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Sarasvati
(in coloured chalk)
Ganesh Lalwani

Recently Discovered Jaina Epigraphs from Tondaimandalam

A. EKAMBARANATHAN

The northern part of ancient Tamil country, known as Tondaimandalam, has a plethora of Jaina monuments containing lithic records of religious and historical importance. Recent survey of the monuments by the present writer in South Arcot and North Arcot districts brought to light some hitherto unknown epigraphs from places such as Vidur, Ponnur, Tirunarungondai and Chittamur.

A temple of modest proportion dedicated to Risabhanatha, the first Tirthankara, exists at Vidur, a hamlet situated 20 kms south-east of Tindivanam in South Arcot district. The edifice, though an earlier one, has lost its original architectural features consequent to extensive repairs and renovations. A fragmentary record of the Rastrakuta king Krsna III (A.D. 939-968) is noticed on a slab built into the floor of the passage leading to the *mandapa* in front of the central shrine. The first part of the inscription mentioning the name of the king, no doubt, is in a good state of preservation, while the rest is very much obliterated.¹ Though the purport of the record is unascertainable, it appears to register some endowment to the Jaina temple. This fragmentary record, apart from pushing back the antiquity of the temple to the middle of the 10th century A.D., reveals beyond doubt the patronage extended by Krsna III who held sway over Tondaimandalam for a brief period. It may be said in passing that the Jaina temples at Velappadi and Tirumalai in North Arcot district also received their due share of endowments from Krsna III. He had been liberal in his religious outlook by contributing Jaina institutions, even though he was a devout follower of Brahmanism.

Ponnur is a reputed Jaina centre situated about 15 kilometres from Wandiwash in North Arcot district, having a temple of Adinatha erected on a low mound called Kanagagiri. The place is variously known as Svarnapura, Hemagrama, Kundakundagrama, etc. The temple possesses numerous icons representing Tirthankaras, Yaksas and Yaksis. An inscription dated in the 17th of Vaisakha in Salivahana 1655 and Kali year

¹ *svasti sri kannara devarkku yandu...*

4834, incised on the rear side of the *prabhāvalī* of a Parsvanatha image, records the gift of the same icon to the Adinatha temple by Anantasena, a disciple of Virasenadeva belonging to the Senagana. The Kali and Salivahana years correspond to May, 1733 A.D.²

Another epigraph, already brought to light,³ from the same temple mentions that in the year 1733 A.D. the residents of Svarnapura made arrangements to take out in procession the images of Parsvanatha and Jvalamalini Yaksi on every Sundays from the Adinatha temple to Nilagiriparvata which was situated to the north-west of the temple at the time of the weekly worship of Helacarya.

It deserves special mention that Nilagiriparvata is the same as Ponnur hill, 4 Kilometres away from the temple, where the sacred foot-prints of Helacarya are carved on an open rock. Helacarya was a renowned monk of the Dravidagana who is said to have attained liberation at Nilagiriparvata. The hill is considered to be the habitat of the goddess Jvalamalini who is stated to have bestowed grace on Helacarya. Her cult got popularised in this area and therefore she occupies a prominent position in the Adinatha temple. A separate shrine is built for her in the same temple and special *pūjās* are performed daily to this goddess.

The above inscriptions clearly testify to the worship of the foot-prints of Helacarya on every Sundays ; during which the images of Parsvanatha and Jvalamalini were carried in procession to Ponnur hill. This practice commenced in the year 1733 A.D. as evidenced by the lithic records. Probably, it was discontinued in recent years after the establishment of the *Kundakundasrama* on the hill. The discovery of the epigraph also helps to fix the age of the processional images of Parsvanatha and Jvalamalini. Of the two icons, the former retains its original style, while the latter, due to retouching and polishing, bears a modern appearance.

Tirunarungonḍai in South Arcot district is one of the sacred Jaina centres to which pilgrims from various parts of the country throng during festive occasions. The huge hillock in the village contains the famous Appandainatha temple with principal shrines meant for Parsvanatha and Candraprabha. The temple has a rich collection of bronze images,

² *svasti sri salivahana sahaptam 1655-ku kaliapptam 4834 chellaninva pramatisa varu-sham vaikasimatham 17 thiyathi ponnur kanagamalainathar koyilukku parsta-natharai, senagana virasenadeva sisyarahiya ananthasenar pamina thanmami.*

³ *Annual Report on Epigraphy, 416/1928-29.*

old and new. Among them, a Navadevata contains an inscription recording its installation by Parsvanainar, Cakravartinainar and Rsabhadhas of the village Karadippakkam, after successfully completing the observance of Adityavrata in the month of Krttika of the Tamil year Pramatisa, which corresponds to 1913 A.D.⁴ The donors are said to be members of one and the same family and among them, Cakravartinainar became the hereditary trustee of the Appandainatha temple. The temple complex grew horizontally and vertically due to the relentless efforts of Cakravartinainar and his successors. Being childless for a longtime, Cakravartinainar's wife, Sivadeviammal, observed severe austerities for forty-eight days propitiating the presiding deity of Tirunarungondai. The lord conferred upon grace to the couple and consequently a female child was born to them. In order to commemorate this, the lady installed a stone sculpture of Saturn, one of the nine planetary deities, at the foot of the hill. The inscription engraved on the pedestal of the same image reveals that it was installed by Sivadeviammal, the wife of Cakravartinainar of Karadippakkam, in the year 1935.⁵ Perhaps to ward off the evil effects of Saturn, his image was consecrated at the foot of the hill. This belief has given rise to the practice of every devotee circumambulating without fail the sculpture of Saturn, after offering worship to the main deities atop the hill.

Chittamur is the headquarter of the Digambara Jain Community with a *maṭha* presided over by a succession of pontiffs from the 16th century down to modern times. Besides, there are two temples, one known as Malainatha and the other Parsvanatha temple. Two epigraphical records have been brought to light from the Parsvanatha temple. The first one is engraved on the basement of the five subsidiary shrines built to the north of the main shrine. It records that the five shrines of Brahmadeva, Ganadhara, Sarasvati, Padmavati and Jvalamalini were constructed with the approval of the pontiff of the Chittamur *maṭha* by Gunamalaiamma], the wife of Sri Balaiya of Tirupparumbur, the then deputy collector. The lady also granted one *kāṇi* of land for offerings to these five deities. Their consecration took place in the month of Vaisakha

⁴ *sri tirunarungondai caityalayatikku karadippakkam parisainar cakravartinainar rsabhadasanainar adityavavara nonbu nimittam ceyyappattatu pramatisa varusham karttigai matham* 1913.

⁵ *cakravartinainar pariyalana sivadeviammal satha sevai karadippakkam* 1935 *varusham*.

of the Tamil year Subhakritu, Saka 1825 and Kali 5004 which is equivalent to May 1903.⁶

Sri Balaiya, hailing from Tirupparambur near Kancipuram, was Deputy Collector looking after the administration of Gingee region of the old Madras Presidency under the British regime. Being a pious Jain, he had been responsible for the renovation of numerous temples in South Arcot and North Arcot districts. The inscription under study reveals the keen interest evinced by his wife in the development of the Chittamur temple.

The second inscription is noticed on a pillar in the *alamkāramaṇḍapa* of the same temple. It states that Svasti Sri Laksmisena Bhattaraka Bhattacarya, the pontiff of the Jinakanchi *maṭha* at Chittamur, renovated the Parsvatirthankara-*maṇḍapa* (i.e., *alamkāramaṇḍapa*) on 22nd monday, the auspicious full-moon day, in the month of Tai of the Tamil year Vrute and Saka 1873, corresponding to 1951 A.D. The record incidentally mentions the other pontiffical *pīṭhas* at Delhi, Kolhapur and Penukonda.⁷ We come to know from other epigraphs that the *prākāra* wall along with the *gopura* of the temple was constructed in the year 1865 A.D.⁸ very likely, the *alamkāramaṇḍapa* also had its completion in the same year. Subsequently, the *maṇḍapa* got dilapidated and hence it had to be repaired and renovated in 1951 at the initiative of the *maṭhapathi*.

⁶ *om svasti sri salivahana sahaptaha 1825 kaliyaptaha 5004 prabhavati sahaptaha 35 melchellaninra varusham subhakritu nama samvatsaram vaikasa matham 11 tiyathi tirupparambur dipty kalaktar sri balaiya avarkal kalatrium madu sri gunamalaiaimmal than athyobhavarga sukhanimittam chittamur sannathiyil svastisri srimad abhinava lakshmisena bhattaraka svamigal aknanumatiyin peril sarasvati mudalana aindu ammanai sannathiyil seivithu pratishta mahotsvamum seivikka pattatu itarku neivethiyathirku nanjai nilattil kani vidappattatu.*

⁷ *svasti sri salivahana sahaptam sahasrasta saptatitri vikruti samvatsare utrayane pusyamasa sutta purnami subhayogatinattil somavaram tirutiyil parsvatirthankara mandapam punarutaranam svastisri nijakadiga dilly kollapura jinakanji penukonda chaturtta siddha simhasana tisvararahiya laksmisena bhattaraka bhattacaryavarya svamigal parsvanatha jinalayattil punaruttaranam seytu vaikkappattatu salivahana sahaptam. . vikrute varusham taimasam 22.*

⁸ A. Ekambaranathan, *The History of Chittamur*, pp. 31-32.

The Electro-Magnetic Field in Man

GYAN CHAND JAIN

A modern discovery discussed and correlated with Jaina
Theory of Karman and Taijas Bodies

The fact of electro-magnetic field in every living being and man is a very important discovery, or, rather rediscovery of modern science. It was also known, in west, in past. Galen advised electric shock from torpedo fish as a cure for headache.¹ The spiritualists of various sorts have been using it and creating effects on persons and things. Now these phenomena are electricity and magnetism. The electricity in a human body can be known through electronic-cephalograph, ossilograph etc. In fact, our every action, voluntary and involuntary, such as muscular contraction and glandular secretion involve the use of electricity.² A Russian scientist Dr. Arkadieiev has calculated 10.9 watt electricity in a human body. This is of a very weak type but it is possible to develop it through concentration and other practices of *yoga*.³ Dr. R. M. Kasliwal has interpreted Sankhya concept of *prakṛti* and *puruṣa* in electro-magnetic terms in his recent articles.⁴ He says that every man has a unit magnetic body in association with a electric body, giving rise to electro-magnetic field. The magnetic body is *puruṣa* while the electric one is *prakṛti* together giving rise to the human personality. Dr. Kasliwal calls the electro-magnetic field as 'self consciousness', unit magnetic field as 'cosmic consciousness'. Cosmic consciousness may be taken as *kevala jñāna* of Jainism but it may better be interpreted as *Brahma* of Vedanta as he talks of merging of unit magnetic field into cosmic field and presently existing as part of the 'whole'. It may be remembered that Sankhya (or Yoga) system does not conceive its *puruṣas* as merging into any cosmic entity.

Though Dr. Kasliwal has drawn parallels with Sankhya-Yoga system but his whole concept is a physicalistic one. He conceives consciousness as energy, 'energy' as convertible into matter or 'mass'. To conceive consciousness as energy or force has not been uncommon even in the

¹ Julian Huxley, *Essays of Humanists*, p. 54.

² *Ibid.*

³ R. M. Kasliwal in 'Spiritualism and Science', a paper published in *Parapsychology*, Vol. IV No. 4, 1962-63.

⁴ *Ibid* and 'Soul and Science' in *The Cosmic Society*, Oct., 1964.

spiritualist thinkers. Sri Aurovindo talked of 'conscious force'. Jainism maintains *anant-śakti* as one of the *anant-catuṣṭayas* which characterise *jīva* in pure state. We do feel 'will' as force and talk of strong and weak will. But we should distinguish spiritual and material force or energy as Julian Huxley distinguishes the former as psychergy.⁵

To proceed further with the field, the physicists are not in a position to doubt the fact of rebirth and survival of human soul. The famous Shanti Bai case of rebirth and host of cases of survival as 'spirits' have disabled the physicists and biologists to assert their old Carvaka convictions of death as a total negation of human personality. According to Dr. C. D. Broad the survival of a psychic-factor must be admitted. To Dr. Kasliwal, and probably to other physicists, the electro-magnetic field is that 'factor' which transmigrates and takes rebirth somewhere, or otherwise survive. Indeed it has been discovered a fact that on death the gross body gets devoid of the electro-magnetic field ; it may very well be said to have transmigrated though we wonder how the physicist can identify the "field" as the same taking rebirth keeping it in the view that it must be a constantly changing phenomena.⁶

In fact, to call the unit magnetic field as the soul of man is a very weak hypothesis. With the constantly changing particle the identity of the 'field' can only be a matter of form. The individual that remembers himself always the same through the biological and psychometabolic changes would not like himself reduced to mere 'form' which with every new grouping of the particles is to be lost for ever, such a concept does tell a lie to the feeling of oneself as definite, unitary or simple, substantial conscious being.

Except for the theory part, we find in the discovery of the 'field' a further confirmation of Jaina beliefs from the studies of science. According to Jainism every man, animal and vegetable life has two other bodies apart from the one gross or *audārika* body. They are *kārman* and *taijas* bodies. *Kārman* may be called the magnetic body while *taijas* the electric body. With our every action of physical, vocal or mental sort the *kārman* body is stirred and attracts *karmic* molecules to incorporate in itself. The incoming molecules are incorporated with a particular effectivity and duration according to the nature of the action and the accompanying

⁵ *Essays of Humanists*, p. 64.

⁶ Gardner Murphy, 'Field Theory and Survival', *Indian Journal of Parapsychology*, Vol. 1 No. 3, 1959, p. 107.

emotions (*rāga-dveṣa*). This *kārman* body is the root cause of all the other bodies viz. for our purpose, the electric and the gross. They are auspicious or inauspicious as is the nature of *kārman* body in operation. Further, on death it is according to the nature of this *kārman* body that a *jīva* transmigrates to some other birth to start his life afresh. The job of *taijas* (electric) body is generally said to provide lustre. In case of ascetics and yogis it may become very powerful to effect any desired benefit or destruction to oneself and others. Both these bodies *kārman* and *taijas* are permanently attached to the *jīva* in *sāmsārīka* stage. They are made better or worse but they always stay. It is only in the case of the self-realised souls, completely detached from anything other-than-their-souls that these bodies are totally shed away. These souls then become *Paramātmān*.

Thus we see that the magnetic and electric bodies are really the paraphernalia of the soul through all its transmigrations. To call the magnetic body the soul of man is, according to Jainism, absurd. It is a physicist's bias for physical monism that he wants to reduce every phenomenon to materialistic terms. The western minds, minds educated in their lines, and unsophisticated minds too, often get accustomed to one sort of reality and find it difficult to conceive any other sort. The word is either wholly material for them or wholly non-material. They cannot conceive 'ghost in the machine'. But there are some, and their number is fast increasing, in the field of psychology, parapsychology particularly, in the west who feel convinced of duality of matter and mind, essential to account for the phenomena of the freedom of will and to explain the distinct types of sensory and extra-sensory perceptions.⁷ Even the biologist of Julian Huxley's eminence has coined the term 'psychometabolism' as contrasted to the phenomena of biological metabolism which is evidently a material process. Indeed, there is quite an evident rift in the west and materialistic monists are openly challenged and flouted today when they have the audacity to try to explain the non-material conscious phenomena in purely physical terms.⁸

In fact, the theories of the modern scientists have been mostly illicit generalisations which on later discoveries are proved false. To take an example, in some detail, the Darwinian theory of Evolution, which, in west, became basic to all bio-social thinking about man, provides a perfect frame of reference but it also prejudices man against the facts which

⁷ J. B. Rhine, *New World of the Mind*, p. 228.

⁸ *Ibid.*

are not included in it. This theory supposes the rise of one species from another. As circumstances changed those who could adopt survived and those who could not got destroyed. That is all true and can work as a very good hypothesis in discovering the process of social and political history of man. Still there are facts coming before the scientists, in huge number, showing incompleteness of the theory and calling for important changes in its conception. The theory conceived the individual merely as a sperm in the father's body starting his life's journey in the mother's womb, perishing completely at death having procreated sometimes some sperms from his body as man during his life-span. He has himself no pre-natal and post-mortem existence. He is merely a link in the evolution of species. The facts of rebirth, survival and transmigration have re-delivered man from this abject state. He can now no more be said a growth of paternal sparm which only is a factor in his gross body formation. He is himself as immigrant into the mother's womb with all his characteristics developed through his past lives and registered in his magnetic and electric bodies. As he grows and lives his life the principal job he does, knowingly or unknowingly, physically to bring certain changes in his magnetic and electric bodies, psychometabolically to evolve or devolve himself to a certain spiritual level. This is no imaginary picture that we put, no reverie that we indulge but the inexorable facts which the scientists must not hoodwink and must change their theory of evolution of life accordingly.

With this example we may well conclude that the important in modern science is not its theory aspect but its discoveries of facts. Unfortunately, the scientists are giving more importance to their theories than to the facts to explain which the theories are framed. They sometimes even talk of not acknowledging those facts which do not fit their general physicalistic framework. It is evidently a very dangerous talk.

Significance of the Field

It is easy to understand from the foregoing discussion that the place of electro-magnetic field in man's life should be immense. We may try to understand its significance briefly as follows :

1. *Its effect on the health of the gross body :*

Our body is healthy or diseased as is this field in us auspicious or inauspicious, powerful or otherwise. We have seen that in all our bodily fuctions it is involved as an essential factor. It has not only direct effect

on our own bodies but also on those who come in our contact.⁹ We can effect cure in others by our sight and touch with its help and unconsciously we are always shedding desirable or undesirable influence on them.¹⁰ In fact, our over-actions are not so important to our own well-being and to that of others for whom we care as is the working of this electro-magnetic field.

2. *The discovery brings forward the importance of the inner spiritual life of man*

This 'field' is in intimate relation with what we feel, think and will, the inside of us. In Yogis who always hold themselves in concentration and contemplation of self this field is supposed to become of a very effective type.¹¹ It means that much of overt actions and physical comforts which are deemed of value to the gross body are of no value to these minute bodies. Rather it may be well said, the reckless life led to pamper the gross body and its senses will produce negative effect on the 'field'.

The electric and magnetic bodies are in nearer and more permanent relation with the self or soul as they leave the gross body on man's death and transmigrate with the soul.¹² The gross body is left here to be burnt or buried. Modern science has brought this fact to our clear preception in the scientific study of the cases of rebirth and survival. It is now foolish to hoodwink the facts and live the life of mere flesh and blood. What is prosperity in relation to the gross body but adversity in relation to the 'field' is really adversity to man. He cannot then keep even his gross body healthy for long. On the other hand, the ascetic who neglects much of external comforts and pleasures of senses but concentrates on self-knowledge and self-realisation, on his own inner conscious life may very well now be taken as directly furthering his spiritual peace and satisfaction, indirectly energizing his electro-magnetic field and further indirectly having healthy effects on his gross body, for which the unintelligent so much thinks, and on other in his environment.

In short the discovery of the 'field' brings forward the value of the inner spiritual life of man. The surest way to become happy is to make that pure, deep and guiltless.

⁹ Dr. M. Ash, *Health, Radiation and Healing*.

¹⁰ *Ibid.*

¹¹ R. M. Kasliwal, 'Spiritualism and Science', *Parapsychology*, Vol. IV No. 4, 1962-63.

¹² *Ibid.*

3. *The discovery reinstates the karma theory :*

The electro-magnetic field transmigrates with the soul to some other birth or life is a very important discovery. The effects created in our gross body will be left on death but the effects created in the field will accompany us wherever we go. It must convince us of the truth of *karma* theory that nothing of what we do, or better do spiritually, is ever lost but bears its fruits if not in this life then in next life or lives.

Revaluation of Values

To my mind the discovery of the 'field' should be a turning point where we should rejudge over values in its light. Whatever morality we hold is either determined with the view to the welfare of the gross-body personality in society or the traditional supernaturalistic morality taken as commanded by God or by some super-human agency. The former could not be sufficiently developed while the latter could not satisfy our reason. Now we can rationally build quite a developed morality which would satisfy our being more than ever. We attempt here to discuss some bases which naturally can be drawn as value conclusions from the discovery of the field as we above understood it.

1. *Spirituality is the core of morality :*

As Plato said that the highest man is contemplative, we should become less physicalistic, extrovert and more spiritual, introvert. It is reaffirmed by the fact that the inner spiritual life of man can only have any effect on his electro-magnetic field. We have seen that better the field the greater the interests of even the gross body are safeguarded and *vice versa*, the worse the 'field' the greater the possibility of injury to the interests of the gross body though we are putting our utmost caution and efforts to safeguard and prosper it. In fact, we should not conceive the amenities, of the gross body any greater riches than the rich electro-magnetic field. The external riches—wealth, social position etc. are to be taken more as a reflection of the richness of the 'field' than merely as the results of one's external efforts.

Further on the conative and affective side, to ensure a better 'field' we must ensure our spiritual peace and satisfaction otherwise the 'field' must remain of a distracted, lower, and even of malignant sort. The unauspicious *kasāyas*, as enumerated in Jaina texts and with some variation in other Indian systems, must have unauspicious effect on the 'field' because the motives, then, are either to harm other living creatures, to

give them pain or merely to identify oneself with his insentient gross body. The mal-intentions may not directly harm our gross bodies but they must invariably create unauspicious effects in the fine electro-magnetic field. We may check the harm to the gross body with the help of men and medicine, even with the help of *mantra-tantra*, if we have acquired that efficacy but we can never hope to check the definite reactions of our motives and thoughts in the electric and magnetic bodies by any external efforts. Their medicine is spiritual only, the purification of the mind of all the evil thoughts, harbouring auspicious ones instead or absorbing oneself in the 'supreme consciousness', to use the phrase of Dr. Kasliwal.

2. (a) *External actions not to be neglected*

The importance given to the inner spiritual life of man by the discovery of the 'field' does not mean the neglect of man's external actions. Those actions that are quite necessary for the healthy existence of the gross body we must do. But those which are not so necessary must be done as symbolising the inner auspiciousness of one's motives and thoughts giving them concreteness. They must not be done unspiritually in a blind conventional manner. They may be intended with wider effects on society, but it is good to know, the surest effects can be expected in one's 'field' and one's psycho-metabolic process only and on no one other in the world. One will feel consoled if he is aware of this fact even though his actions have gone defunct of the intended external effects.

With such an ethics when man has learnt to give primary importance to his inner spiritual life, identifies himself with his pure conscious being; if he cannot stay on this level comes down to the level of auspicious thoughts and knowledge of things and does external actions not primarily to 'move' others but that they 'move' oneself and believing in the chain of automatic reactions—thoughts reacting on the 'field' and the 'field' reacting on the gross body and the environment, the individual is probably but on sound rational ethical footing. He does not require to be mystified with the intervention of God in giving the fruits of his good or bad actions in a distance of time, if there is any such 'God' and electric bodies and which Jainism has been calling *kārman* and *taijas* bodies.

(b) *Individual is an evolving immortal entity*

Further, to combine the discovery of the 'field' with the authentic case of reincarnation and the theory of evolution, as interpreted above through births and deaths, we find that an individual has its own history passing from one birth to another sowing seeds of either good or bad

sorts in the 'field' and reaping their fruits in the same or the next births. The individual must be told this great truth about himself that how from unicellular (*nigodīya*) stage he has come to evolve to the stage of man and what can be his future prospects, with respect to the changes brought in the 'field' and the possible 'field-less' stage, that of *Paramātmān*. To yoke oneself to the service of state, society and the gross body and remain negligent of what may be deemed as sheer individual is a great blasphemy to the Truth. Truth must be studied naked as it is. Then only, we can hope to become exact and faultless in deciding the gradation of human ends without which we are no better than a blind or a mad man.

The world is a mystry to a great extent because life is a mystry and we do not know how we came to be man all of a sudden from the parental protoplasm and we can perceive nothing but total darkness beyond the little days or years of life. The existential anguish of death so much corrodes on man's mental and physical health that if he comes to know the assurance of the Jet attacker Peter¹³ that it is not necessarily so worse after death, and further by our actions we can earn a good lot and get assured like Socrates that in next life we would get better friends, we will become more happy and courageous. The ignorance about our 'being' beyond birth and death has made of us an absolute slave of this gross body. We can think in no terms but that of this body and its amenities. The conflicts in society—religious, social, political, economic, international—all centre round the body and its more or less imaginary needs. It is of vast importance to day that man be made well aware of his 'being' which is deathless. It will not only act as a very good diversion but will give him great spiritual satisfaction and in turn will remove much of the trouble in his life which is nothing but the reflection of his psychological spiritual discomfiture.

The American philosopher Dewey has said that a labourer who does a particular labour in a factory but does not know how the finished product ultimately comes out, what is the whole functioning and organisation of factory is an ignorant slave and not the master of his present labour. He cannot enjoy his labour. Is it not a good analogy for a man who does not know how he is reaping particular fruits, what future effects he is ignorantly sowing, how he has come about to be the man he is and how he is to process through the future beyond death? Most men are ignorant slaves in this respect and modern scientists, mostly, are unfortunately reluctant to recognise the facts which uncover the mystry beyond death and make man aware of his true 'being'.

¹³ Gerald Cummins, *Mind in Life and Death*.

Let us hope that the modern scientists will give due cognizance to the fact of transmigrating 'psyche' or soul and he as such quite distinguishable from the gross body and from the constantly changing electromagnetic field too. However, we fear, that 'field' the being material in nature could be detected in the physicists laboratory but the conscious processes of mind have always escaped his grasp as a physicist and we can never hope any illumination in that respect untill he becomes ready to recognise extra physical as extra physical. This I express with all the due regard for the facts he has discovered.

Indian Atomism

J. C. SIKDAR

[from the previous issue]

Resistance (Pratighāta) of Paramāṇu (Ultimate Atom)

The resistance (*pratighāta*)¹⁶¹ obtained by a *paramāṇu* is possible under three conditions : (1) If there takes place the physical contact of a *paramāṇu* with another one, while making motion in great speed by the process of natural transformation, then the first one is resisted in itself and can resist the second one with which it comes into contact, (2) Having combined with another *paramāṇu* or a *skandha* by virtue of its property of cohesiveness and dryness (attractive and repulsive forces), a *paramāṇu* loses its individuality (or discreteness) for a certain period of time, (3) It is resisted in its motion at the last border of the universe because of the absence of the principles of motion in the non-universe. Thus according to these three kinds of resistance, three names have been attributed to the resistance obtained by *paramāṇu*, viz. (1) *vega-pratighāta* (resistance obtained by a *paramāṇu* when it is resisted by another one on the way of its motion), (2) *bandha-pariṇāma-pratighāta* (resistance obtained by a *paramāṇu* due to its property of cohesiveness (attractive force) and dryness (repulsive force) and (3) *upakārabhāva-pratighāta* (resistance obtained by a *paramāṇu* at the last border of the universe because of the absence of principle of motion).¹⁶²

The Jaina view of oscillation and motion of *paramāṇu* is nearer to the atomic motion of the physical sciences.

As for example, “From X-ray studies it is known that in crystallising solids the atoms are located at definite points in a lattice arrangement. The atoms vibrate about those lattice points, the amplitude of the vibration increasing the rise in temperature. At the melting point, which occurs at a fixed temperature different for each crystallising substance,

¹⁶¹ *Sthanangasutra*, *prathama vibhaga*, with *Tika* of Abhayadevasuri, published by Agamodaya Samiti, Bombay, 1918, *sthana* 3, *uddesaka* 4, *sutra* 211, p. 171.

¹⁶² *Tattvarthadhigamasutra* by Umasvati, *prathama vibhaga*, p. 368 ; see also *Bhasya*.

the amplitude of the vibrations have become so large as to disturb the orderly arrangement of the atom."¹⁶³

The concept of oscillatory behaviour, or wave motion is a basic one which finds wide application in atomic physics.¹⁶⁴ The wave aspect of elementary particles is possibly their most fundamental characteristic, and it is not possible to reduce this concept further by forming any adequate picture of what substance, if any, is undergoing pulsation.¹⁶⁵

"The motion of atom is demonstrated by the breaking up of atom, its smashing by the energy within itself and the emission of energy from it and the radiation from the radio-active elements which consist of three distinct types—rays. Radio-active substances emit spontaneously either helium nuclei or electrons. There take place the radio-active transformation in them. When a nucleus is transformed into another, either by α -or-decay, some energy is released in the process, which is taken up as the energy of motion of the α -or the particle with surplus appearing as Y-rays. The energy released from the nucleus may be quite high of the order of millions of electron-volts."¹⁶⁶

As to *vega-pratighāta* of *paramāṇu* conceived in Jaina philosophy the physical sciences contain a parallel view in regard to the collision of atomic particles. "In any elastic collision, between two billiard balls, the total energy and the total momentum before and after the collision must be the same. If one ball makes a head-on collision with another at rest, the first will come to a stop and the second will carry on in the forward direction with the energy and momentum previously had by the first particle. In off-centre collisions both balls will be set into motion at right angles to each other, and the direction and energy of each of the balls can be simply calculated from the conservation of laws. Similarly, if an atomic particle collides with a helium nucleus, both are set in motion at right angles to each other. We can often observe the paths of both particles after collision in a cloud chamber and verify that the laws of conservation of energy and momentum hold for nucleus processes."¹⁶⁷

¹⁶³ *Physics : Principles and Application* by Margenau, Watson and Montgomery, p. 261.

¹⁶⁴ *Atomic Physics* by Harnwell and Stephens, 1.4, p. 12.

¹⁶⁵ *Ibid.*

¹⁶⁶ *Ibid.*, p. 65.

¹⁶⁷ *Atoms and the Universe*, by G. O. Jones, J. Rotblat and Whitrow, p. 84.

“Neutrons themselves are last detected by making them collide with protons, i.e., by letting the neutron beam pass through a hydrogenous medium, say water or paraffin wax. Since the neutron and the proton have approximately the same mass, their collision is analogous to that between two billiard balls. In a head-on collision the neutron is brought to rest and the proton is emitted in the forward direction with the whole energy. In the off-centre collisions the proton may be emitted at different angles but from the angle of emission and from the energy of the proton the energy of the neutron can be deduced.”¹⁶⁸

In regard to *bandha-parināma-pratighāta* of *paramāṇu* a similar theory is found in the physical sciences. “Every atom exerts a force upon every other atom. The details and the magnitude of the force vary as between one type of atom and another, but in general, the force is always a force of attraction when the atoms are at a distance apart greater than their normal diameters, changing to a force of repulsion if the atoms are forced very close together. Thus there will be a tendency for atoms because of their force of attraction to draw together and stick.”¹⁶⁹

The Jaina view of *upākārābhāva-pratighāta* of *paramāṇu* (ultimate atoms) compares well with the view of modern science that beyond the borders of the finite universe even the light rays do not travel, as nothing lies beyond, probably nothing manifested; “light rays, apparently going in a circle, returning boomerang-like to their point of departure.”¹⁷⁰ That is to say, they are resisted or checked like *paramāṇus* of Jaina philosophy at the last border of the universe because of the absence of the support of motion.

Transformation of Paramāṇu

According to the Samkhya philosophy, “change is taking place everywhere, from the smallest and least to the highest. Atoms and reals are continuously vibrating and changing places in any and every object. At each moment the whole universe is undergoing change, and the collocation of atoms at any moment is different from, what it was at the previous moment.”¹⁷¹

¹⁶⁸ *Ibid.*, p. 87.

¹⁶⁹ *Ibid.*, p. 126.

¹⁷⁰ *Mysteries of Space*, p. 5 (UNESCO Pamphlet).

¹⁷¹ *History of Indian Philosophy* by Dr. S. N. Dasgupta, Vol. 1, p. 250.

Rajas (energy) works on the original infinitesimal units of mass (*bhūtādi*), “absolutely homogeneous and absolutely inert and ubiquitous, being devoid of all physical and chemical characters (*rūpādibhirasam yutam*) except quantum (*paricchinnatva parināmas*).”

The action of energy on the original units of mass produces the infra-atomic unit-potentials (*tanmātrās*) charged with different kinds of energy. It “represents the subtle matter, vibratory, impingent, radiant, etc. instinct with potential energy.” These ‘potentials’ arise from the unequal aggregation of the original mass-units in different proportions and collocations with an unequal distribution of the original energy (*rajas*).¹⁷²

“First the ‘potential’ of the sound-stimulus is *lodged* in one class of particles, *tanmātras*, which possess the physical energy of vibration (*parispanda*), and serve to form the radicle of the ether-atom (*ākāsa-paramāṇu*) ; then the potential of the tactile-stimulus is lodged in another class of *tanmātras*, particles which possess the physical energy of impact or mechanical pressure in addition to that of vibration, and serve to form the radicle of the air-atom (*vāyu-paramāṇu*), next the potential of the colour-stimulus is lodged in a third class of *tanmātras*, particles which are charged with the energy and radiant heat and light in addition to these of impact and vibration, and serve to form the nucleus of the light-and-heat corpuscle, then the potential of the taste-stimulus is lodged in other *tanmātras*, particles which possess the energy of viscous attraction, in addition to those of heat, impact and vibration, and afterwards develop into the atom of water ; and lastly, the potential of the smell-stimulus is lodged in a further class of *tanmātras*, particles which are charged with the energy of cohesive attraction in addition to those of viscous attraction

¹⁷² *tanmatrarupadeh kim karanam iti cet svakarana-dravyanam nyunadhikabhavena anyo anyam prati samyogavisesa eva svajatiyopastambhadina vrddhihrsadikam ca yukta* ; vide *The Positive Sciences of the Ancient Hindus*, p. 25.

heat, impact and vibration, and which serve to form the radicle of the earth-atom.¹⁷³

According to the Nyaya-Vaisesika, transformation of atomic matter takes place in the form of chemical action in its different forms in accordance with the following rules, viz. (1) *kāraṇaguṇapūrvakah kāryaguṇodṛṣṭah*,¹⁷⁴ (2) *samānajātiyasamyogah dravyārambhakah vijātiyasamyogah*, (3) *apākajaruparasagandhasparsaparimāṇaikatvaikapṛthaktvagrutvadra-vatvasnehavegah kāraṇaguṇapūrvakāh* and (4) *rūparasagandhanusna-sparsasabdaparimāṇaikatvaikapṛthaktvasnehah samānajātyārambhakah*¹⁷⁵.

The Nyaya philosophy agrees with the Vaisesika on this point *kāraṇaguṇapūrvakah kāryaguṇodṛṣṭah* (the quality of the composite product is produced by the corresponding quality of the constitutive cause as a rule). But it differs from the latter in regard to a particular class of events, viz. the emergence of new qualities in earth bodies due to the action of heat. That is, it is a kind of *disjunction-conjunction* of the *taijasa* (fiery) elements by which the previous colour, etc., of the earth-atoms are destroyed and another colour, etc., are produced in their place.

On the contact of an earthly object with fire in a furnace a motion is generated in the ultimate constituent particles of it through the forcible

¹⁷³ *Ibid.*, pp. 25-26.

sadvaisesah tadyatha sabdātanmatram sparsatanmatram rūpātanmatram rasatanmatram gandhātanmatram ca ityēkadvitricaturpancalaksanah, sabdādayah pancavisesah, Vyasabhasya on Yogasutra, 18, pada II, p. 98.

ahankarat sabdātanmatram tatascāhankarasahakṛtat sabdātanmatrat sabdasparsa-guṇam sparsatanmatram evamkramena ekaikaguṇavṛdhya tanmatrani utpadyante, Samkhyapravacanabhasya, 1. 62.

sabdadinam murttisamanajatiyanam ekah parinamah prthiviparamānuh tanmatra-vayvāh bhūtāntaresu api snehausanyaprinamitva avakasadanani upadaya samanyam ekavikararambhah samādheyah, Vyasabhasya on Yogasutra, sutra 14, pada iv.

tadyatha gandhātanmatram varjjayitva catustanmatranam snehajatiyanam ekah parinamah jalaparamānuh tesam ca mahajalādhī evam gandharasau varjjayitva ausnya jatiyanam tritanamātranam tejo anu tebhya mahatejādhī evam gandharasānam varjanat dvabhyam vayvanuh tebhya mahavayvādhī evam sabdātanmatradāhankarāmsa—sahakṛtat akasānu tebhya mahakasādhī, Vijnanabhikṣu remarks, atra darsane ayam siddhantah sabdāditanmatrapancake kathiniasnehadivyaṅgyah prthivīyati-jatiyah santi, Yogavartika, Su. 14, pada IV.

¹⁷⁴ *Vaisesikasutra, II. 1 24.*

¹⁷⁵ *Prasastapadabhasya, Guṇapadarthanirūpanam.*

contact (*abhighāta*) of impulsion (*nodana*)¹⁷⁶ of the fire. As a result of this motion the disjunctions are generated by it in its turn ; they cause the destruction of the conjunctions in existence between the various parts of the composite and finally convert them to their ultimate particles. Later on the destruction of their qualities (by these particles of fire) again fresh qualities are generated in place of the old ones by a fresh similar contact of fire. They are called *pākaja* (transformed by chemical action). There are stated to be of two kinds of *pāka* (chemical action), viz., *pīlupāka* (chemical action of isolated atoms) of the Vaisesika and *piṭharapāka* (chemical action of the whole body) of the Naiyayikas.¹⁷⁷

The Vaisesikas¹⁷⁸ maintain that when the unbaked earthen pot, etc., are brought into contact with fire, motion is produced in *paramāṇus* of it by the forcible striking (*abhighāta*) or pressure (*nodana*) of the fire. Disjunction is produced by this motion in the constituents of the pot and it is followed by the destruction of the conjunction existing between the various constituents of the composite and finally their splitting up into the ultimate particles (atoms). After the complete disintegration of the body of the unbaked earthen pot a second impact of fire-particles upon the isolated atoms (*pīlu-āṇus*) destroys their original attributes like colour, etc. A third impact of fire, which occurs, generates fresh attributes, i.e., red colour etc., in these atoms in place of the old ones. Thereafter, a reverse motion is generated by the influence of the unseen force of the individual selves in the liberated and homogeneously transformed atoms which combine together by twos. The combination of the red dyads results in the corresponding triads ; thus the

¹⁷⁶ *parthivaparamanurupadinam pakajotpattividhanam ghatederamadravyasyaginī sambaddhasyagnyabhighatannodanadva tadarambhakesvanusu karmanyutpadyante tebhya vibhagah vibhagebhyaḥ samyogavinasah samyogavinasabhyasca karyadravyam vinasyati tasmin vinaste svatantrēsu paramanusvagnisamyogadausnyapeksacchya-madinam vinasah punaranyasmadagnisamyogadausnyapeksat pakaja jayante, Prasastapadabhasya, Pakajaprakaranam.*

¹⁷⁷ *Vaisesikasutra*, upaskara, 7.1.6. ;
Nyayakandali of Sridhara, p. 107 ;
Kiranavali of Udayana, p. 183 ;
Nyayamanjari of Jayantabhatta, Pt. II, pp. 11-12 ;
Nyayavartika of Uddyotakara, chap. III, *ahnika* 1, *sutra* 4.

¹⁷⁸ *apake nihksiptasya ghatederamadravyasya vahnina nodanadabhighatadva tadarambhakesu paramanusu dravyarambhakasamyogavirodhivibhagenarambhakasamyoganase dravyanasavasyambhavat. drsyate hi sthityamahitanam*, etc., *Vaisesikasutra*, *Upaskara*, 7.1.6. ;
Prasastapadabhasya, Pakajaprakaranam.

process leads to the production of the red pot of the original magnitude and shape.¹⁷⁹

The merit of the theory of *pīlupākaja* (chemical action of isolated atoms) is that it follows strictly the dictum “The quality in the effect is necessarily the outcome of the corresponding quality of the cause”,¹⁸⁰ i.e., the emergence of new qualities takes place in the isolated atoms (*pīlus*) as a result of the action of heat.

The theory of *pīṭharapāka* of the Naiyayikas maintains that the change of qualities takes place in the whole body (*pīṭhara*), remaining structurally intact¹⁸¹ as a result of the action of heat on the ground that it is perceived that a pot remains structurally intact even when it is being burnt by the fire inside the potter’s furnace.¹⁸² The recognition of the identity of the burnt pot and the unbaked one is not invalidated by a subsequent experience, but it stands as conclusive proof against the Vaisesika view which holds the two pots to be entirely different both numerically and qualitatively¹⁸³ and so on.

It appears from the analysis of *pīlupāka* and *pīṭharapāka* theories that the latter process seems to be more acceptable for the physical sciences have demonstrated that heat can penetrate into a piece of metal and bring about a change in its internal structure without destroying the magnitude of it. Taste, smell and colour also change with its chemical action.

According to Jaina philosophy, an ultimate atom (*paramāṇu*) undergoes two kinds of *pariṇāma* (transformation) viz., *gati-pariṇāma* (transformation of motion) and *agurulaghugūṇa-pariṇāma* (transformation of quality of neither heaviness nor lightness). An ultimate atom having equal *gūṇa* (quality) will transform another ultimate atom having equal but dissimilar *gūṇa* (quality) because of its combination with another ultimate atom or molecule. An ultimate atom having higher degrees of

¹⁷⁹ *Ibid.*

¹⁸⁰ *Ibid.*

¹⁸¹ *Ibid.*

Nyayakandali, p. 107 ;

Kiranavali, p. 183 ;

Nyayamanjari, Pt. III, pp. 11-12 ;

Nyayavartika of Uddyotakara, ch. III, *ahnika* 1, *sutra* 4.

¹⁸² *evam ghatadinamavasthayitvam na ca ghatadervinase kardamadibhirvina punarutpattiyukta* etc., *Vyomavati*, p. 447, a Commentary on *Prasastapadabhasya* ed. CSS.

¹⁸³ *Vyomavati*, p. 447.

qualities will transform an ultimate atom having the lower ones.¹⁸⁴ It is explained by Umasvati in his *Tattvārthādhigama Sūtra* that some *skandha* (molecule or aggregate) is formed by the process of combination of ultimate atoms, some by that of dissociation of molecules and some by both the processes of combination and dissociation of ultimate atoms¹⁸⁵ or molecules. When one binary molecule is formed by the combination of two discrete ultimate atoms, then it is called *dvipradesika skandha* produced by the combination of two ultimate atoms. Similarly, *tripradesika*, *catupradesika*, *saṃkhyātapradesika*, *asaṃkhyātapradesika*, *anantapradesika* up to *anantānantapradesika skandha* are formed by the combination of three four, countable, countless, infinite up to infinite-fold infinite ultimate atoms respectively¹⁸⁶ and so on.

The ultimate atom is not the effect of any material substance, for this reason the combination of material substances is not possible in the origination. It has been conceived as eternal ; nevertheless here its origination which is spoken in of the aphorism '*bhedādanuh*' is explained from the point of view of *paryāya* (mode), i.e. an ultimate atom is eternal as substance, but it is also producible (*janya*) from the modal point of view. The states of its existence sometimes as the constituent element of a molecule and sometimes as discrete atom, because of being dissociated from molecule are its *paryāya* (modes or particular conditions). Its discrete state (*viśakalita avasthā*) originates by the disintegration of molecule, for this reason, here the purport of the statement '*bhedādanuh*' is this much that, the ultimate atom having discrete state is the effect (*kārya*) of the disintegration of the molecule, not the pure ultimate atom.¹⁸⁷

In the physical science the transformation of atomic matter is explained by the chemical behaviour of it in the following manner. "Why molecules can sometimes inter-change atoms and form new substance, and why molecules already formed can sometimes dissociate again into

¹⁸⁴ *bandhe samadhi kau parinamikau, Tattvarthadhigamasutra, ch. V. 36.*

¹⁸⁵ *sanghatat-bhedat sanghatābhedaḍi tellyastribhyah karanebhyah skandha utpadyante dvipradesaelayah, Tattvarthahhasya, V, 26, p. 366.*

¹⁸⁶ *tadyatha—dvayoh paramanvah sanghatat dvipradesah dvipradesasyanosca sanghatat-tripradesah, evam samkhyeyanam samkhyeyanam ca pradesanam sanghatat tavat pradesah, Tattvarthadhigamasutra Bhasya, p. 367.*

esmeva bhedaḍ—dvipradesaparyantah, Ibid., p. 370.

¹⁸⁷ *bhedadeva paramanurutpadyate, na sanghataditi, Ibid., p. 371 ; see also the Tika of Siddhasena Ganin, Ibid., p. 371.*

separate atom.¹⁸⁸ These questions correspond to the *sūtras* of *Tattvārthādhigama Sūtra* *bhedasamghātebhyah utpadyante, bhedādaṇuḥ* (molecules are formed by division, combination and division-cum-combination ; atom is produced only by division).

“In more complex chemical reactions in which atoms are interchanged between molecules there are more quantities of energy to be considered. There are the energies which have to be supplied before the separate molecules can be dissociated and also the energies gained by formation of the new types of molecule. Even in a gaseous mixture there will be ample opportunity for interchange during collisions between molecules. The course of a given chemical reaction will depend on all these qualities of energy and upon the temperature, and also on the concentrations in which the various substances are present.”¹⁸⁹

This chemical behaviour as explained in the physical sciences is similar to the Jaina conception of transformation of atomic matter by the process of combination, of dissociation and of both combination and dissociation of atom.

Combination of Atoms (Paramāṇus)

According to the Samkhya, the process of combination of different elements of matter is explained in the following manner : there are stated to be two classes of aggregates, viz., (1) those of which the parts are closely united and fused, being lost in the whole (*ayutasiddhāvavāyah*) and (2) mechanical aggregates or collocations of distinct and independent parts (*yutasiddhāvavāyah samūhah*).

As an aggregate of the first kind a substance may be classified into two groups, viz., (1) the *bhūtas* and their ‘isomeric’ modifications (*bhūta-bheda* and *bhūta-vikāra*) and (2) chemical compounds (*milita-dravya saṁhāta-bhūtārtha*). The second class of the substance may be sub-divided into two groups, viz (i) those compounds of atoms of the *bhūta* class, i.e. of different isomeric modifications of the same *bhūtas*, and (ii) those compounds of atoms of different *bhūtas* classes. In the former there takes place the contact between ‘isomeric’ atoms (*sajātīya-samyoga*) while in

¹⁸⁸ *Atoms and the Universe*, p. 132.

¹⁸⁹ *Ibid.*, pp. 132-133.

the latter there occurs the contact between heterogeneous atoms (*vijātiya-samyoga*). The first contact brings about the intimate combination.¹⁹⁰ The isomeric atoms by a peculiar liberation of energy (*sājatīya-upaṣṭambha*—the action of similars on similars) are attracted towards one another, and being rivetted as it were, from the so-called material cause (*upādāna-kāraṇa*) of the compound product.¹⁹¹ The second kind of contact (that between unlike atoms of heterogeneous *bhūtas* begins with a liberation of energy (*upaṣṭambha*), which breaks up each of the *bhūtas* and taking particles (or atoms) of one as nuclei or radicles, groups, particles of the rest round these radicals in a comparatively free or unattached conditions.¹⁹²

In the above process the one *bhūta* performing the function of providing the radicles is called *upādāna-kāraṇa* (material cause) while the others bringing about the release of energy by their collocation (*upaṣṭambha*, *avaṣṭambha* or *viṣṭambha*) are known as *nimitta-kāraṇa* (efficient cause).¹⁹³ It is demonstrated by the examples of the *rasas* as modifications of *ap* (water with earth-accretions that this process applies to the attributes (*guṇas*) and the *bhūtas*.¹⁹⁴

According to Aniruddha, both isomeric and heterogeneous combinations are real cases of constitutive contact (1) *ārambhaka samyoga*, e.g., *bhautika vāyordehārambhakatvam*—Aniruddha on *Sūtra* 113, chap. V, (vide *P.S.A.N.*, p. 50). But in the latter Samkhya-Patanjala the current teaching denied this—*bahūnāmupādānayogāt* (*sūtra* 102, chap. V), where Vijnanabhikṣu notes—*bahūnām bhinnajātiyānām copādānatvam na dṣṛṣṭamiti sajātiyamevapādānam itarācca bhūtacatuṣṭayamupaṣṭambhakam*. (*The Positive Sciences of the Ancient Hindus*, p. 50)

¹⁹⁰ *sangah, sangakhyah yah, samyogavisesah tenaiva dravyanam vikaro bhabvati, Pravacanabhasya*, Vijnanabhikṣu, p. 136 ; see *The Positive Sciences of the Ancient Hindus*, p. 49.

¹⁹¹ *The Positive Sciences of the Ancient Hindus*, p. 49.

¹⁹² *Ibid.*

¹⁹³ *evamekaikagunasambhavat pradhanagunam asṛitya apradhanagunahparinama-bhedan pravarttayanti, Samkhyatattvakaumudi* by Vacaspati Misra on *karika* 16 ; see *The Positive of Sciences of the Ancient Hindus*, p. 50.

¹⁹⁴ *yatha akasdekarasam salilam patitam nanarupat samslesat bhidyate*, Gaudapada on *karika* 17 ; vide *The Positive Sciences of the Ancient Hindus*, p. 50 ; *tatra api (taijase sarirerapi) bahutaraparthivav-ayavavastambhat, alpatve ca anupabhogat*, Aniruddh on *sutra* 112, chap. V.
vatisamkaryasya asmakamadosatvat samagrisamavadhane anekairapi indriyaih ekada ekavṛttyu padane badhakam nasti ; Samkhyapravacanabhasya, see *P.S.A.H.*, p. 50.

It is admitted by the Samkhya that dyad (*dvyanuka*) may be formed by atoms in constituting substances.¹⁹⁵ In the mediaeval Samkhya-Patanjala it was conceived under the influence of the Nyaya-Vaisesika that the intimate combination took place in the case of the structure of molecule formed of 'isomeric' atoms, while in the case of a molecule formed of heterogeneous atoms there occurred only grouping of comparatively free or loosely attached atoms round a radicle atom (*vyūhana*) with liberation of energy (*upaṣṭambha*, *avaṣṭambha* or *viṣṭambha*) and the setting up of unequal stress and strain (*guṇa-vaiṣamya-vimarda*—Isvarakṛṣṇa). There existed a fundamental difference between these two structures of molecules. But this distinction is not applicable to the *tanmātras* (infra-atomic potentials or *sūkṣma-bhūtas*) the forms of subtle matter which could combine into close "fusion whether homogeneous or heterogeneous."¹⁹⁶

The Nyaya-Vaisesika explains that the ultimate atoms cannot exist in discrete state in creation;¹⁹⁷ nevertheless, the atmospheric air consists of the masses of atoms in a loose uncombined state.¹⁹⁸ One earth-atom combines with another by an original tendency to form a dyad (*dvyanuka*). In the same manner the dyads of other elements of matter are constituted. The ultimate atoms are endowed with inherent vibration (*parispandana*) and it is the rule that while combining in pairs except in the case of the chemical action under the influence of heat, the original qualities of the ultimate atoms generate homogeneous qualities in the dyads.¹⁹⁹

¹⁹⁵ *tatha anyanyasrayasca dvyanukavat gunah*, Gaudapada on *karika* 12 ; see *The Positive Sciences of the Ancient Hindus*, p. 52.

¹⁹⁶ As for instance, *sukṣma-sarira* (subtle body), the vehicle of the sentient principle is admitted by Vijñānabhikṣu to be *pancabhutatmaka* (*pancabhautika*), i.e., all the five *tanmatras* function as *upadana-karanas* (material causes), the gross body is stated to be a 'heterogenic' compound with the earth *bhuta* as a radical or base (see *Samkhya-bhasya*, *sutra* 11, 12, 19 ; chap. III, vide *P.S.A.H.*, p. 53).

But according to the original Samkhya-Patanjala, the production of a new substance by the contact of dissimilar elements (*vijatiya-samyoga*) was admitted as freely as it in *Vedānta*, and was conceived as in nowise differing from the formation of a compound of atoms of the same *bhuta* class (vide *P.S.A.H.*, p. 54).

The Samkhya view of chemical-physical action does not make any distinction between collocations of isomeric and those of heterogeneous atoms, as basically they are all collocations of the *gunas* ; even it is urged by Vijñānabhikṣu that the qualities of a compound substance are not necessarily the result of similar qualities in the compound elements.

sajatiyakaranaganasyaiva karyagunarambhakata iti tu tesam tarkikanam api na niyamah, vide *Ibid.*, p. 54.

¹⁹⁷ *Sivāditya*, *Saptapadārthin*, vide *commentary*, p. 21.

¹⁹⁸ *stimitavayustu paramanusamuha eva anarabdhadravyah*, *Saptapadārthin*, p. 21.

¹⁹⁹ *karyagunam karanaganapurvakam*, *Vaisesikasutra*, 7.1.6.

In the orthodox view, the primordial infinitesimal atoms begin with an unceasing vibratory motion²⁰⁰ and an inherent impulse which leads them to combine into dyad. The dyads constitute larger molecules, having combined by threes, fours, fives, etc., and the variety of elementary substances. The particular arrangement of them is determined by the physical cause as well as by the unseen force (*adr̥ṣṭa*).²⁰¹ It appears that this view had been originated by Prasastapada.²⁰²

According to another view maintained by the Vaisesika system, the ultimate atoms possess an inherent tendency to combine with one another, but some combine in pairs, others in triads, others in tetrads, etc., either by the ultimate atoms falling into the groups of threes, fours, etc., direct, or by the successive addition of one atom to each preceeding aggregate. The latter process of combination by the successive addition of one atom to each preceding aggregate is similar to the Jaina view of the formation of *dvipradeśika-tripradeśika skandhas*, etc. Therefore, like the Jaina *tripradeśika skandha*, the Vaisesika *tryaṇuka* inheres in three atoms, but not in three *dvyāṇukas* (dyads). Similarly, the same process of combination of atoms follows in the case of tetrads, pentads, etc.²⁰³

Praśastapādabhāṣya states that “the dyads are combined by threes, fours, fives, etc. (*tryaṇuka*, *caturṇuka*, etc.) to constitute different isomeric modifications.” The variety of earth-substances is due to difference in the arrangement of the molecules (e.g. their greater or less density) and, above all, their grouping or collocation (*vyūha*, *avayavasanniveśa*), which

²⁰⁰ *anavarataparispandamanaparimitapavannadiparāmanavah*, Raghunathasiromani, vide *P.S.A.H.*, p. 100.

gatisilatvat patatravyapadesat patantiti, Nyayamanjari, Udayana, vide, *P.S.A.H.* p. 100.

²⁰¹ *dyanukaivbahubhirarabhyata ityapi niyamo na . . . nanvadr̥stakarita sarvabhavaman, sr̥stik*, Nyayakandali of Sridhara *Prthivinirupanam*, pp. 80-81.

yada caturanukamarabhata caturṇam dryanukananamrambhakatrat, cf. Vacaspati's *Bhamati*, chap II, pada 11, sutra 2.

²⁰² *paramanudvyanukesu bahutvasinkhya taivarabdhe karyadiravye tryanukadilaksane*, *Prasastapadabhāṣyam*, *Parimananirupanm*, p. 57.

²⁰³ *caturvidhan naramanavah ksiti-jatagnivayunam, dvahyam paramanubhyam dyanukamarabhyate tribhiḥ paramanubhistryanukamarabhyate*, etc., Utpala, ch. I, sloka 7, *Vr̥hatsamhita*, cf. also Sridhara's admission *athava yadi paramanavo dyanukamarabhyata tatsahitastryanukamarabhante tryanukasahitastu*, etc., Samkara seems to speak of two binary molecules in the *Vaisesika* as forming a tetrad; vide. *P.S.A.H.*, p. 101.

account for the specific characters (*aparajāti*) manifested by these isomeric substances.”²⁰⁴

As already pointed out, an elementary substance like earth produced by primary atomic combination may undergo qualitative change under the action of heat in a furnace, according to two theories, viz., *pīlupāka* of the Vaisesika and *pīṭharapāka* of the Naiyayakas, i.e. (1) the decomposition into homogeneous atoms, transformation of atomic qualities and finally recombination, all under the operation of heat and the assuming of new characters by the molecules and larger aggregates under the influence of heat without decomposition into homogeneous atoms or change of atomic characters.²⁰⁵

In the Buddhist philosophy the process of combination and dissociation of matters are not clearly dealt with as it is treated in other Indian schools of thought. Nevertheless, it is implied from the Buddhist conception of *saṃghāta-paramāṇus* (combined atoms) like *saptadravyaka aṣṭadravyaka*, *navadravyaka* and *daśadravyaka*, and *kalāpa* that the atoms of earth, of water, of fire, and of air and the atoms of colour and shape, sound, odour, taste and tangible cannot appear independently without being combined with the fundamental ones, in the ratio of four atoms of primary matter to one of secondary.²⁰⁶ So the minimum number of four atoms of general materiality integrated with each atom of colour, odour, taste, and secondary tangibility matter is necessary “for their actual appearance in life”.²⁰⁷ In the case of particular piece of matter resounded, atoms of sound being added to it make the combination

²⁰⁴ *samanajatiyasamyogah drvyarambhakah na vijatiyasamyogah*, vide *P.S.A.H.*, p. 98. *sa prthivi sthairyadyavayavasannivesavisista anarajatibhurvopetal*, *Prasastapada-bhasya*, *Prthivinirupanam*, p. 12. *stharuyam nivadatvam... aparajatayo vyajyante*, *Nyayakandali*, p. 81. *sthairyam sthirata... dravyopanipatamatrenaiva bhanguratvat*, *Kiranavali of Udayana*, *Prthivinirupanam*.

²⁰⁵ *tesamanumanena vinasah parikalpate... pratiksanamutpadavinasau sambhavalaiti*, *Nyayamanjari (bhuta-caitanya purvapaksa)*, vide *P.S.A.H.*, p. 102. *praktisusiratayaiva karyadravyasya chatadeh arambhat antastejah kananupravesa-krtapakopapatteh... pitharapakapsai evarpesalah*, *Ibid*; *ye bijavayavaste purvvavyuhaparityagenatvyuhantaramapadyante vyuhantarapattau ca prthividhaturabdhatum samgrhita.....Nyayavartika*, *Uddyotakara*, ch. II, *ahnika 1, Su.4*, vide *P.S.A.H.*, p. 103.

²⁰⁶ *The Central Conception of Buddhism*, Stcherbatsky, p. 12.

²⁰⁷ *Ibid*.

comprising nine different atoms.²⁰⁸ “The combined atoms (*saṃghāta-paramāṇu*) alone appear in phenomenal reality, the simple ones or infra-atomic elements presumably, were relegated to the transcendental reality, in accordance with the general character of a Buddhist element. This device made it an easy task for Buddhists to oppose indivisibility of atoms.”²⁰⁹

According to the later Vaibhasikas, “air-atoms, form air by aggregation, fire-atoms constitute fire by aggregation, water-atoms form water by aggregation and earth-atoms form earth by aggregation. The elements combine to constitute inorganic substances, organism and organs.”²¹⁰

The combination of atoms is explained in Jaina philosophy in this way that some *skandha* (molecule) is formed by the process of combination of *paramāṇus* (ultimate atoms), some by that of dissociation of *skandhas* and some by both the processes of combination and dissociation of *paramāṇus* or *skandhas*.²¹¹ When one *dvipradeśika-skandha* (binary molecule) is formed by the combination of two discrete *paramāṇus*, then it is called a *skandha* produced by the integration of two *paramāṇus*. Similarly, *tripradeśika skandha* (triad) up to *anantānantapradeśika skandha* (molecule having infinitesimal infinite units of matter) are formed by the combination of three up to infinitesimal infinite *paramāṇus*²¹² respectively.

The combination of *paramāṇus*²¹³ takes place as a result of the chemical behaviour of the properties of matter of unequal degree viz. (1) *snigdhatva* (cohesiveness or attractive force), (2) *rūkṣatva* (dryness or repulsive force) and (3) *snigdhatva-rūkṣatva* (cohesiveness cum dryness or attractive cum repulsive forces), which are inherent in both *paramāṇus* and *skandhas* having two up to infinitesimal infinite units.

²⁰⁸ “The actual number of atoms in a *saṃghāta-paramāṇu* will be much greater, since each atom of secondary (*bhautika*) matter needs a set of four primary atoms of its own, but if *dhatus* alone are reckoned, the number will express the classes (*dhatus*) of elements (*dharma*s) represented, *Ibid.* (cf. *Abh.* p. 22).

²⁰⁹ *Ibid.*

²¹⁰ Vide *The Positive Sciences of the Ancient Hindus*, pp. 92-3.

²¹¹ *Tattvarthadhigamasutra* by Umasvati, *prathama vibhaga*, ch. v. *sutra* 26, p. 366.

²¹² *Ibid.*, p. 367 (See *Bhasya*).

²¹³ *Bhagavati Vyakhyaprajñapti*, *sataka* 8, *uddesaka* 9, *sutra* 4, and *Prajñapana*, *purvardha*, *pada* 13, *sutra* 185, *bandhasattrimisika* by Banarasigani, Sri Atmananda Grantha-mala, *dvasarasatna*.

It lasts for one *samaya* (instant) in the minimum and *asamkhyāta kālas* (innumerable units of time) in the maximum. Two *paramāṇus* combine together into a *skandha* (molecule) because of their possession of the property of *snehakāyatva*²¹⁴ (cohesiveness or attractive force). *Skandhas* also integrate and disintegrate into two, three units, etc.²¹⁵ On the basis of this Jaina Agamic view on the process of combination of *paramāṇus*, Umasvati explains it in this manner that it takes place by virtue of the proportion of cohesive and dry forces²¹⁶ which are associated with them. The origination of the material aggregate of the mutual contact of discrete (unitary) *paramāṇus*, etc.²¹⁷ For this reason, besides the contact (*saṃyoga*), there is something for its production. The purport of the aphorism *snigdha-rukṣatvad-bandhah* is to show this fact. In addition to the mutual conjunction it is also necessary that there should be the properties—cohesiveness and dryness (i.e., attractive and repulsive forces) in *paramāṇus*. When cohesive and dry constituent parts combine mutually with each other, there takes place their binding—transformation of oneness, (i.e., integration). The molecules like dyads, etc., are formed by this combination. There can be two kinds of combination of cohesive and dry constituent parts, viz. *sadrśa* (similar) and *visadrśa* (dissimilar).²¹⁸ The taking place of combination of the cohesive constituent with the cohesive one and that of the dry constituent with the dry one is called *sadrśa-bandhana*²¹⁹ (similar combination), while the combination of the cohesive constituent with the dry one is called *visadrśa-bandhana* (dissimilar combination). So there are stated to be two kinds of *bandhana-pariṇāma* (binding-transformation of matter), viz. *snigdha-bandhana-pariṇāma* (binding-transformation of the cohesive constituent parts) and *rūkṣa-bandhana-pariṇāma* (binding transformation of the dry constituent parts).²²⁰

The general rules of the combination of particles of matter are as follows : (1) There does not take place the combination of cohesive and dry constituent elements of matter having the quantum of the lowest (minimum) properties (energies),²²¹ i.e., there does not occur the combination of *paramāṇus* having the minimum quantum of properties. (2) On

²¹⁴ *Bhagavati Vyakhyaprajñapti*, sataka 1, uddesaka 10, sutra.

²¹⁵ *Ibid.*

²¹⁶ *Tattvarthadhigamasutra*, prathama vibhaga, ch. V, sutra 32, 1.

²¹⁷ *Ibid.*

²¹⁸ *Ibid.*

²¹⁹ *Ibid.*, ch. V, sutra 34 ; p. 422.

²²⁰ *Prajñapanasutra* (Tika), purvardha, pada 13, sutra 185, p. 287.

²²¹ *Tattvarthadhigamasutra* by Umasvati, prathama vibhaga, ch. V, sutra 33, p. 421.

account of there being equal quantum of properties there does not take place the combination of similar constituent particles of matter.²²² That is to say, there is no possibility of the combination of the cohesive constituent part with the cohesive one and that of the dry constituent with the dry one. (3) *Paramāṇus* having equal degree of cohesiveness or dryness, and being of the same kind, cannot combine with *paramāṇus* of their own kind²²³. (4) There takes place the combination of similar or dissimilar constituent parts having the difference in their degrees of cohesiveness or of dryness by two units more.²²⁴

In the three aphorisms '*na jaghanyaguṇānām*' '*guṇasāmye sadṛṣānām*' and '*dvyadhikādiguṇānām tu*' the first aphorism forbids the combination of particles of matter on the ground that there cannot take place the mutual combination of *paramāṇus* having the minimum properties of cohesiveness or dryness in them.²²⁵ It is revealed by the act of negation that there can be the mutual combination of all cohesive or dry constituent elements having medium and maximum degrees of these properties.²²⁶ But in this rule also there lies an objection which is explained in the next aphorism '*guṇasāmye sadṛṣānām*'. According to it, there cannot take place the mutual combination of similar constituent having equal degrees of properties of cohesiveness or of dryness. In this way there cannot occur the combination of the cohesive *paramāṇus* with the cohesive *paramāṇus* having equal degree of cohesiveness (i.e., attractive force) and that of the dry *paramāṇus* with the dry *paramāṇus* having equal degree of dryness (i.e. repulsive force).²²⁷ The contention of this negation shows that there can be the combination of similar *paramāṇus* having unequal degree of properties—cohesiveness and dryness (attractive and repulsive forces).²²⁸ Having abridged the expressed meaning in the third aphorism *dvyadhikādiguṇānām tu* the limitation for the combination of equal quantum of properties of similar constituents has been determined. In accordance with this rule there can take place the combination of similar constituents having unequal degree of property—cohesiveness or dryness, when the property of cohesiveness or of dryness of another

²²² *Ibid.*, ch. V, *sutra* 34, p. 422.

²²³ *Ibid.*

²²⁴ *Ibid.*, ch V. *sutra* 35, p. 424.

²²⁵ *Ibid.* see the commentary of ch. V., *sutra* 33, p. 421.

²²⁶ *Ibid.*, pp. 421-22.

²²⁷ *Ibid.*, see the commentary on ch. V, *sutra* 34, p. 422.

²²⁸ *Ibid.*, p. 433.

constituent element is more than the property of cohesiveness or of dryness of another constituent element by two, three, four units, etc.²²⁹ Therefore, if the property of cohesiveness or of dryness of one constituent element is more than the property of cohesiveness or of dryness of the other constituent element by only one unit, then there cannot be the combination of similar constituent elements.²³⁰ It is suggested that the Samkhya view of the combination of isomeric atoms (*svajātīya-saṁyoga*) and that of heterogeneous atoms (*vijātīya-saṁyoga*) caused by a peculiar liberation of energy (*upaśṭambha*)²³¹ is comparable to the Jaina rules that there would be combination between *paramāṇus* of the same kind and different kind, if there be difference in the degrees of cohesiveness and dryness.²³² Truly speaking, the combination of matter of the Samkhya-Yoga view is *pañcīkaraṇa*.

The Jaina conception of the inter-acts or inter-actions between *paramāṇus* which give rise to the existence and behaviour of matter in bulk bears some points of similarity with the law of the physical sciences in regard to the inter-atomic forces and the combination of atoms. It is explained by the latter that “every atom exerts a force upon every other atom. The details and magnitudes of the force vary as between one type of atom and another ; but in general the force is *always of attraction* when the atoms are at a distance apart greater than their normal diameters, changing to a force of repulsion, if the atoms are forced very close together. Thus there will be a tendency for atoms because of their force of attraction to draw together and stick.”²³³

The above outlines of Indian Atomism as embodied in the works of different Indian schools of thought clearly reveal the greatest value of their respective scientific approaches to the problem, even in the absence of critical varifying data of modern experimental science.

²²⁹ *Ibid.*, p. 424.

²³⁰ *Ibid.*

²³¹ *Samkhyapravacanabhāṣya* by Vijnanbhikṣu, ed. by Ramasankara Bhattacharya, published by Bharatiya Vidya Prakasan, Varanasi, VS. 2022, ch. V, *sūtra* 65, p. 212 ; see *The Positive Sciences of the Ancient Hindus*, p. 49.

²³² *Tattvarthadhigamasūtra*, *prathama vibhaga*, p. 423.

²³³ *Atoms and the Universe* by Jones, G. O. Rotblat and Whitrow.

Gleanings

Pārśvanātha Temple, Lodrovā

This late 15th or early 16th century Jain temple is by far the most beautiful building of the Great Indian Desert. Built of yellow sandstone, it shines like gold in the sun. Its *jāli* of stone-carved lace-work is superb and has a simplicity and boldness of design that is nowhere matched by the more ornate *jāli* work of the buildings in Jaisalmer fort and town. The use of yellow sandstone, with its golden aura and the delicate *jāli* carvings, is nothing new in the buildings of the old Jaisalmer state. What distinguishes this particular structure from all other buildings of the desert are its inexpressibly lovely contours, which project outwards from the base like the angles of a spreadout fan. The temple consists of (1) a cella with perforated screens in which is installed a new image (the older image has been removed to the Parsvanatha temple in Jaisalmer fort), (2) a porch with richly carved pillars that stand in front of the sanctum, (3) a circumbulatory (*pradakṣinā-patha*) going round the cella and the porch and (4) a richly ornamented *torāṇa* or gateway.

A spire rises over the cella. Carved into it are miniature spires that strongly accentuate the ascending movement. The outer wall of circumbulatory follows in every respect the star shaped ground plan of the sanctum itself. It is covered by a roof with large open windows. The light thus let in pours through the *jāli* windows of the cella into the sanctum itself—an unusual thing for a *garbhagrha* (cella of the sanctum) which is supposed to be dark. It is the combination of the star shaped ground plan with the outward incline of the walls of the circumbulatory that has created the striking angles of the temple. So far as I know, it is the only temple to be so structured in India. It is a unique medieval temple, but being situated in the heart of the desert, it has not attracted the attention it deserves from historians of Indian art. On the east side of the temple stands a strangely carved tree that is worshipped as the *kalpavṛkṣa* of Indian mythology. The tree is covered by a tower.

from 'the Great Indian Desert' by Rajat Kanta Ray,
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