ten modes (*Karmas*) affecting each subclass of *Karma* which are as follows :

1. Bonding (*Bandha*)
2. Increase (*Utkarṣaṇa*) in the duration and fruition.
3. Decrease (*Apakarṣaṇa*) in the duration and fruition.
4. Transference (*Saṅkramaṇa*) of one subclasses of *Karma* into another subclass of the same kind of *Karma*, for example, the pleasant-feelings producing (*Sātāvedanīya*) *Karma* can be transformed into unpleasant-feeling-producing (*Asātāvedanīya*) *Karma* and *Asātāvedanīya*, into *Sātāvedanīya* *Karma*.²
5. Premature operation (*Udīraṇa*).
6. Existence (*Sattā*).
7. Operation (*Udaya*).
8. Subsidence (*Upaśama*). *Karma* particles are prevented from operation for a limited time. During this time, they may suffer transference and/or, increase or decrease of duration and fruition.
9. *Nidhattī*. This means that *Karma* particles are prevented from operation for a limited time. During this time, they are neither brought into operation prematurely, nor transformed into those of another subclass, but they may suffer increase or duration and fruition.
10. *Ṇikācaṇa*. In this case, the *Karma* particles are prevented from operation for a limited time during which premature operation, transference and increase or decrease in duration and fruition cannot occur.

1. वंधुकट्ठणकरणं संकममोकट्टुदीरणा सत्तं
उदयुवसामणिधत्ती णिकाचना होदि पडिपयडि । —Gomaṭa., K.K. 437

2. See Bibliography, Reference No. 5.

Transference is of five kinds :

*uvvelaṇavijjhādo adhāpavatto guṇo ya savvo ya
sankamadi jehin kamman pariṇāmasaṇa jīvāṇaṃ¹*

There are the following five kinds of divisions (*Bhāgahāras*) by which *Karmas*, by the thought-activities of souls, are transformed into other *Karmas*.

1. *Uḍvelaṇa Saṅkramaṇa*, the transference in which one type of material *Karma* is transformed into another without the following three kinds of thought-activities : *Adhaha* (downward), *Apūrva* (new) and *Anivṛtti* (advanced).
2. *Vidhyāta Saṅkramaṇa*, the transference occurring when the soul has slight purity of thoughts. In this case, the duration and fruition are reduced due to such thought-activities.
3. *Adhahapravṛtti Saṅkramaṇa*, the transference occurring in the material *Karma* from one type to another during their bonding.
4. *Guṇa Saṅkramaṇa*, the transference in which the number of material *Karma* particles changes by several orders of magnitude.
5. *Sarva Saṅkramaṇa*, the transference of all material *Karma* particles in the possession of the soul.

The above concepts indicate that the soul can modify the material *Karma* particles in its possession by appropriate thought-activity. Thus it is the soul and not *Karma* which is more powerful. Details of transference have been described in the Jain scriptures.

MODERN SCIENCE AND THE THEORY OF KARMA

Modern Science

“Science is the product of man’s attempt to understand himself and the world in which he lives; it embodies knowledge about the natural world and ourselves, and it is organized in a systematic fashion derived from experimentation and observation.”² Science is the study of natural phenomena—matter, energy, life processes, etc. Thus science helps in unraveling the nature of things (*Vastusvarupa*). At present, there is no direct scientific experimental evidence which can support all aspects of the theory of *Karma*—it is no possible to perform any experiments on a soul. Nevertheless, many features of the theory of *Karma* have their parallel in modern science and the principles on which the Jain *Karma* theory is based are the same as the basic tenets of modern science.

According to modern science, all natural phenomena occur because of the intrinsic attributes of the substances involved. The gathas 60-62 of *Pañcāstikāyasāra* quoted above, conform to this principle of modern science. The theory of *Karma* may be considered as the interactions between soul and material particles which occur due to the thought-activities of a living being and due to the attributes of soul and the particles of matter. Let us consider a few natural phenomena. Water from rivers, lakes and oceans is evaporated by the rays of the sun. The water vapor rises, clouds are formed and it rains. Thus rain results from the interactions between water, solar energy, atmospheric particles, wind, etc. Such interactions occur due to the intrinsic properties of matter and energy. Charcoal burns because atoms of carbon have the capability of combining with atoms of oxygen, each atom of carbon combining with two atoms of oxygen to form carbon dioxide. When 6×10 atoms of carbon combine with $2 \times 6 \times 10$ atoms of oxygen

1. उव्वेलणविज्झादो अधापवत्तो गुणो य सव्वो य ।
संकमदि जेहि कम्मं परिणामसेण जीवाणं । —*Gomaṭa., K. K., 409*

2. See Bibliography, Ref. No. 6

to form carbon dioxide, 94 kilocalories of heat are involved and on one can change the amount of energy released in this process. However, if a limited supply of air is passed through hot coke (carbon and ash), carbon monoxide is formed in which one atom of carbon combines with one atom of oxygen. This is an example of a chemical reaction being affected by the environment. The phenomenon by the presence of some substances which themselves remain unchanged in the process, is another example of a chemical reaction being influenced by the environment. This may be compared with the concept of the pseudo-Karmas and Karmas creating the environment for the thought-activities (*Yoga*) of a living being and the innate transformations of the soul. However, it is not possible to draw an exact parallel because the innate transformations of the soul, and the mechanism of interaction between soul and material particles are beyond experimentation.

Living and Nonliving Beings in Modern Science

“Living things have certain characteristics, none of which by itself is sufficient to define them as being alive, but which, when taken together, enable us to distinguish them from nonliving. The capacities for growth, maintenance and reproduction, movement, responsiveness, change—these are the properties of the living.”¹ Science has not been able to determine what imparts all these characteristics to the living beings. It is the soul which does that according to Jainism. Further, modern science says “Life is characterized by the capacity to perform a series of highly organized interacting processes that occur within a definite framework.”² There are certain large molecules known as nucleic acid which are informational molecules. These are DNA (deoxyribonucleic acid) and RNA (ribonucleic acid). DNA can reproduce itself and it contains within it the information for directing the synthesis of proteins. DNA is like a blueprint which resides in the nucleus of the cell. RNA is the transcriber and translator of the genetic code which is the symbolic message that directs the cell to produce specific substances. “A gene is a linear stretch of the DNA molecule that contains the information for producing a protein chain.”³ Genetic changes (mutations) are produced in a cell or an organism when one nucleotide (building block of the nucleic acid) is exchanged for another. These concepts are parallel to the Jain concept of the physique-determining *Karma*. However, there are some important differences between the two concepts. First according to the Jain concepts, the *Karma* particles cannot be detected by any means, and second heredity plays an important role in the case of genes but it does not play the same role in the case of *Karma* particles. Nevertheless, the parallelism between the concept of informational molecules and the theory of *Karma* is significant.

Influence of Feelings and Emotions on Life Processes

Our feeling and emotions have a profound influence on our body. Dr. Martin Stein of Mount Sinai Medical Center of New York studied six men whose wives died of breast cancer. He found that each one of them “showed marked changes in their lymph cells, which help guard against disease. ... Thus the grief of their wives, illness and death had put them at a greater risk to developing some kind of illness themselves.”⁴ Scientists have also discovered “that our brains, which are responsible for making us feel the complicated sensation we call pain, contain endorphins, natural analgesics that are, milligram for milligram, several times more potent than morphine.”⁵ These natural pain-relieving substances, endorphins, are particularly concentrated in the limbic system which is located in that part of the brain which is closely linked with strong emotions.

The chemical system of our body is controlled by the brain. The endocrine system consisting of about a dozen glands in our body, reacts to mental stress. When a man is under tension, adrenalin from his adrenal glands gets into his blood stream and hearts to beat faster. Some hormones from his pituitary gland at the base of the brain, raise his blood pressure. These effects can give him a heart attack or stroke. Even the

1,2,3. See Bibliography, Ref. No. 6

4. Ibid, Ref. No. 7

immune system of our body which protects us from infection, is influenced by our feelings and emotions. People in stressful situations are more likely to develop such problems as sore throat, influenza, etc. . Just as negative emotions like grief and anger produce adverse effects on our body, the positive emotions help in preventing and curing illness.¹ Thus the secret of good health, longevity and happiness lies in a life of nonviolence, being at peace with oneself and with our environment. The above discussion indicates the effect of our thoughts and emotions on the life processes which involve material particles (the various chemicals in the body). The Jain theory of *Karma* also involves the effect of our thought-activity and passions on material *Karma* particles. It should, however, be remarked that *Karma* particles are different from the chemical substances in the body.

Effect of Environment on our Feelings and Emotions

The fruition of *Karma* is the process involving the effect of material particles on the living being. Again, it is beyond the realm of modern science to study such effects. However, there are many instances in which our environment, which is our pseudo-*Karma* according to the Jain principles, influences our thought-activities. Psychologists believe that our frame of reference and self-image are established early in life. These serve as guides in our later life. (This is like our past *Karma* affecting our present). Researchers have found that windowless classrooms and artificial lights are not conducive to learning. Sun light has been found to affect our mood and consequently the biological processes in our body.² The sight of a beautiful piece of art, the meeting with our relatives and friends, watching a horror movie, etc., give rise to different kinds of thoughts and feelings. However, a person can develop his inner strength and may not let the environment influence his thought-activity and feelings. Similarly, a person can develop the capability to control the effect of fruition of *Karma* on his thought-activity and feelings.

Some Parallels of Transformations of Karma

The Jain *Karma* theory implies that the material *Karma* particles associated with the soul of an individual contain information on the past thought-activity and passions of the individual. There could be some code for recording the nature (*Prakṛti*), duration (*Stṛiti*), fruition (*Anubhāga*), etc., and the transference could involve altering this coded information by means of the appropriate thought-activity. This can be compared to the informational role of the nucleic acids, the functioning of our memory and the memory of a computer. Of these, so far, only the working of the memory of the computer is best understood. Modern computers store bits of information in extremely tiny cells. Each cell can store one bit of information and is a two-state device, one state representing a zero (0) and the other state, a one (1). The different characters are represented by different sequences of 0's and 1's. For example, the sequence 11000001 represents the letter A and the sequence 11100011, the letter T. The contents of the memory of a computer can be easily changed by altering the sequences of 0's and 1's stored in the various cells. Very little is known about the functioning of the memory of a living being. "The task of RNA is to act as a copy of the genes and pass on this impressed blueprint for the correct construction of bodily proteins. In theory, therefore, the ability of RNA to handle information seemed to make it a suitable agent for the handling of memory.... Memory has three ingredients-registration, retention and recall...If RNA is the chemical that, by having its molecular pattern altered during registration, is the card index basis of memory, this fact does not explain how the card index is either maintained (retention) or used (recall)."³ However, learning a new solution to a mathematical problem or the new address and telephone number of a friend, for setting something, etc., constitute changes in the information stored in our memory. The new and developing field of genetic engineering involves manipulation of the genes, i.e., modifying the information stored in them. These are some examples of modifications of

1. See Bibliography, Ref. No. 7

2. Ibid, Ref. No. 8

3. Ibid, Ref. No. 9

stored information. The mechanism of the various aspects (nature (*Prakṛti*), duration (*Sthiti*), fruition (*Anubhāga*), etc.) of bonding and of the various types of transference of *Karma* particles is not understood. However, the phenomena of bonding and transference of *Karma*, which involve storage and modification of information, seem to be similar to the working of the memory of computer, the modifications of the information retained by us and the techniques of genetic engineering.

CONCLUSIONS

It is evident from the above discussion that the Jain theory of *Karma* conforms to the fundamental concepts of modern science. A detailed scientific study of *Karma* theory and further researches in the field of biology are expected to reveal many more important similarities between the theory of *Karma* and scientific knowledge.

I am greatly indebted to my teachers of Jain religion. Pandit Kailash Chandra ji Jain Siddhāntācārya and Pandit Daya Chandra ji Jain Shastri of Ujjain. I also express my deepest gratitude to Pandit Phool Chandra ji Jain Siddhāntācārya for a number of valuable and highly illuminating discussions.

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Doctrine of Karma

*Almost all religions admit that gain or loss, pleasure and pain is the result of *Karmas* but Jainism has scientifically indicated how and why Karmic matter is attracted and bounded with soul. How *Karmas* can be stopped and destroyed? *Bhagavān Mahāvīra Aura Unakā Tattva Darśana*, p. 882

*Combination of Karmic matter with *Jīva* is due to *Yoga*. *Yoga* is the action of mind, speech and body. The opportunity for combination is created by *Bhāvas* or the affective states and such affective states are due to desire, aversion and perverse cognition—*Pañcāstikāyasāra*, 148.