

**VALLALAR'S VISION OF NUCLEAR PHYSICS**

**AND**

**NERVOUS SYSTEM**

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## FOREWORD

The insights of our saints and seers are unerring products of a direct vision boon of the concentrated powers of the soul. They are not inferred conclusions from logical premises. The latter are mediate, deductive and utmost probable. Direct intuitions do not function through links of arguments and premises but are a leap into the very nucleus of truth and reality. This is what is signified by what the Gita calls the Divine Eye (*divya-caksus*).

Saint Ramalinga Vallalar is a standing monumental proof of the possibility of these intimations of not only a spiritual science, but also the secrets of the physical universe. As he himself declares, he is the descendent of the continuous line of seers and sages (திருக்கூட்ட மரபு).

The Upanishads declare that the Supreme Reality is the smallest of the small and the greatest of the great (*anoraniyan mahatomahiyam*). They also reveal to us how the space within the heart (*daharakasa*) is the same as universal *akasa* only to thrust home the truth that one reality is comprehensively present everywhere.

The Sankhya and the Vaisesika systems have given a profound analysis of the cosmology reducing the plurality of the elements of reality and experience to more and more inclusive generic forms. The Vedantas of Sankara and of Ramanuja have incorporated all the elements of existence in one primordial cause namely Brahman.

Thus, in Indian thought, we have the idea of creation of the world from the atomic elements (Vaisesika) or the evolution of the world out of one homogeneous matter (Prakrti) mechanically (according to later Sankhya) or by the bidding of God (Advaita and Visistadvaita) either really (Visistadvaita, Saiva Siddhanta) or illusorily (Advaita).

To Saint Ramalingam, as for the Upanishadic tradition or Siddhanta tradition, the world is spiritual through and through. Every physical element owes its being and function to an ultimate intelligence; and the soul and its ingredients too are no less the function of a principle set in motion by a superior spiritual power.

In this thesis entitled "*Vallalar's Vision of Nuclear Physics and Nervous System*", Sri T. R. Thulasiram has expounded Vallalar in a lucid and with much depth of understanding. The pre-occupation with the spiritual in our land sometimes makes us forget the physical forces which should be understood for a healthy life here on earth. It is time that the balance is restored.

Sri Thulasiram has drawn many a concept from Sri Aurobindo in presenting his essay. A psycho - physical analysis of our being as to arrive a complete and correct concept of man attempted in the essay with an effective look into Kundalini Yoga has fulfilled a long felt need in this area.

“Know thyself” is the dictum of all spiritual masters from time immemorial. Sri Thulasiram has to be congratulated on his brave attempt. The world of earnest scholars in religion and philosophy do certainly feel a debt of gratitude to Dr. Sri N. Mahalingam out of whose initiative and active imagination, books such as this one are finding their light of the day.

Madras  
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## GENERAL EDITOR'S PREFACE

A perusal of Ramalinga Swamigal's works will throw considerable light on his knowledge of nuclear science. His works are as precise and as scientific as any modern book on physics. To those who have known Vallalar as a spiritual and literary scholar, this work is a revelation. This book examines his contribution to physical, philosophical and psychical sciences in a manner worthy of appreciation and adoration.

Arut *Prakasa* Vallalar has given us the concept of SHRISHTI JNAYAM in his BOOK OF UPADESHA which deals with the seven kinds of atoms and nuclear particles grouped under three broad heads as the effectual, causal-effectual, and causal-particles of matter. His book of TATVA LOKAS tells us about BHUTA TATVAS or the five elements. His poems TIRUVADI PERUMAI and JOTHI AGAVAL deal with atoms and nuclear particles of physical science. All these concepts are explained in the broad set up of their link and relationship with the supra-physical substances and forces.

Vallalar has distinguished atomic particles of physical elements broadly into three classes, the causal, causal-effectual and effectual, namely 1. VIBHU ANU, the substance of ether of space (corresponding to graviton and neutrino) 2. PARAMA ANU a fine atomic substance (of light and heat corresponding to photon of visible and invisible light) and 3. ANU the atomic substance of light and heat as of sunray (corresponding to electron emitting light).

The atoms have been classified into VAL ANU the basic atom of science, DRAVA ANU, the atom or molecule of liquid, GURU ANU, the atom of metallic elements or molecule of heavy elements of a solid nature, LAGHU ANU, the atom of gases or their molecules. Thus seven kinds of atoms and atomic particles have been distinguished.

Vallalar says that the sun's ray is BHUTA KARYA ANU. According to him it is the basic atomic particle which is yet derivative. In other words it is the ANU proper, the atomic particle of electron; it is derived from its original causal source or causal heat of the sun; (Karana Ushna of Surya referred to in the said chapter; it possibly corresponds to Karana Agni of the Jeeva as heat of vapour of the heart centre mentioned in the book of Upadesha under PINDA LAKSHANA); the causal heat of the sun is evidently the super heat and light in its core giving rise to ethereal substances possibly of a secondary nature corresponding to neutrinos, and the intermediate substance of photons of light X-rays and gamma rays.

Ramalinga Swamigal speaks of TATVA BHUTAS. These are the five physical elements of ether, gas, fire, water and solid matter. They are five substances of different grades, energies and forms. The ethereal substance of space is the subtlest of the physical matter and is the permanent causal substance, producing the effect of an outer visible form of the curvature of space; in its inner nature it is formless (hence massless or having zero rest mass) and extremely superfine in its substance and

lightness, so as to become the infinitely all pervasive physical substance which supports all the other elements, their various motions and energies. The massless neutrino is the outer etherial substance, and massless graviton is the inner, supporting all energy levels of all kinds of substances from zero to the maximum. According to Swamiji, there are many kinds of *Akasa*, the etherial substance, hence implying different grades of space. There are also many different gaseous states from the subtlest to the gross. Through the varying light and heat energies of these gaseous states, condensation of matter is made possible resulting in the formation of heavier elements like liquid and solid.

In regard to the generality of BHUTA TATVAS or the physical elements, Vallalar observes that the causal substance of atom or atomic particle (Bhuta Karana Anu) is extended immanently (Vyapti) in a free and unimpeded manner in the effectual substance (Karya Anu Paryanta). This evidently refers to the involutory manifestation.

The causal atom or atomic particle is involved in the effectual. Therefore, the substance of ether is involved in the gross material elements, or in other words, solid matter contains ether. Speaking about each element more specifically Vallalar says that BHUTA KARANA ANU is immanently extended into all the five elements, upto the gross physical matter of earth and the gross physical body.

With regard to the generality of physical elements he observes that the effectual atom or atomic particle (Bhuta Karya Anu) extends pervadingly (Vyapaka) upto the causal source (Karana Anu Paryanta), but in a fettered and impeded way or under resistance (Upadhi Samanya). This is evidently evolutionary manifestation of matter, from without and below, into or towards the causal source. This shows that ether has in it or possesses a part, which is the nature of material substance as in solid state of matter.

Thus, the atoms of the five elements contain each other, both in *involutionary and evolutionary* manifestations of matter. As we have rightly taken BHUTA KARYA ANU to mean electron, the wave-particle of heat of sun-ray, the BHUTA KARANA ANU will naturally signify etherial substance which in the discoveries of science can be taken as graviton (including neutrino). As a matter of fact, the configuration of electrons in shells or layers surrounding the nucleus of atom decides the nature of the element, its chemical and electrical properties and its chemical bond or binding relationship with atoms of other elements to form molecular compounds.

The stanzas of TIRUVADI PERUMAI (12-37) prove that Swamiji had the vision, a complete and direct knowledge of atoms, atomic particles, the forces and energies in them, their various densities or masses of matter, the variation in their masses brought about by the forces present in atoms, the stability and instability of the forces in relation to the masses. He saw the space within atoms, the secret substances within electron (ANU) that formed the light and space. He knew the forms or shapes of atoms of various elements and their variations and the properties or qualities of matter and their relation to the undeviating fixed order and harmony of light.

From what has been said above it is clear that Swamiji's knowledge of physics was of a high order. His works afford a lot of scope for research. Mr. Thulasiram has done an excellent job in sorting out the scientific truths in Swamiji's works.

In this book, he has arranged the material in ten chapters. While the first chapter deals with Atoms, Nuclei and particles of matter, the second one throws light on Vallalar's knowledge of the five elements. The third chapter is an account of the scientific concept from ATOM TO ATMA. In the fourth chapter, the IDEAL of AMRITA and VISHA VAYU is elaborated. The fifth chapter deals with proton, electron, photon, neutrino, gravitation as in Swamiji's literature. While the sixth chapter deals with Neutrinos and gravitons, the seventh deals with the properties of matter. The eighth chapter seeks to throw light on Sri Aurobindo's views on atoms and atomic particles. The ninth chapter explains centres or chakras and the nervous system. The tenth chapter gives us a clear idea of sensory pathways of the spinal cord and deals with the psychological, vital and physiological nervous system as conceived by Ramalingar.

Every chapter of the book is written with clarity of a high order and the views are supported by quotations from the works of Swamiji. An approach of this kind is a pioneering effort worthy of commendation.

Mr. Thulasiram has established that Swamiji is much more than a spiritual scholar or a literary star. A perusal of the work will prove beyond doubt that Arut Prakasa Vallalar saw things far ahead of his times and proved that religion and science are not isolated but inter-related.

Madras  
April 1987

N.Mahalingam

## AUTHOR'S PREFACE AND INTRODUCTION

Swami Ramalingam (1823-1874) alias Arut Prakasa Vallalar, the Munificent Donor of divine Grace - Light, known popularly as Vallalar - had his unparalleled and integral realization of the Divine, and fulfillment of his spiritual-physical life by supramental transformation of his dynamic nature, not only of mind and life energy into their divinised states and functionings, but also of the divinisation of his body into a luminous and deathless body - which he repeatedly affirmed in his Arutpa poems and writings and speeches. In such a divinised state of life, both in his inner soul as governed by Divine Spirit, as well as in the outer physicality of body, he had a total vision and multi-dimensional comprehension of the whole universe (1) in its immense infinitudes of worlds and planes - spiritual, supramental, overmental, mental vital, subtle - physical and the gross physical with all their contents, beings, forces of play and their interactions and effects - as well as (2) in its microscopic infinitesimals of atoms and nuclear particles like neutrons, protons, electrons, neutrinos and their exchanges into luminous energies of photons of light of various denominations, with their bearing on and relationship with gross physical matter, physiology, psychology and spirituality and their well-knit strands of harmonisation in the progressive evolution of human life. In short, he had seen in a direct vision all the worlds, beings and forces of their nature as well as all their physical bodies. We may very well say that he has made a great and enlightened contribution by his writings, to the physical sciences, particularly to nuclear physics and astrophysics, and to physiology of the nervous system as seen by a direct scanning especially in its relation with the subtle centres of force and consciousness in the body called chakras which have a bearing also on the life energies and mental faculties and their functions as well as psychic and spiritual growth in man.

In a certain sense, and moreover, if we are to look at things from the Swami's stand-point, the modern scientists with all their great and laudable achievements may be said to lag behind in solving the inseparable problems of the soul-mind- life-body complex of man's nature, because the unifying thread or link of knowledge is yet missing somewhere. They are not able to present as yet a cogent and co-ordinated view or picture of the realities of life. But behind all their efforts and researches is the guiding light of the Divine. One day the two poles, science and spirit, matter and spirit will be linked up in a palpable and recognisable manner.

To help the common reader in the understanding of the subject we have presented in a few chapters nuclear physics as such as in the language of science. We have correlated the scientific terms: atom, nucleus, neutron, proton, electron etc., with the Tamil or Sanskrit words, used by the Swami in his poems and writings, with explanatory notes and cross references here and there. It will enthuse scientists as well to make a study-in-depth of the subject and pick up rare hints and clues, the Swami has sprinkled here and there, as guide lines for the pursuit of their more serious research. To make the book more practical and useful, three chapters (see Appendix) are added on methods of inward concentration, health and self - treatment of diseases, by use of spiritually charged magnets and by color ribbon therapy methods through food and color lights- these being the practical and useful applications of the deathless

forces of the Swami's Body still vibrating among us, particularly around our environmental bodies.

Sri Aurobindo's vision and experience of atomic and sub-atomic particles are also quoted in a separate chapter. Man does not know the inner divinity of his soul, nor is aware of his outer environmental divinity, which has been made possible since 1874 by Swami Ramalingam. Because of the universal EBP-UNO powers of divinity brought about around each individual by Swami Ramalingam since 1874, and due to the diffused universal manifestation of the supramental Light of Grace in the subtle-physical atmosphere of the earth, brought about by the Mother and Sri Aurobindo since 1956, the evolution of man will receive a quicker pace and is bound to change into a divine evolution of his life. So, man now can tackle the seemingly insurmountable problems created by anti-divine forces, by contacting the power of Grace-Light in his environ by fingertips held in the close environ of his body or by touching it in his photo as well as at the top corners, and remembering the Divine Being of Grace-Light at the same time. Evidently, in the light of the above findings, there is an active collaboration among the said three masters in enlightening man in his spiritual - physical evolution, and it is also corroborated by the fact that the same power as in UNO and Neyveli prevails in Auroville city, founded in 1968 by the Mother, and her photo taken on 15-8-64 (as in her poise with joined palms) also reveals the same power both in her body and environ.

As already explained in the opening pages, Swami Ramalingam has manifested four ranges of spiritual-physical powers from his deathless body - EBP, UNO, SR Body and SR SAT Powers. His body disappeared in lieu of death, by a process of dematerialization in the concrete presence of the Divine Being of Supreme Grace-Light at his place on 30th January 1874, and that with a pre-announced intention of his to enter into all the physical bodies. In fact, it is meant to lift every man directly into the free spiritual-physical atmosphere of the divine Spirit, by a transcendence at once of all religiosity and its shackling limitations of religious fanaticism, dogmatism, violence and secondary means of approach and seeking of the Divine through priesthood and religious symbols. The Swami strongly advocated the transcendence of all religions, as the only solution, but without emphasizing religious equality or integration or co-operation of religions as an escape. He wanted to bring thereby the direct Rule of the Divine in the earthly life of man. Such a positive approach is made possible now, by directly relying on and utilizing the EBP and UNO power around man. The Swami is carrying it out. EBP power around scientists the world over has intuitively helped them to contribute to the enormous new discoveries since 1974 and they are bound to lead to human unity. Man shall utilize the same power to transcend religious barriers in order to feel the true spiritual love and brotherhood for each other as world citizens.

I am profoundly thankful with a sense of heart-felt gratitude to Dr. N. Mahalingam who has made all arrangements for bringing this book into the limelight as a publication of the International Society for the Investigation of Ancient Civilizations. I express my thanks in love to all those who helped in correcting the proofs and preparing an elaborate index. My thanks are also due to the printers for making a good get-up of the book.

Sri Aurobindo Ashram  
11.3.1987

T.R. Thulasiram

## ON THE PICTURE OF SWAMI RAMALINGAM AND HIS FOUR POWERS OF MANIFESTATION

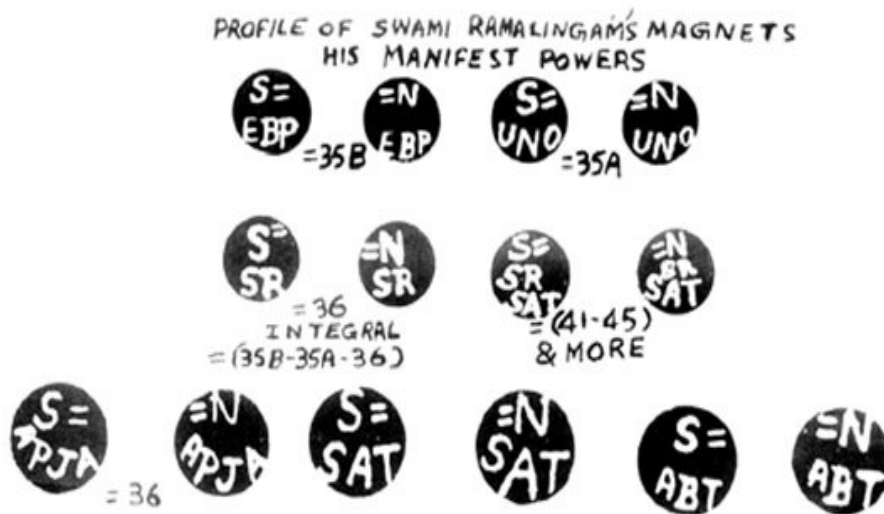
### THE PICTURE OF SWAMI RAMALINGAM



The full picture of Swami Ramalingam alias Vallalar (1823 - 1874), from head to foot, as given in the book is a photo- print of a painting. Because of his luminous deathless body, filled with the divine Light of Grace (Arut Perum Jothi) his form could not be drawn in photography. However, he comes in the fullness of his divine

glory and power, only when he is represented, as in the picture, in fullness of his body, and that without sacred ash on his forehead.

His form of body vibrates with the Supramental Truth-power of Grace-Light, his formless environ with the power of dynamic Satchitananda, and his eyes shine with the combined powers of both, manifesting the Supreme Equality of the Absolute Truth (or Supreme Reality). One can feel these powers by touching for a few minutes, his body and environ, separately, and finally looking into his eyes. If touched and looked simultaneously, the presence and integral power of the Supreme Divine Being of Grace-Light (Arut Perum Jothi Andavar, abbreviated as APJA) can be felt, resulting in an inward concentration but with the sense or feel of equality even in one's body, which is due to the Swami's attainment of a luminous deathless body.



An orange fruit kept in touch with any part of his picture for a few seconds, absorbs and retains his body power of Grace-Light in its outer skin, the power of formless Satchitananda in its pulp, and the power of form-formless supreme equality in its seeds. The fruit when eaten gives its power of Satchitananda to our body, which it retains.

A magnet becomes a permanent spiritual magnet, when it is charged with the power of Grace-Light, by holding it in contact with his body for a minute (marked as SR); likewise another magnet with his environ-power of Satchitananda (marked as SR SAT); and a third with the power of Supreme Equality by holding it within the palms and seeing into his eyes at the same time for 2-3 minutes. Such magnets or their photo-pictures can be used, by touch, for meditation. See illustration; the third is not shown herein.

Spiritual magnets of the said powers can also be made by direct call and remembrance of the name of each of the said Impersonal Truths, when holding a new magnet each time for the purpose. See APJA, SAT and ABT magnets in the illustration. With them, Swami's corresponding magnets respectively agree in power. The Swami's power of Supreme Equality exceeds the equality power of Ardha

Nareeshwara or the equi-poised power of God-Goddess, which is the basis of Equality of the spiritual self.

Swami Ramalingam dematerialized his deathless body in the concrete Presence of the Divine Being of Supreme Grace-Light at his place on 30th January 1874 with a view or declared purpose of entering into all the physical bodies. See his public statements and speeches on his last days. As a result he was not seen any more in body. At the least, it is now proved that he has entered into the environmental body of every person of his times, on the earth, in every part of the globe, kings, scientists, scholars, (e.g., King Edward VII, Charles Darwin, Louis Pasteur), common men, tribals and hill men etc., and continues to do so ever since 30th January 1874, irrespective of the differences of sex, age, race, nationality, religion, culture, caste, community and political affiliations.

Therefore, a magnet charged by keeping it in touch with the close environ of the body of any person, as in his or her photo taken after that date or ever since, shows one of the Swami's powers. It is his power around man and the magnet is called EBP magnet, as it is equally the environmental body power of every person. Since 1874, the Swami is also manifesting another power of his, by entering into the atmosphere of all international conferences and forums\*, Olympics and world bodies like League of Nations, UNO, UNESCO etc., in order to bring about human unity and the compassionate rule of a world government which he strongly advocated in his times. The same power is felt in Neyveli town (near his last living place at Mettukuppam) and also in Auroville near Pondicherry, and in Yogaville in Virginia USA. A magnet charged by keeping it in touch with the picture of UNO Head quarters in Manhattan area of New York, is called UNO Magnet, which is higher in power than EBP. Swami's own body-power (SR Magnet) exceeds UNO power. It may be said that EBP and UNO powers are contained in the Swami's body-power. See illustration. However, UNO power can also be felt by touching at the top corners of the photo of every person; likewise Swami's Body-power felt at the top corners of the pictures of UNO Assembly or other international conferences. EBP-UNO powers reconcile with the power of Swami's place at Mettukuppam or of its picture.

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\* On Science and Technology, Commerce and Industry, Food and Health, Art and Culture, and in the forums of Non-Aligned and Commonwealth nations, and in the Congress for promoting the case of a world government.

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The Swami's picture can be touched and seen and otherwise used for the following purposes.

It can be touched and seen directly for the purpose of worship, meditation, concentration but by the Divine Being of Supreme Grace-Light who is in the soul of every man, and finally His eyes may be seen to receive the divine Grace and Blessings of Love. The Swami always held before man, the Divine Being of Grace-Light as the Goal, for worship, meditation and realization, though the Swami is fully identified with Him.

Magnets purchased for the purpose of therapy or for concentration in Yoga - as referred to in Appendix I, II and IV may, before use by touch, be charged with the spiritual power of the Swami, by keeping them in contact with His picture, on His body and environ together, and then touching it for a minute. It becomes a permanent, spiritual magnet with the Swami's Power and Presence.

Swami's picture can be used for the purpose of color Ribbon Therapy (see Appendix IV) for self-treatment of diseases, for health and yoga. In the case of psychotic and neurotic persons mental disorder and/or spirit possession, the near relative also may help them through both color-therapy and magnet-therapy. North Pole of Swami's spiritual magnet has to be kept on the top head, forehead, heart, navel, and lower abdominal and pubic centres, successively for 5 minutes, while the patient shall touch its South pole by left palm only. Patient's color-deficiencies in his body may be found by joint dowsing, in which the near relative also keeps his fingers on ribbons and removes them along with the patient, and accordingly, he shall be treated by color ribbon therapy by food and by radiation of color - power.

A small size picture of the Swami may be kept in contact with the two wires of the main or sub-switch of the house. This serves to bring a spiritual-physical atmosphere in the living premises and its five elements and in the electric lights and equipment of the house. Swami's presence and power can be felt in seeing the light.

If polythene-covered picture of the Swami, is kept on touched by finger-tips of one hand, during the intake of food, drinks, fruits etc., our ignorant body too absorbs and retains in its own ignorant way, the great spiritual-physical powers of the Swami's body and environ. After a month of such practice, one is able to feel, appreciate and distinguish the different physical powers as such in the Nature around us, e.g., the distinct powers in the different species of flowers, in the different color lights or color ribbons and cloths; in ultra-violet rays of the early morning (an hour before sun rise), X-rays, gamma and cosmic rays, electrons of an electronic picture, accelerated protons and neutrons (by touch of empty gaps of space in their picture in Science books); and likewise the powers of astronomical bodies, sun, planets, stars, galaxies, nebulae, cosmic darkness etc., the enormous physical powers in sun-spots, pulsars, quasars, radio galaxies, and at the centre of our galaxy, the milky way as in their pictures; and above all, the different spiritual - physical powers of saints, sages, yogis and Vedic Rishis, founders of the great religions all the world over, whether past or present, by touch of their pictures, or of their shrines, tombs etc., or by touch of their spiritual magnets got charged by contact with such pictures or by direct call and remembrance of their name, Swami Ramalingam's powers, even the EBP, exceed theirs, both individually and collectively.\*

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\* EBP-UNO powers of the Swami surround even all saints and Yogis who are born or lived or living after 1874, and it can be felt only at top corners of their picture as for example, in the case of Ramana Maharishi, Sri Ramakrishna, Sri Aurobindo etc. However, in a few persons who are cruel and violent in nature like Hitler or who have gone mad (i.e. a case of spirit-possession), EBP power is weakened and hence not felt, but their UNO power is felt intact at the top corners of their picture which can be utilized with hope and promise to correct, recover and redeem them, and to strengthen and activate their EBP also.

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EBP power around a person may be felt by bringing the palms closer and closer, or closer to each side of the body, at the face or waist, but without touching it. It is activated by touch and especially by smell of a flower (like white Aster, Rosy-red rose, Sweet Basil, Sweet Marjoram (leaf), Polyantha rose, yellow chrysanthemum) and is felt forcefully when the flower is kept aside, bringing an inward concentration as a result. EBP is also felt likewise when corresponding fingertips of both hands are brought close to each other but without touch. It grows into UNO or SR Body-power according as the same is done with extended hands at different distances. EBP power is more readily felt if one touches first in one's photo his or her ignorant body of negligible power for 2-3 minutes, and then touch by a finger-tip on the close environs of body. It comes to be surely felt by repeated alternate touching of body and its close environs. The same EBP power is very much active collectively in the healing congregations of the masses in a public place, when it is made open to people of all religions.

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## 1. Atoms, Nuclei and Particles of Matter

Arut Prakasa Vallalar's works are scientific. A careful research into these reveals that the book of Upadesha, the book of Tatva Lokas and the poems captioned Tiruvadi Perumai and Jothi Agaval deal with scientific subjects such as Atoms and Nuclear particles which are to-day considered important subject matter in modern physics. In his book, *Upadesha*, he discusses Shristi Jnyam, which deals with the seven kinds of atoms and nuclear particles grouped under three broad heads - effectual, causal effectual and causal particles of matter. In his book of Tatva Lokas, he discusses the five elements, called the Bhoota Tatvas. His poems, Tiruvadi Perumai and Jothi Agaval, deal with Atoms and Nuclear particles, in a broad set-up and their link and relationship with the supra physical substances and forces. All these make his philosophical work scientific. Any modern scientist will be astounded at the abundance of scientific materials found in his works.

For ages past, the smallest indivisible unit of matter has been called atom. An atom may be in the gaseous, liquid or solid state. Science has discovered a number of elements, as many as 103 till now which are listed in the periodic table. Each element has characteristic physical and chemical properties. Atom is the basic structure of the elements. To give some examples of elementary atoms: atoms of gases like hydrogen, oxygen, nitrogen and chlorine; atoms of liquid such as mercury; atoms of solid metals such as copper, silicon, zinc, gold, uranium etc; examples of other solid elements are sodium and potassium.

Now two or more atoms of one and the same element combine to form a molecule. Thus in nature oxygen and hydrogen are found in their free states as molecules of two atoms and they are called chemical atoms or molecular atoms of  $O_2$  and  $H_2$  respectively. However, of the two gases, hydrogen is very rare in its free state as it readily combines with oxygen to form water or water vapour. Now again two or more atoms of different elements may combine to form a molecular compound that will have entirely different physical and chemical properties than those of the constituents. Thus, two atoms of hydrogen and one atom of oxygen combine to form water ( $H_2O$ ) that can be called a molecular compound. It is also an example of chemical fusion releasing energy in the form of flame or explosion at the time of fusion. To take another example, one atom of sodium and one atom of chlorine combine to form a molecule of sodium chloride ( $NaCl$ ) which is our common salt, a chemical compound. It is also a molecular compound. All molecular compounds are also chemical compounds. Thus apart from the free single atoms and double or triple molecular atoms of the same element, we have molecular compounds of different elements and they constitute most of the substances of the earth and its atmosphere. Besides, there are also mixtures of different gases, different liquids and different powders and solids which are to be distinguished from molecular and chemical compounds. Thus, gases like nitrogen, oxygen, carbon-di-oxide and water vapour mix themselves to form air of the atmosphere, but they do not normally combine to form molecular compounds which means a radical change in their structure. Similarly, metallic powders of two or more metals may form a mixture. Mixtures of such substances can be easily separated by physical means into their constituent elements, without involving a chemical or electrolytic process of separation such as electrolysis of water to resolve it into its constituents namely oxygen and hydrogen gases.

We may also note that the free atoms of a given element either as single atoms or double and triple molecular atoms (for example oxygen in its three forms of chemical atoms known as  $O_1$ ,  $O_2$  and  $O_3$ ), may exist in any of the three states of gas, liquid and solid. Even molecular compounds like water are also known to exist in the said three states, as water vapour, water as liquid and water frozen as ice and snow. So too, gases like hydrogen or oxygen may be reduced into its liquid and solid forms. Thus we find that the three gaseous, liquid and solid states of matter are rather different states of the same element or of the same molecular compound; and the change in their states arises due to variations in the intensity of heat. Now again, there is a fourth state of matter into which an element can be changed by ultra-high temperatures as in the sun and the stars. It is called the plasma state of the element (corresponding to the plasma state of heat) but here the atoms of the element undergo a radical change, more radical than a chemical change, in the sense that they remain no more as atoms, but each atom breaks into its component parts called atomic particles namely the orbital or outer electron or electrons and the nucleus; and the nucleus in turn breaks into its nuclear particles known as neutrons, protons, electrons, photons and neutrinos. Almost the entire mass of the nucleus and even of the atom as such is made of the masses of neutrons and protons. If electron is treated to have a unit mass, the neutron and proton respectively have 1839 and 1836 atomic mass units. The mass of neutron or proton of one element is the same as that of the corresponding neutron or proton of another different element. Oxygen has 8 neutrons and 8 protons in its nucleus and so the nuclear formula of oxygen is given as  ${}_8O^{16}$ , the subscript indicating the number of protons (called atomic number) and the superscript the total number of protons and neutrons together (called the mass number). Here also oxygen has two or more nuclear types. Thus, we have  ${}_8O^{16}$ ,  ${}_8O^{17}$  and  ${}_8O^{18}$ , the number of neutrons increasing from 8 to 9 and 10 respectively whereas the number of protons is eight which is same in all the three cases or more possible cases of nuclear oxygen.

Atom of an element is so minute that it cannot be seen even by ultra - modern electronic microscope; but it is no more an indivisible unit of matter as hitherto thought of; it breaks up into atomic and nuclear particles as we have seen in the preceding para.

An atom is about a hundredth of a millionth of inch across. In the centre of the atom is the nucleus that contains almost the entire mass of the atom. Electrons form the outer structure of the atom, circling or orbiting round the nucleus. Atom consists almost entirely of empty space inside; its size is indicated approximately by the orbit of its outermost electron. The nucleus of atom contains neutrons and protons, which have nearly the same mass. There are also other stable particles in the nucleus, which have negligible mass as in the case of nuclear electrons or of no mass (i.e. zero rest mass) as in the case of photons and neutrinos. There are also unstable particles in the nucleus namely mu-mesons and pi-mesons. Hydrogen is the simplest atom having one proton as the nucleus and an electron orbiting the nucleus. This is  ${}_1H^1$ . There are other nuclear types of hydrogen viz.  ${}_1H^2$  (with one proton and one neutron in the nucleus) and  ${}_1H^3$  (with one proton and two neutrons in the nucleus). Proton has positive electric charge and this charge is counter - balanced by the negative charge of an orbital electron. In an atom there are as many orbital electrons as there are protons in the nucleus, the neutrons being electrically neutral. Each element has a different

proportion of neutrons and protons, whereas the number of the orbital electrons is the same as that of protons.

Electrons are negatively charged. They are held in the atom by the equal positive electric charge of protons of the nucleus, though electrons and protons differ very largely in their masses. Neutrons of the nucleus have no electric charge. Since an atom as a whole is electrically neutral balancing the electrical charge between protons of the nucleus and outer electrons of the orbit, it follows that the number of orbital electrons in an atom is the same as that of protons. Though an atom is small and made of almost entirely empty space, there is the electric field that permeates all of this space. This electric field arises due to the interaction of the positive and negative charges of protons and electrons.

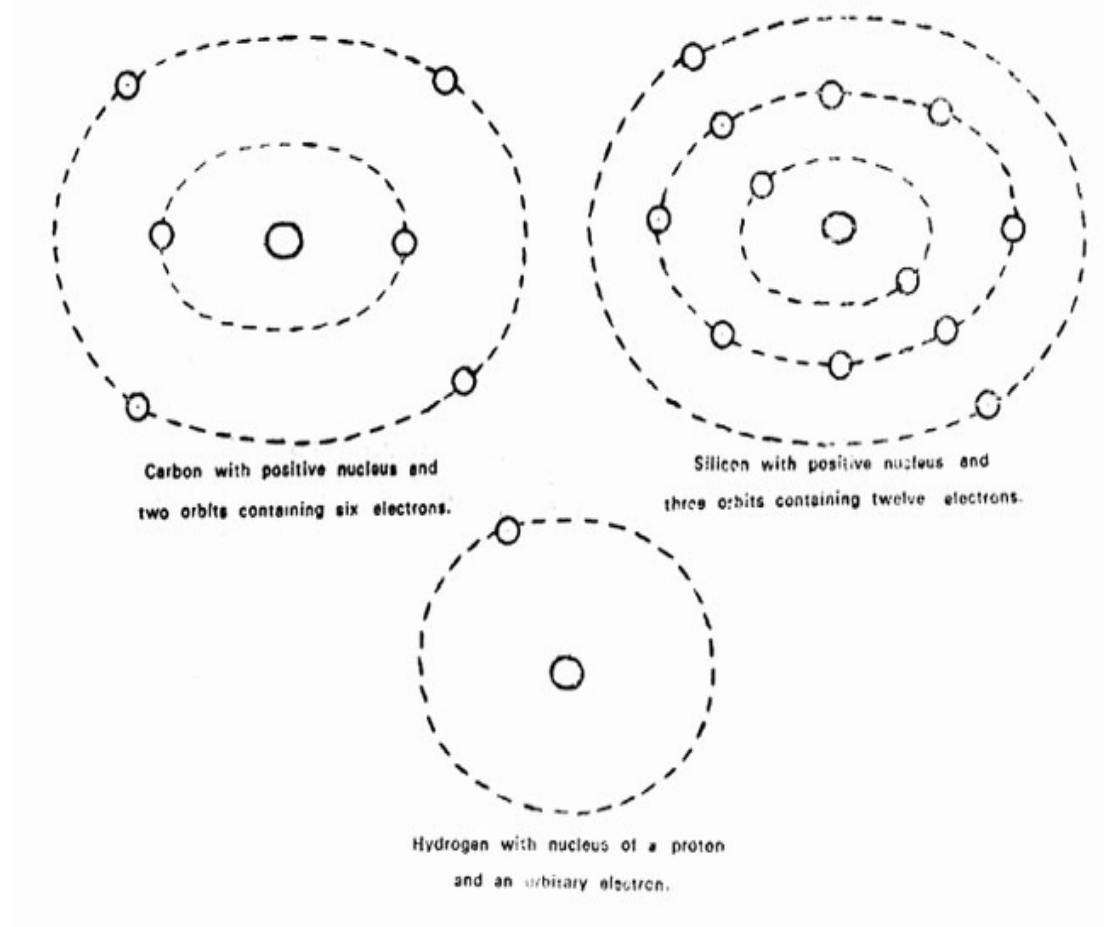
Electrons revolve about their nucleus in definite orbits. They move with acceleration and consequently radiate electro-magnetic waves. But according to quantum laws the energy of an electron in an atom can have only very specific discrete values, it cannot vary continuously, and an electron cannot radiate continuously. There is always a minimal energy, which an atom does not lose under any conditions so long as it succeeds in retaining its electron complement. If we could photograph a hydrogen atom in lowest energy state (the most elementary system which is its single electron orbits around the nucleus of a single proton), we would get what is called an "electron cloud" with maximum density at a certain distance away from the nucleus. This distance can be considered as a rough measure of the radius of the orbit.

In the structure of more complex atoms, the electrons are arranged in orbital layers or shells surrounding the nucleus. Every shell has a very definite number of vacancies. The innermost shell can accommodate at the most two electrons, the next one eight, and the next one eighteen, the further next thirty two, and the yet farther next eighteen and the next eight and so on till we reach the outermost shell which is the seventh in the order of shells and this last can accommodate again two electrons only at the most. There are also subshells within a shell but the total number of electrons in that shell including its sub-shells does not exceed the maximum given for that shell. However, not two electrons can occupy the same state at any one time. There must be some difference, which is that of spin of the electrons. The lowest energy orbits are in the inner shells and they are the most stable. In regard to atoms having very few electrons, only the innermost orbital shell is filled. Thus the single electron of hydrogen, and the double electrons of helium have their orbits in the innermost shell. The two electrons of helium must naturally have opposite spins of angular momentum.

The size of an atom does not change; it is the same for all elements, in spite of the increasing number of electrons. An increase in the positive charge of the atomic nucleus causes a compression of the inner shells. In this way, the dimensions of all atoms as defined by the radii of their outermost shells are about the same, whereas the inner electrons become packed in, closer to the nucleus as the charge builds up. This also explains the varying densities of mass of the different elements for a given volume.

The number of outer electrons varies periodically as the charge on the nucleus increases. After completion of filling up the vacancies of the first shell with electrons, a fresh shell is started. That explains also the periodic table of the elements. These regularities in atomic structure are most obvious when atoms make encounters. They interact and impinge with their outer shells in and through the peripheral electrons; and thus the chemical properties of an element or compound arise due to chemical binding between the outer electrons (valence) of two or more combining atoms. Chemical bonds have a peculiar property of saturation. An atom of hydrogen can pick up one other such atom, but never two or more. An atom of carbon can link up with four atoms of hydrogen but no more. Saturation is due to the limited number of collectivized or common electrons. In the most elementary hydrogen molecule ( $H_2$ ), both the electrons of the two hydrogen atoms behave as if each electron spent some of the time near one nucleus and the rest of the time near the others. So the forces generated by electron collectivization or electron cloud are called exchange forces. The exchange effect consists in the simultaneous collectivization of two electrons by two identical nuclei. The shape of the electron cloud of a hydrogen molecule ( $H_2$ ) differs markedly from the spherically symmetrical cloud of isolated or single, atom of hydrogen.

### CARBON, SILICON, HYDROGEN CYCLE WITH NUCLEUS



There is no inter-atomic relationship in a molecule for the simple reason that there are no atoms that remain unchanged when they combine to form a molecule. For example, there are no hydrogen atoms, strictly speaking, in a hydrogen molecule,

because their individuality dissolves when they merge into a new system. But the only thing that remain is the raw materials, namely two protons and two electrons, out of which it was constructed. Herein lies the fundamental difference of chemical forces from all other forces. A molecule may be regarded as the sum of nuclei (as shielded by inner electrons) and the common outer electrons whose movements depend on the distance between the nuclei.

When the unlike atoms (of different elements) join, the common electrons are in non-symmetric motion relative to the two nuclei. This is evident in non-uniform molecules such as common salt (NaCl or Sodium Chloride) and Hydrochloric acid (HCl) and others. In sodium chloride, for example, the binding is accomplished by the collectivization of eight valance electrons, one from sodium (which has a total of eleven electrons) and seven from chlorine (which has a total of seventeen electrons), the “stronger” atoms of chlorine expropriating an electron from the “weaker” atom of sodium which becomes a positive ion, the former becoming a negative ion. Thus there is a chemical binding due to the attraction of unlike charges. The distribution of electrons loses its polar nature, i.e. the positive and negative ions, as the differences in the nuclei disappear and becomes completely symmetrical for identical atoms as for example  $H_2$ ,  $O_2$  and so on.

Spin is essentially the rotation of particle on its own axis, like the spinning bullet emerging from the barrel of a gun in the direction of flight and imparting its rotational motion to the target or in other words imparting the same angular momentum to the target. A remarkable thing is that a target, like a small coin, when bombarded by electrons or other elementary particles (neutrons, protons), absorbs them and gets the same rotational motion as those of the incident particles. Photons (particles of light) transfer to the target twice the amount of angular momentum as that the electrons, neutrons or protons would impart. Certain other particles such as pi-mesons do not cause any rotation at all; so they have zero spin. Spin of electron is an essential factor when atoms combine to form molecules.

The mutual orientation of spins is a decisive factor. An electron can be twisted either rightwards or leftwards in the direction of motion i.e. in its orbital motion around the nucleus. Thus there are only two orientations of electron spin (i.e. clockwise and anticlockwise) with respect to any direction. If the spin of an electron is determined, the spin of another one is either parallel or anti-parallel to it.

The mutual orientation of spins is, therefore, a decisive factor in the formation of a molecule of hydrogen. Chemical binding appears only when the common electrons have opposite spins. The hydrogen molecule has a pair of electrons with antiparallel spins (i. e. opposite spins) and does not attach fresh atoms.

Again, chemical bonds are accomplished only by electrons with “free” spins, i.e. electrons of the outer shell. In the inner completely filled shells, electrons always form pairs and never take part in chemical binding. Only when the outer shell of the atom is not completely filled can its electrons establish a chemical bond; but not all the electrons, that is to say, the number of electrons with “free” spins (and hence the valency of the atom, for example, carbon has four valency) is equal to either the number of external electrons outside of completely filled shells whichever is the smaller of the two numbers. Thus the chemical and physical properties of an atom are

determined more by the number and arrangement of the electrons in the outermost shell than by the total number of electrons in the atom; and the chemical binding is the result of the number of electrons with “free” spins, which enter into mutual binding relations. Electron spin determines the whole chemistry of atoms. Chemical reactions are involved covering a wide range of events from simple combustion to the most delicate physical and chemical transformations within a living organism. Thus the peripheral electrons with their “free” spins are responsible for most of chemical and physical properties of the elements and compounds whereas the more intricately constituted nucleus gives the essential individuality to the element. Therefore, to transform one element into another, the nucleus has to be altered.

Basically there are ninety-two kinds of atoms with varying chemical and physical properties and they occur as natural elements on the earth. They are the elements such as hydrogen, oxygen, carbon, gold and uranium. Hydrogen is the simplest atom with one proton in the nucleus. As we move from the simplest to the most complex atom, the number of neutrons and protons in the nucleus increases and in some elements like oxygen, carbon and nitrogen, they are equal, and in the more heavy elements like gold and uranium neutrons far out-number the protons. Even in regard to a particular element there may be a short range of excessive neutrons over protons say one or two or three more neutrons than is required for the most common and stable state of proportion between neutrons and protons. Thus each element apart from its most common stable state has two or three less stable states of slightly varying proportions. These are called nuclides or more commonly as isotopes. Thus we have the most stable Hydrogen -1 denoted by the formula ( ${}_1\text{H}^1$ ) and the less stable varieties of  ${}_1\text{H}^2$  (called deuterium) and  ${}_1\text{H}^3$  (called tritium). These are the three nuclides or isotopes of hydrogen. Chemical elements in nature occurs as a mixture of isotopes.

The unstable arrangement of protons and neutrons disintegrate spontaneously emitting radiation. Radio active materials or isotopes emit three types of radiation namely alpha, beta and gamma. Radiation of alpha particle which is a formed nucleus of two protons and two neutrons (i.e. equivalent of the nucleus of Helium) does not penetrate deeply; the alpha particles of a radio active element are stopped by a few sheets of paper or a few inches of air. Beta particles (electrons originating from the nucleus of radioactive elements i.e. nuclear electrons) are more penetrating but they are stopped by thin sheets of aluminium or even by thick cardboard. Gamma rays are very powerful in penetration of matter, more powerful than X - rays. Several inches of metal would be penetrated before they are stopped. However, all types of radiation fog affect photographic Plates, even when wrapped in black paper. Natural radioactivity points out that the nuclear structure, unlike the extra-nuclear family of electrons, is very compact and complex, capable of ejecting particles like alpha, beta and gamma. The gamma rays are not, strictly speaking, constituents of nuclei, but they are emitted when a nucleus is in an “excited state” and so long until it returns to the normal. They are like the X-rays or visible light emitted when the peripheral electrons return from a higher energy level to its normal state. A close study of the alpha ray and gamma ray spectra reveals that there is a great order in the internal structure of the nucleus despite its complexity. The continuous nature of the beta-ray spectra (spectra of nuclear electron) is associated with another new particle, the “neutrino”, which though massless has a discrete energy value, because along with the beta-emission is also found the ejection of neutrino from the nucleus.

Researches in artificial transmutation of elements indicate that alpha particles, protons, neutrons, positrons, electrons, (Beta particle) and neutrinos make up the constitution of nuclei in some way or other. Alpha particles are stable sub-units made up of two protons and two neutrons within the overall set up of the nucleus, particularly in the case of heavy elements, like uranium that is radio-active. Again, "cosmic ray studies" prove the existence of another fundamental particle in the nucleus and it is named as mesons, negatively or positively charged and classified accordingly as mu-mesons or pi-mesons, and they are extremely unstable breaking into electrons and positrons, neutrons and anti-neutrinos and giving off Gamma rays.

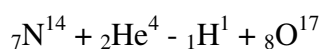
We are led by the discoveries of nuclear science to the conclusions that the nuclei of different elements are fundamentally built up from the same simple elementary particle namely the proton of hydrogen. The electrical neutrality of the atom as a whole suggests that even electrons i.e. the outer or peripheral and inner electrons of the various shells, (as distinguished from beta or nuclear electrons) should be considered as part and parcel of the constitution of the nucleus. The beta-ray emission by natural radioactive elements confirms the existence of electrons in the nucleus. However, there is a school of thought that considers that the electrons (i. e. nuclear electrons) do not preexist in the nucleus but are formed just at the instant of emission caused by the transformation of neutrons into protons and vice-versa ( $n - p + e^-$ ;  $P - n + e^+$ ). As protons and neutrons are convertible into each other in the nucleus, they are regarded rather as two alternative states of a single heavy nuclear particle called nucleon.

Now about transmutation of one element into another by natural radiation called radioactive decay of radioactive element. For example uranium-238 gives or changes into thorium-234 by ejecting an alpha particle. Tritium ( ${}_1\text{H}^3$ ) which is one type of hydrogen emits or ejects negative electrons from its nucleus and becomes or changes into another gaseous element, Helium  ${}_2\text{He}^3$ . In this case negative electron is produced when a neutron changes into a proton. Similarly phosphorus isotope ( ${}_{15}\text{P}^{30}$ ) emits a positron (positive electron) and turns into a silicon isotope  ${}_{14}\text{Si}^{30}$ ; in this case a positive electron is produced by a proton changing into a neutron.

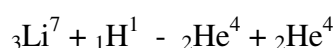
1.  ${}_{92}\text{U}^{238} \rightarrow {}_{90}\text{Th}^{234} + {}_2\text{He}^4$  or  $\text{U}^{238} \rightarrow \text{Th}^{234} + \text{He}^4$
2.  ${}_1\text{H}^3 \rightarrow {}_1\text{H}^2 + e^-$  or  $\text{H}_3 \rightarrow \text{He}_3 + e^-$
3.  ${}_{15}\text{P}^{30} \rightarrow {}_{14}\text{Si}^{30} + e^+$  or  $\text{P}^{30} \rightarrow \text{Si}^{30} + e^+$

Now about artificial transmutation of one element into another by bombarding the atoms of the element (for the purpose of nuclear disintegration) with incident particles (called also as projectiles) such as cosmic rays, alpha particles, gamma rays, protons, deuterons (nuclei of hydrogen - 2), neutrons and electrons: The first three projectiles are natural agents derived from the powerful cosmic rays of the outer space striking upon the earth or from the natural radio-active elements, while the others are artificially produced, for the purpose with the help of electron guns or cyclotrons and accelerated into increasing velocities and energies by suitable machinery so as to break up the atoms of a given element which becomes the target for the said bombarding particles.

The first artificial transmutation of atoms was made by Ernest Rutherford with the help of the fast moving alpha particles from natural radio-active element. Nitrogen was bombarded with alpha particle and got changed into oxygen with the emission of a proton of hydrogen.



With the help of accelerators like cyclotrons, synchrocyclotrons (synchrotrons) and electron accelerators, protons or electrons are nowadays accelerated before striking a given element. Lithium-7 was bombarded by accelerated protons (i. e. protons of Hydrogen) to produce alpha particles (helium nuclei).



With the synchrocyclotron (accelerator), artificial pi-mesons were first created and the decay of a pi-meson into an electron and a neutral particle called neutrino was first observed. The particles that come forth at high speeds, on the breaking up of nuclei, are traced by "Particle detectors" like cloud (gas) chamber, bubble (liquid) chamber or spark (metal plates) chamber wherein the tracks of the recoiling particles are obtained on photographic plates and this is made possible due to the ionising effect of charged recoiling particles. However, the massless and neutral particles like neutrinos and the photons of gamma rays do not leave any trace of their track in the said chambers, but their presences are inferred by characteristic effects of the interaction.

The gamma ray emission usually accompanies the alpha or beta disintegration of a radioactive nucleus. Artificial nuclear disintegration leads to excited states of the resultant nucleus. The change produced as a result of nuclear reaction manifests itself not only by the emission of a particle from the nucleus but also by the reconstitution of the remaining particles in the nucleus with the emission of gamma rays. The time taken normally for this emission is extremely small, of the order of  $10^{-16}$  seconds, unless delayed by other circumstances. However, it is still not conclusively decided whether the emission of gamma rays is before or after the departure of disintegrated alpha or beta particles from the nucleus. A study of gamma ray and alpha ray spectra, reveals more about the inner structure of the nucleus, i.e. the existence of nuclear energy levels, whereas the continuous nature of the beta spectra does not, Alpha rays have a fine structure, the Beta rays a continuous spectrum and the Gamma rays highly mono-chromatic lines.

Gamma rays are also known as photons of invisible light. They are the extremely short wavelengths of the radio - magnetic waves, shorter than those of x-rays. Photons of visible light are made of somewhat larger wavelengths. These photons of visible and invisible light are massless and have the velocity of light. As between neutrinos and photons of gamma rays, the former has still shorter wavelengths, though both are considered to be travelling at the same speed of light. Photons are radiated from the sun into the space around and reach us on the earth. Photons of gamma rays can be directly produced by the interaction of electrons and positrons. Conversely electron-positron pair can be formed by high-energy gamma rays that is to say, the massless rays, by change of energy, assume a mass and become the said pair.

Photons of visible light and invisible light (x-rays and gamma rays being invisible) can be taken as two orders of light. In the hottest core of the stars, photons are considered to get converted into neutrinos via “electron-positron pair increases” in the core. It is said that the major portion of the energy formed in the core of a star reaching 6,000,000,000<sup>0</sup>C appears as neutrinos.

Massless particles like the neutrinos, photons and gravitons (hypothetical massless particle associated with gravitational force), all begin to move at the velocity of light at the very instant of their creation and they continue to so move at that speed till the moment of absorption. This indicates that the neutrinos remain in the immediate vicinity of a proton only for about  $10^{-23}$  seconds and hence in that short interval, the chances of interaction are extremely poor such that on the average they would have to travel through 3500 light years of solid matter before absorption. A photon also travels at the speed of light, but according to the situation or level of energy, when a photon must be emitted by an atom, it is emitted in about  $10^{-8}$  seconds. Hence a photon in the vicinity of an atom for  $10^{-8}$  seconds has a better chance of being absorbed than the neutrino. Considering both the photon and neutrino as waveforms, photon has a considerably longer wavelength than the neutrino and as a consequence takes longer time to pass through an object, even though both are travelling at the same speed. Gamma rays (photons) penetrate only ten feet of lead before being absorbed. Ordinarily light (photons) which has longer wave length is more readily absorbed and hardly penetrates more than a few dozen atoms-thicknesses of a solid.

Neutrinos have no rest mass, like that of photon. It means there are no neutrinos at rest. As soon as they are born by natural disintegration of nucleus or by induced and artificial interaction or due to excessively hot conditions of the stellar and solar cores where also they are born, they begin to move at the velocity of light. They pass through and leave off the stellar bodies into outer space and reach into the earth and into its inner core in no time as it were. That is to say, they pass through all barriers and even through solid matter such as the earth and its material objects and even through our physical bodies, but without producing any interaction or disturbances in us. As a matter of fact, billions and billions of neutrinos pass through every square centimetre of the earth’s cross section. They are found ubiquitously everywhere. In short they fill all spaces in and around, above and below and permeate throughout the entire physical universe of matter and space. From all accounts we may safely say that the neutrino is substance and yet no substance (as it has no mass or shape). It is substance and yet energy. This must be a substance of ether, the *akasa* of the Indian system of knowledge, pervading and becoming space itself, and yet it cannot be felt, seen or known directly and tangibly as a material substance, though as an outer effect of their existence, the space is seen as a dome or rather as a curvature of space. They are called in science the elusive particles or even as “vacuum particles” - terms which are quite contradictory in sense. We may call neutrinos rather as the space-giving or space-forming substance, in fact, as the substance of space itself.

Graviton may be considered as another order of etherial substance, subtler than neutrino but yet forming the substratum of physical space. According to Swami Ramalingam, the yogi and nuclear scientist, if we may give a modern scientific

appellation to his name, there are many different orders of ethereal substances or spaces (*anantha akasabhedha*).

Modern scientists do infer that ether might be the substance through which the force of gravitation was transmitted and that it might be identical with the ether that did or did not transmit light. The nineteenth century scientists called the particular ether that transmitted light as “luminiferous ether” and so they thought there might exist more than one variety of ether. For them ether was needed as a reference point against which the motion of all other bodies and substances and forces could be measured, and ether itself was considered to be motionless, though transmitting forces such as gravity and light-waves. Possibly the various discrete energy-values of short wavelengths of the visible and invisible ranges of light, though both the ranges travelling at the same speed of light, may be explained as related to the various kinds of ethereal substances.

### Characteristic of known fundamental particles

Chart I CHARACTERISTICS OF KNOWN FUNDAMENTAL PARTICLES

Family	Name	Particles Symbol	Anti Particles Symbol	Mass	Spin	Electric Charge	Life-time in seconds	Decay (Disintegration) Products
	Photon	$\gamma$	$\bar{\gamma}$	0	1	0	Stable	
	Graviton	G	G	0	—	0	Stable	
	Neutrino (Electron type)	$\nu_e$	$\bar{\nu}_e$	0	$\frac{1}{2}$	0	Stable	
	Neutrino (mu-meson type)	$\nu_\mu$	$\bar{\nu}_\mu$	0	$\frac{1}{2}$	0	Stable	
Electrons	Electron	$e^-$	$e^+$	1	$\frac{1}{2}$	-1	Stable	
	Positron			1	$\frac{1}{2}$	+1	Stable	
L-mesons	Mu-meson	$\mu^-$	$\mu^+$	206.7	$\frac{1}{2}$	-1	$2.2 \times 10^{-6}$	$e^+ + \bar{\nu}_e + \nu_\mu$
	Pi-meson	$\pi^-$	$\pi^+$	273.2	0	1	$2.6 \times 10^{-8}$	$u^+ + \nu_\mu$
	Pi-meson neutral	$\pi^0$	$\pi^0$	264.2	0	0	$2.2 \times 10^{-16}$	$2\gamma$ , or $\gamma + e^+ + e^-$
K-mesons	K-meson	$K^+$	$K^-$	966.5	0	1	$1.2 \times 10^{-8}$	$e^+ + \nu_e + \pi^0$ $u^+ + \nu_\mu$ or $\pi^0 + \pi^+$ $3\pi$ , or $u^+ + \nu_\mu + \pi^0$
	K-meson neutral	$K^0$	$\bar{K}^0$	974	0	0	$1.0 \times 10^{-8}$ $6.0 \times 10^{-8}$	$\pi^+ + \pi^-$ , or $2\pi^0$ $\pi^0 + \pi^+ + \pi^-$ , or $\pi^+ + e^- + \nu_e$
Nucleons	Proton	$p^+$	$p^-$	1836.1	$\frac{1}{2}$	1	Stable	
	Neutron	$n$	$\bar{n}$	1838.5	$\frac{1}{2}$	0	1013	$p + e^- + \bar{\nu}_e$
Hyperons	Lambda hyperon	$\lambda^0$	$\bar{\lambda}^0$	2182	$\frac{1}{2}$	0	$2.5 \times 10^{-10}$	$p + \pi^-$ , or $n + \pi^0$
	Sigma hyperon	$\Sigma^+$	$\bar{\Sigma}^+$	2327	$\frac{1}{2}$	1	$0.8 \times 10^{-10}$	$p + \pi^0$ , or $n + \pi^+$
	Xi-hyperon	$\Xi^-$	$\bar{\Xi}^-$	2580	$\frac{1}{2}$	-1	$1.2 \times 10^{-10}$	$\lambda + \pi^-$

NOTE: The mass, spin and life-time of antiparticles are the same as for the particles. The charge of an antiparticle is opposite in sign and equal in magnitude to that of the particle.

In the final analysis, force is convertible into matter and the physical universe of matter is said to be the creation of force. This has been established as a fact by Einstein, by his formula of relativity between mass, energy and constant velocity of light. So, each kind of force has a characteristic substance of its own and it is spoken of as a field of force. The particle (or substance) that corresponds to the electro-

magnetic field is the photon, which is considered different from other particles only because the laws of interaction make it particularly easy to create and annihilate. The particle corresponding to the gravitational field is the graviton, which has not yet been observed as individual particles. The said two fields are of long range, while the fields corresponding to the other particles are of short range, less than the size of the atom. The latter consists of the strong and weak nuclear fields. In the strong nuclear field the protons, neutrons and mesons participate in interactions, while in the weak nuclear field the electrons and neutrinos. Photons, neutrinos and gravitons have no rest mass and they always travel at a constant velocity of light from the moment they are born; whereas electrons, protons, mesons and neutrons have a rest-mass and can travel with any velocity not exceeding that of light. Thus each field manifests itself as a type of elementary particle. There are different kinds of interactions between various pairs of these fields. The particles of a given type are always identical but they are not fixed in number, because they are constantly being created or annihilated or transmuted.

Now again according to variations in energy levels of a particle, its nature and substance (mass) would change. So we may speak of many kinds of etherial substances such as neutrinos and gravitons, each variety forming a different state of etherial space. Thus for example, the space immediately surrounding the earth and that at high altitudes would greatly differ in regard to their gravitational forces, the latter tending towards a zero gravitational force. Therefore, there will prevail corresponding gravitons forming their respective etherial spaces.

## 2. The Five Elements

In dealing with *bhuta tatva*, the physical matter, which is first tatva under the chapter “*Tatva Lokas*” (dealing with 103 *tatvas*) Swami Ramalingam mentions its first three main aspects among a total of 34 as *rupa*, *swarupa* and *swabhava*, but contrary to the usage of the terms *rupa* and *swarupa* to mean the form (i.e. outer form) and essential form (i.e. the inner form) of a thing or principle, the Swami uses them to mean the essential form or the inner form by the term *rupa*, and form or outer form by the word *swarupa*. Possibly the Swami considers the outer physicality of matter as the first basis of approach or the starting point from the evolutionary side of nature. He uses the two terms in the said significances also in regard to other *tatvas* or principles, particularly in the said book on *Tatva Lokas*. Each *tatva* similarly refers to its respective 34 aspects.

We give below the text and the rendering in regard to the physical matter in general. See the full text of the *Bhuta tatva* at the end of this chapter.

“*Sukshma antara sneha anutva savikalpa sadhya vicitra bhuta rupa shakti; sthula bahya sneha anutva savikalpa sadhya sadhya vicitra bhuta swarupa shakti; Sukshma sthula bahya antara kriya sneha anutva savikalpa karma sadhya sadhaka vicitra bhuta swabhava shakti.*”

1. “The varied essential form (*rupa*) of the physical matter (i.e. the five elements in general) is a force of essential form which is constituted by the subtle and inner atoms (or atomic particles) which are attracted into a binding (friendly) relationship in the objective phenomenal creation of nature. The varied form (*swarupa*) of the physical matter is a force of form, which is constituted by the gross and outer atoms (or atomic particles) which are attracted into binding (friendly) relationship in the objective phenomenal creation of nature. The varied essential nature (*swabhava*) of the physical matter is a force of action in the created and creative phenomenal nature in order to perform works of a subtle and inner kind as well as of a gross and outer kind by the atoms of matter (or atomic particles) which are mutually attracted into binding relationship.”

Now the essential form (*rupa*), form (*swarupa*) and essential nature (*swabhava*) of each of the five elements are elaborated. Each aspect is spoken of as substance-energy or force of the element of matter.

2. “*The rupa of Prithvi* (the earthly gross solid matter) is by its heaviness and hardness and it is a force; the *rupa* of liquid (of water) is by its liquidity and coolness and it is a force; the *rupa* of fire is by its heat and lightness of weight and it is a force. The *rupa* of gas (*vayu*) is by its extra lightness and motion, and it is a force; the *rupa* of ether (*akasa*) is by its extremely super-ultra lightness and by its permanence as the causal substance (*nirantara adhikarana parama atyati laghutva akasa rupa sakti*) and it is a force. (i.e. ether of space is the permanent causal substance or substratum for all physical substances).”

3. “The *swarupa* of the gross earthly solid matter is quadrangular and it is a force; the *swarupa* of liquid is bi-angular and it is a force; the *swarupa* of fire (or heat) is triangular and it is a force; the *swarupa* of gas (or gaseous state of *vayu*) is hexa-angular i.e having six angles and it is a force; the *swarupa* of ether (*akasa*) is circular or global and it is a force *kundalakara akasa swarupa sakti*, i.e the outer form of ether or etherial space is its curvature).”
  
4. “The essential nature (*swabhava*) of the gross earthly solid matter is the force of heaviness of the atoms mutually attracted into a binding relationship (*gurutva sneha anutva*) so as to effectuate a fixation (of place in space) by an extraordinarily subtle form of work. (*Gurutva sneha anutva sadhana asadharana suksma sthapana karmatva prithvi swabhava sakti*). The essential nature of liquid is the force of fluidity of the atoms mutually attracted into a binding relationship so as to effectuate the action or work of a spreading motion. The essential nature of fire or heat is the force of heat of the atoms mutually attracted into a binding relationship so as to effectuate the action or work of an upward spreading motion (*ushna sneha anutva atilaghutva sadhana oordhva prasarana karmatva Teju swabhava sakti*). The essential nature of gas or gaseous state is the force of the upholding quality (i. e. containing by pressure) of the atoms of super-ultra lightness mutually attracted into a binding relationship so as to effectuate the action or work of a continuously expanding or prevading motion (*alamba snehanutva atyati laghutva sadhana vyapaka Upanu prasarana Karmatva vayu swabhava sakti*). The essential nature of ether (*akasa*, the etherial substance of space) is the force of formlessness (i. e. form dissolving quality) of the atoms (or atomic particles) of extremely super-ultra lightness mutually attracted into a binding relationship so as to effectuate a subtle causal action or work of an infinite all-prevasiveness (of motion) - *nirakara sneha anutva parama atyaty laghutva suksma sadhana anusyuta karana karmatva akasa swabhava sakti*.”

Now we may give some explanations on the above, in the context of the discoveries of nuclear science. In regard to the outer forms of the five elements (*swarupa*), we have their bi-angular, triangular, quadrangular, hexa angular and lastly circular or spherical shapes or forms. They seem to correspond with the various shapes considered to be taken up by the distribution of electron density i.e. the three dimensional distribution of mass and charge of the electron (wave particle) within an atom, say, for example, the hydrogen atom which is the simplest. Thus there will be a spherical shape with one node, a square or cube with four nodes, a hexagon with six nodes and so on. “The electron cloud distribution” thus assumes different shapes within the space of atom according to its various energy levels of orbits consistent with the nature of the elements. The electron in its orbital movement around the nucleus of an atom acts as a charge oscillating from one end of its orbit to the other, and this creates electro magnetic radiation, which it emits off in the form of visible light. Its mass and charge are spread out symmetrically throughout the space immediately surrounding the nucleus.

Now in the case of the outer form of ether of etherial space, which appears to us as a dome-like curvature of sky, it may possibly be due to the extremely subtilised form of orbital electron at the accelerated velocity close to or equal to that of light, that is to say, at the ultra high or maximum energy level when it gets transformed into

the massless neutrino of the outer electron family. It annihilates in that process its known mass by releasing energy as photons of invisible light, But in contrast to the outer form of ether as a curvature of etherial space, the inner and essential nature of ether (*swabhava*) is spoken of as formless substance or a form dissolving form of substance supporting all motions and energies of action. Possibly the inner nature of ether is represented by the neutrino of the very nucleus (i.e. another variety as formed from out of a nuclear electron or directly as formed out of neutron) in the inner part of atom. Or it is identifiable with graviton, the gravitational field with in atom and outside it.

Thus in regard to ether which is verily the substance of space, the Swami observes that it has an outer form (*swarupa*) which is global, i. e. with a curvature of space, and an inner form (*rupa*) which is the causal and permanent substratum for all the material substances, and an inner nature of force (*swabhava*) to dissolve form so as to make its substances all-pervasive and formless and thereby support all motions and actions in it at all energy levels. Formlessness here implies the massless substance of an all-pervasive and all-permeating nature such as neutrino or graviton, though it is yet a substance having energy levels, in principle, all the energy levels from zero to the maximum. It is in a critical state of etherial space, that accelerated particles and anti-particles, for example electrons and positrons, at the high velocity of light collide and annihilate themselves as to mass and change into massless formless substances as neutrinos and anti-neutrinos. Of course, particles of matter having mass may take their birth in another state of etherial space possibly corresponding to the outer form of ether, the *swarupa* state, The critical state of ether, in which spontaneous or instant annihilation of mass of matter takes place, may correspond to its *swabhava* state.

In *Joti Agaval* poem, the Swami mentions three states or kinds of etherial physical space namely a causal seed-state, a formless state and a manifest state (வெளியின் கருநிலை, அருநிலை, விரிநிலை) which possibly correspond to *swabhava*, *rupa* and *swarupa* states of *akasa* described herein. Again, the etherial spaces are said to be many (*ananta akasa bheda*) according to the 'Book of Upadesha' and similarly manifold gaseous states arise. Therefore, it is implied that there should be many etherial substances forming their spaces in the physical universe. We have treated the neutrinos and gravitons as etherial substances and again according to modern discoveries of science, there are, broadly speaking, two kinds of neutrinos, the neutrinos of the electron family and those of the muon family. Possibly gravitons also may have their different grades according to the variations of gravitational force even within a given system of stellar (sun) and planetary bodies, material objects and elements, and atoms and nuclei. But *Joti Agaval* poem also points out that the space is one (i.e. The universal space) in which all, each and everything are manifested - the manifestations of material nature of atoms and particles, plantlife, animal life and the consciousness of a mental human life (உயிரியல், வித்தியல், சித்தியல்) physical space, life space and mental space and spiritual space and implied in that one universal space and each space has its characteristic substance and energy. Thus, behind or within the many varieties of etherial space, there is an unifying or harmonising unitary space, which is the crowning summit (வெளியின் முடிநிலை). The physical etherial space also serves in its own field as a summit for the material things and forces of matter because it happens to be the immanent core or seed - state of all matter (வெளியின் கருநிலை).

The one universal space in its highest purity is *Paramakasa*, the supreme space or sky of the supreme Ether (i.e. the Supramental space formed by the pure spiritual substance inherent with its own being the *Siva*, and with pure force the *shakti*) - not the physical ether of the physical space which is only a derivative from the supreme Ether, through the intermediary skies or spaces of (1) overmind (with its substance of *Pranava anu*, an overmental sound-producing substance), (2) Mind and (3) Life (with their corresponding substances). The Physical ether of Physical space forms the more material atomic substances and elements of our physical world. The physical ether of the physical space is called *bhuta karana anu or vinn anu or vibhu anu* (vide: “Upadesha,” and the poem *Tiruvadi Perumai*, dealt with in the forthcoming chapters and pages).

*Joti Agaval* poem also points out that the physical etherial space (நிலை விண் அதாவது வெளியின் வியன் நிலை) which we see around and above us is filled with a characteristic sound (i. e. an etherial sound) – (வெளியினில் ஒலி நிறை வியன் நிலை-ஜோதி அகவல் 497). The physical space is a form of the substance of *Siva*, the supreme being (விண் நிலை சிவத்தின் வியன் நிலை-ஜோதி அகவல் 357). It is the last one among the four broad kinds of spaces, (*Joti Agaval* line 340 - விண்நிலை விண்ணாய் அதாவது விண்ணின் நிலையான விண்ணாய்). The four spaces are the inmost, the inner (i.e. the middle), the inner - outer (i.e. as compared with the next, the outer this is larger or wider) and the outer, corresponding to (1) supramental (2) overmental (3) subliminal and (4) physical (விண்ணின் உள் விண்ணாய், விண்ணின் நடுவிண்ணாய், விண்ணின் உறுவிண்ணாய்-ஜோதி அகவல் 338 - 340)

The inner-outer space, which is the subliminal containing the mental and vital life spaces is much larger or wider than the physical space and hence called *uru vinn*. The physical space, which is relatively the outer when considered among the said four broad kinds of spaces, has in itself an exterior form and interior formless physicality of space as we have seen in the foregoing pages.

Now the full text of the *Bhuta tatva* of the “*Tatva Lokas*” is given hereunder. Each state of the *bhuta tatva* is spoken of as a *loka* or rather as a state of energy (*shakti loka*). After mentioning the 34 descriptive features or states of the physical matter in general, the text proceeds to give similar elaborations for each of the five kinds of physical matter, namely ether, air heat or fire, water and earth. Finally the permuted combinations of the five elements are given. Next follows the details of the next *tatva* namely *Tanmantra Tatva* which we have not given herein.

## **TATVA LOKAS**

### **BHUTA TATVA**

1. Sukshma sthula antaranga bahiranga Sadharana asadharana bhoutika pratyaksha vyakti *rupa* samavaya karana mula mayantarantara ahankara ekadesa-udbhava tanmatra karya BHUTA TATVA LOKA.

1. Sukshmantara snehanutva Savikalpa sadhya vicitra bhuta rupa sakthi loka.

2. Sthula bahya snehanutva savikalpa sadhya vicitra bhuta svarupa sakthi loka.
3. Sukshma stula bahyantara kriya snehanutva savikalpa karma sadhya sadhaka vicitra bhuta svabhava sakti loka.
4. Karanenu karya paryanta sadhyatva bhuta sati samanya vyapti sakti loka.
5. Karyanu karana paryanta sadhyatva bhuda-upadhi samanya vyapaka sakti loka.
6. Vividha rupa sadhya bhuta visesha sakti loka.
7. Vividhanu vyaparatva bhuta guna sakti loka.
8. Bahya-indriya sukshma vikalpa vishaya sadhyatva bhuta varna sakti loka.
9. Visesha anutva sadhya bhuta paratva sakti loka.
10. Samanya anutva sadhya bhuta aparatva sakti loka.
11. Aneka anutva vicitra samanya samavaya sadhya bhuta bhava sakti loka.
12. Adhithana matra bhuta nimitta sakti loka.
13. Adhithana visesha matra bhuta nimitta visesha sakti loka.

(Apica) and

1. Sukshma sthula snehanutva sambandha rupa vyaktyadi sadhaka sadhya bhuta udbhava sakti loka
2. Bhuta udbhava Adhikarana sakti loka
3. Bhuta udbhava karana sakti loka
4. Bhuta udbhava parva sakti loka
5. Bhuta udbhava karma sakti loka
6. Bhuta udbhava upakara sakti loka
7. Bhuta udbhava upakara preraka sakthi loka
8. Bhuta adhikara sakti loka
9. Bhuta adhikara adhikarana sakti loka
10. Bhuta adhikara karana sakti loka
11. Bhuta adhikara parva sakti loka
12. Bhuta adhikara karma sakti loka
13. Bhuta adhikara upakara sakti loka
14. Bhuta adhikara upakara preraka sakti loka
15. Bhuta laya sakti loka
16. Bhuta laya adhikarana sakti loka
17. Bhuta laya karana sakti loka
18. Bhuta laya parva sakti loka
19. Bhuta laya karma sakti loka
20. Bhuta laya upakara sakti loka
21. Bhuta laya upakara preraka sakti loka
22. (Ittham) Thus

1. Kathina gurutvadi prthivi rupa sakti loka
2. Sita draaavatvadi ap rupa sakti loka
3. Ushna laghutvadi teja rupa sakti loka
4. Calana-atyati laghutva vayu rupa sakti loka
5. Nirantara adhikarana parama-atyati laghutva akasa rupa sakti loka
6. Catus kona prthivi svarupa sakti loka
7. Dvi kona svarupa sakti loka
8. Tri kona teja svarupa sakti loka
9. Shat kona vayu svarupa sakti loka

10. Kundala akara akasa svarupa sakti loka
11. Gurutva snehanutva sadhana-asadharana sukshma sthapana karmatva prthivi svabhava sakti loka
12. Dravatva snehanutva sadhanat prasarana karmatva ap svabhava sakti loka
13. Ushna snehanutva ati laghutva sadhana oordhva prasarana karmatva
14. Alamba snehanutva atyati laghutva sadhana vyapaka upanu prasarana karmatva vayu svabhava sakti loka
15. Nirakara snehanutva parama atyati laghutva sukshma sadhana anusyuta karana karmatva akasa svabhava sakti loka
16. Vividha vicitra rupa sadhya prthivi visesha sakti loka
17. Ap visesha sakti loka
18. Tejo visesha sakti loka
19. Vayu visesha sakti loka
20. Akasa visesha sakti loka
21. Pinda anda paryanta sati samanya sadhya prthivi vyapti sakti loka
22. Ap vyapti sakti loka
23. Tejo vyapti sakti loka
24. Vayu vyapti sakti loka
25. Akasa vyapti sakti loka
26. Maya paryanta upadhi samanya sadhya prthivi vyapaka sakti loka
27. Ap vyapaka sakti loka
28. Tejo vyapaka sakti loka
29. Vayu vyapaka sakti loka
30. Akasa vyapaka sakti loka
31. Vividha udbhava anutva vicitra prthivi guna sakti loka
32. Ap guna sakti loka
33. Tejo guna sakti loka
34. Vayu guna sakti loka
35. Akasa guna sakti loka
36. Prthivi varna sakti loka
37. Ap varna sakti loka
38. Tejo varna sakti loka
39. Vayu varna sakti loka
40. Akasa varna sakti loka
41. Prthivi bhava sakti loka
42. Ap bhava sakti loka
43. Tejo bhava sakti loka
44. Vayu bhava sakti loka
45. Akasa bhava sakti loka
46. Prthivi paratva sakti loka
47. Ap paratva sakti loka
48. Tejo paratva sakti loka
49. Vayu paratva sakti loka
50. Akasa paratva sakti loka
51. Prthivi aparatva sakti loka
52. Ap aparatva sakti loka
53. Tejo aparatva sakti toka
54. Vayu aparatva sakti loka
55. Akasa aparatva sakti loka
56. Prthivi udbhava sakti loka

57. Prthivi udbhava adhikarana sakti loka
58. Prthivi udbhava karana sakti loka
59. Prthivi udbhava parva sakti loka
60. Prthivi udbhava karma sakti loka
61. Prthivi udbhava upakara sakti loka
62. Prthivi udbhava upakara preraka sakti loka
63. Prthivi adhikara sakti loka
64. Prthivi adhikara adhikarana sakti loka
65. Prthivi adhikara karana sakti loka
66. Prthivi adhikara parva sakti loka
67. Prthivi adhikara karma sakti loka
68. Prthivi adhikara nimitta sakti loka
69. Prthivi adhikara nimitta vesesha sakti loka
70. Prthivi laya sakti loka
71. Prthivi laya adhikarana sakti loka
72. Prthivi laya karana sakti loka
73. Prthivi laya parva sakti loka
74. Prthivi laya karma sakti loka
75. Prthivi laya upakara sakti loka
76. Prthivi laya upakara preraka sakti loka
77. Ap udbhava sakti loka
78. Ap udbhava adhikarana sakti loka
79. Ap udbhava karana sakti loka
80. Ap udbhava parva sakti loka
81. Ap udbhava karma sakti loka
82. Ap udbhava upakara sakti loka
83. Ap udbhava upakara prekara sakti loka
84. Ap adhikara sakti loka
85. Ap adhikara adhikarana sakti loka
86. Ap adhikara karana sakti loka
87. Ap adhikara parva sakti loka
88. Ap adhikara karma sakti loka
89. Ap adhikara upakara sakti loka
90. Ap adhikara upakara preraka sakti loka
91. Ap laya sakti loka
92. Ap laya adhikarana sakti loka
93. Ap laya karana sakti loka
94. Ap laya parva sakti loka
95. Ap laya karma sakti loka
96. Ap laya upakara sakti loka
97. Ap laya upakara preraka loka
98. Teja udbhava sakti loka
99. Teja udbhava adhikarana sakti loka
100. Teja udbhava karana sakti loka
101. Teja udbhava parva sakti loka
102. Teja udbhava karma sakti loka
103. Teja udbhava upakara sakti loka
104. Teja udbhava upakara preraka sakti loka
105. Teja adhikara sakti loka
106. Teja adhikara adhikarana sakti loka

107. Teja adhikara karana sakti loka
108. Teja adhikara parva sakti loka
109. Teja adhikara karma sakti loka
110. Teja adhikara upakara sakti loka
111. Teja adhikara upakara prearaka sakti loka
112. Teja laya sakti loka
113. Teja laya adhikarana sakti loka
114. Teja laya karana sakti loka
115. Teja laya parva sakti loka
116. Teja laya karma sakti loka
117. Teja laya upakara sakti loka
118. Teja laya upakara preraka sakti loka
119. Vayu udbhava sakti loka
120. Vayu udbhava adhikarana sakti loka
121. Vayu udbhava karana sakti loka
122. Vayu udbhava parva sakti loka
123. Vayu udbhava karma sakti loka
124. Vayu udbhava upakara sakti loka
125. Vayu udbhava upakara preraka sakti loka
126. Vayu adhikara sakti loka
127. Vayu adhikara adhikarana sakti loka
128. Vayu adhikara karana sakti loka
129. Vayu adhikara parva sakti loka
130. Vayu adhikara karma sakti loka
131. Vayu adhikara upakara sakti loka
132. Vayu adhikara upakara preraka sakti loka
133. Vayu laya sakti loka
134. Vayu laya adhikarana sakti loka
135. Vayu laya karana sakti loka
136. Vayu laya parva sakti loka
137. Vayu laya karma sakti loka
138. Vayu laya upakara sakti loka
139. Vayu laya upakara preraka sakti loka
140. Akasa udbhava sakti loka
141. Akasa udbhava adhikarana sakti loka
142. Akasa udbhava karana sakti loka
143. Akasa udbhava parva sakti loka
144. Akasa udbhava karma sakti loka
145. Akasa udbhava upakara sakti loka
146. Akasa udbhava upakara preraka sakti loka
147. Akasa adhikara sakti loka
148. Akasa adhikara adhikarana sakti loka.
149. Akasa adhikara karana sakti loka
150. Akasa adhikara parva sakti loka
151. Akasa adhikara karma sakti loka
152. Akasa adhikara upakara sakti loka
153. Akasa adhikara upakara preraka sakti loka
154. Akasa laya sakti loka
155. Akasa laya adhikarana sakti loka
156. Akasa laya karana sakti loka

157. Akasa laya parva sakti loka
  158. Akasa laya karma sakti loka
  159. Akasa laya upakara sakti loka
  160. Akasa laya upakara preraka sakti loka
  161. Prthivi prthivi sakti loka
  162. Prthivi ap sakti loka
  163. Prthivi tejas sakti loka
  164. Prthivi vayu sakti loka
  165. Prthivi akasa sakti loka
  166. Ap prthivi sakti loka
  167. Ap ap sakti loka
  168. Ap tejas sakti loka
  169. Ap vayu sakti loka
  170. Ap akasa sakti loka
  171. Tejo prthivi bhuta sakti loka
  172. Tejo ap bhuta sakti loka
  173. Tejas tejo bhuta sakti loka
  174. Tejo vayu bhuta sakti loka
  175. Tejo akasa bhuta sakti loka
  176. Vayu prthivi bhuta sakti loka
  177. Vayu ap bhuta sakti loka
  178. Vayu tejo bhuta sakti loka
  179. Vayu vayu bhuta sakti loka
  180. Vayu akasa bhuta sakti loka
  181. Akasa prthivi bhuta sakti loka
  182. Akasa ap bhuta sakti loka
  183. Akasa tejo bhuta sakti loka
  184. Akasa vayu bhuta sakti loka
  185. Akasa akasa bhuta sakti loka
- (Apica) and

1. Cara bheda bhoutika sakti loka
2. Acara bheda bhoutika sakti loka (adayasca grahyah) etc.

#### NOTE ON TATVA LOKAS:

The Swami lists the *tatvas*, which come to as many as 103 *tatvas* beginning from *Bhuta tatva* the first and ending with the last eight *tatvas* namely *Anadi Nitya Atma Cit Shakti*, the universalised soul and its power (item 96) *Anadi Nitya Iccha, Jnana and Kriya shaktis* i.e. the universal *Para Iccha, Jnana and Kriya Shaktis* (items 97 to 99) *Sukharambha Cit Shakti* i.e. a formulated power of *Cit-Shakti* coming into a frontal revelation more and more to help the soul in its transition into the Truth world (item 100), *Adhara Para Shakti*, or *parai* i. e., the cosmic *Maha shakti* (item 101), *para siva* the cosmic overlord (item 102) and *Paranada* (item 103). Except for the last eight *tatvas* above mentioned, he gives as many as 34 details i. e. 34 aspects or states of powers for each of the *tatvas* and each such aspect or state of power is said to be a *loka* or world of experience either manifested by the *shakti* or possible to be manifested by her and hence called a *shakti loka*. Under the first *tatva* i.e. *Bhuta tatva* we have shown prominently or underlined the terms that occur commonly in all the said 34 details under each *tatva*; of these, 16 details could be treated as more

important and they comprise the first thirteen details together with three others following them namely *udbhava*, *adhikara* and *laya*. There are 18 further details which are only an elaboration or ramification of the said three i.e., *udbhava*, *adhikara* and *laya*. Thus the said 16 main details and 18 sub-details together form a total of 34 details above referred to in respect of each *tatva*.

Now again the Swami refers to the sixteen main details as derived from an essential four that may be *rupa*, *swarupa*, *swabhava* and *visesha* powers of a *tatva* or possibly *rupa*, *swarupa*, *swabhava* and *vyapti* powers. The said essential four develop within themselves or bring out the next four and successively the next two other sets of four. Thus in the poem “*Arul Villakkamalai*” the Swami speaks of the development of sixteen states or aspects or powers in all including the essential four of each *tatva* (see *Arul Villakkamalai* stanzas 28 to 38). The said sixteen states which are the aspects or powers of a *tatva* are shown by the following example of bhuta *tatva* or more properly in the same order as given for “*Jnana Indriya Vishaya tatva*” which is the fourth *tatva* of the *Tatva Lokas*. The main essential aspects or states are (1) *Rupa* the essential form (2) *Swarupa* the form (3) *Swabhava* the essential nature (4) *Visesha* the special dynamic nature. The next four aspects or states namely (5) *Vyapti*, the power of immanent pervasiveness, (6) *Vyapaka* the power of extension, (7) *Guna* the general quality, (8) *Varna*, the seed-sound characteristically representing the truth of *tatva* are the respective developments from out of the main four aspects or states namely *rupa*, *swarupa*, *swabhava* and *visesha*. The next set of four aspects or states i.e., (9) *bhava*, the inherent truth instinct or idea - will be the truth of *tatva*, (10) *Paratva*, its higher formulation in the higher world (i. e., in the range of Summit overmind), (11) *Aparatva*, its lower formulations in the lesser world (i.e. in the overmind and in spiritual Mind and in the lower worlds of Ignorance below), (12) *Nimitta* the immediate instrumental cause for the formulations and manifestation of the *tatva* i.e. movement of the *tatva* from its possibilities into actualities are again the respective developments of the main four aspects or states in the same above order namely *rupa*, *swarupa*, *swabhava*, and *visesha*. The next set of four aspects or states of a *tatva* i.e. (13) *Visesha Nimitta* the special instrumental cause or instrumentation for the formulations and manifestations i.e. movement of the *tatva* from its possibilities into actualities, (14) *Udbhava* birth or creation, (15) *Adhikara* power of rule and control or maintenance. (16) *Laya* dissolution or destruction, which may be correlated with the main four aspects or states, though in a different order i. e., *Visesha nimitta* with *visesha*, *udbhava* with *rupa*, *adhikara* with *swarupa* and *laya* with *swabhava*. Thus the said sixteen aspects or states (also called *lokas*) of a *tatva* are essentially developments within its first main four states according to the poem “*Arul Villakkamalai*” stz. 28 to 38). However the four main states of a *tatva* may be taken alternatively as its *rupa*, *swarupa*, *swabhava* and *vyapti* (instead of *Visesha*) powers and on this basis also the other twelve derivations or developments can be correlated. Thus 16 main details or states of a *tatva* are indicated in the above.

The 18 sub-details that develop out of the *udbhava*, *adhikara* and *laya* aspects of a *tatva* are as follows. The said *udbhava*, *adhikara* and *laya* develop common sub-details under each of them. Whereas the creation, maintenance and dissolution (*udbhava*, *adhikara* and *laya*) are states of a *tatva* arising in or by its own right, the sub-states that follow are its formulations due to the influence or intervention of powers of mind, vital life and of the subtle-physical (*tanmatra*). The six sub-states under each of the three are namely (1) *adhikarana* (2) *karana* (3) *parva* (4) *karma* (5)

*upakara* and (6) *upakara preraka* i.e. super-faculties and faculties (of mind), time and function or operation (of life power) impulsion towards actualisation and help towards actualisation (in the subtle-physical and the physical). Thus the 16 main details and 18 sub-details form a total of 34 details for each *tatva*.

Now, the said eight higher *tatvas* (items 96 to 103 of the *Tatva Lokas*), do not have *udbhava* and *laya* powers but have the *adhikara* power only, because they come in the realm of *Paratva* or summit overmind and have their beginning and end in the Truth World Beyond and only serve as its manifesting and communicating or transmitting mediums or powers in the universal manifestation. This speciality distinguishes them from the other *tatvas* that immediately come below them in the next lower range.

In another chapter called “*Karanateeta lokas*” the main or important *tatvas* of “*Tatva Lokas*” are repeated but finally transcended so as to reach into their true source, the Truth - World of supermind which in turn leads into the worlds of *Satcitananda* beyond. But these are not relevant to the subject matter of this book. They are elaborately dealt with in the author’s book. “*Arut Perum Joti and Deathless Body*” particularly in its second volume which contains the full text of “*Tatva lokas*” and “*Karanateeta lokas*”. However, we would like to point out that the said 103 *tatvas* can be reduced to 43 main *tatvas* (possibly corresponding to 43 shaktis or triangles of *Sri Chakra*), if we ignore the enumeration of 59 *tatva* which are only elaborations or forms of the thirty third *tatva* namely *Apara Bindu tatva*, and likewise another *tatva* which is the 100th as it is an elaborated form of *para sakti*. According to the songs of *Tiruvadi Perumai* quoted herein under the fifth chapter, the Swami refers to the 43 forces governing the atom of physical matter.

### 3. From Atom to Atma

#### ORDER OF CREATION, SPIRITUAL AND MATERIAL

Now we give herein below the translation of the above subject (*Shristi Jnaya*) taken from the book of Upadesha. Tamil text is quoted at the end of the chapter. It speaks of the Divine and the souls in the sky of spirit. It compares the souls in spiritual sky with physical atoms in the physical etherial sky. We are here concerned more with the physicality of matter, its atoms, molecules and atomic particles in the physical etherial space of the universe and we shall give under each para of the text, our notes of explanations on the basis of the discoveries of the atomic and nuclear science.

1. “*Akasa*, the physical sky or space of ether, is beginningless. Likewise, its cause, which is *paramakasa* the Supreme supramental sky of spiritual substance is also beginningless. The sky of spirit is the essential form (*Swarupa*) of the Divine. Again, the gas or gaseous state of the physical etherial space is also beginningless. Just as gas or gaseous state in the etherial sky is beginningless, so too in the spiritual sky of the Divine is *Arut Shakti* the Grace-Power of the Divine (i.e. *Cit Shakti*) which is also beginningless. The physical space of ether is wholly filled up without a gap by “anus” the atoms and atomic particles of physical substance. So too the Sky of Spirit (*anma akasa*), which is verily the Divine Being is full of ‘anus’ the souls which are children of the One Spirit. These “anus” are called atma-the soul”

Notes:

- a) The Divine Being is the Supreme Spiritual Substance and is represented by ether of the physical space; and His Cit - Shakti, the Consciousness - Force of the Divine by the next physical element, i.e. gas (*vayu*) as a form of power.
  - b) In the Indian language and particularly in Tamil anu means the minute physical substance as well as the soul-spark. Its meaning has to be ascertained according to the context. However, to distinguish them the former is called by the Swami as “anu” and the latter “anma anu. Again, anu here in its physical sense indicates not only atom as known to Science, but also atomic particles such as neutron, proton, electron etc., and aggregates of atoms called the molecules. In the next para of the text, they are distinguished in a broad way by characteristic names. The one Divine Existence has become the soul-spark of the individual being, and physical atom.
2. “The atoms of Physical space (*bhuta akasa anu*) are of ordinary and special kinds. Again, they fall into seven classes. They are namely, (1) *val anu*, the nascent, the new born or young atom (i.e. the basic atom as known to science), (2) *drava anu*, the liquid atom or molecule of liquid atoms), (3) *guru anu*, the heavy atom (i.e. the atom of a heavy element of solid matter or molecule of heavy atoms), (4) *laghu anu*, the light anu (i.e. the atom as gaseous element which is of light weight) (5) *anu*, the atomic particle, i.e. electron as distinguished from *val anu*, the atom of science (6) *Paramanu* the subtler

atomic particle, i.e. photon, (7) *Vibhu anu*, the all pervading atomic particle or substance of ether possibly represented by neutrino or graviton. These ‘anus’ or atoms are of manifold distinctions. These distinctions Can broadly fall into three groups namely, *karya anu*, *karya-karana anu*, and *karana anu* - the effectual, causal - effectual, and causal atom or atomic particle. They can also be termed as the impure, pure - impure, and pure (*apakva*, *pakva - apakva*, and *pakva*). Likewise in the presence of the Divine as Sky of Spirit (*anma akasa*), souls too become of three types namely the impure, pure - impure, and pure. They become the three types of souls because of the Grace - Shakti (acting) in the presence of the Divine, just as the said three broad classes of atoms or atomic particles of the physical space are due to the presence of gas or gaseous state therein.”

Note:

- a) In the succeeding *para*, *anu* is defined by the Swami as *bhuta karya anu*, the effectual or derivative physical atomic particle and that it is the same as the heat of the sun ray, i.e. particle of sun ray carrying heat, and therefore it is to be taken as electron of the sunlight or simply as the electron. If electron is the effectual atomic particle, then it follows that photon of visible and invisible light is the causal-effectual, and neutrino or graviton the causal. Thus *anu*, *paramanu* and *vibhu anu* are respectively the effectual, causal - effectual, and causal atomic particles. Further as *anu* means the small particle having the least mass, it is to be taken as electron in the above context. This significance and meaning of *anu* as the electron is supported by the following stanza of the poem “*Tiruvadi Perumai*.” “The earthly gross physical matter (solid) is the first of the five elements. It is constituted by basic atom (*val anu*, the nascent or young atom as the basic atom of science). Within it is *anu* (the electron). Within the *anu* (electron) is the much valued light (i.e. the photons of visible physical light produced or emitted by high-energy electrons of the nucleus or those in orbital motion); within that light is another light which is yet physical light (i.e. the photons of invisible light called as massless photons of x - rays and gamma rays). Within that merited inner physical light (எண் பூதத்து அவ்விளிக்குள் i.e. as distinguished from supra-physical light such as mental light or spiritual light) is the space (i.e. the etherial physical space, which is caused by the massless neutrinos or gravitons). Within the natural or phenomenal space (இயல் வெளி) is another space (i.e. a less gross or a subtler and inner space but yet physical, possibly the space formed by gravitons and extending into and overlapping with the subtle - physical space) and in that space the Lord plays in dance giving the physical rhythm of music (பண்பூத நடம்புரியும் i. e. the musical rhythm of the etherial physical space, the finest or subtlest sound being associated with etherial space).” O maid-friend: who can really speak of the mastery and goodness of His action in play? None can know in detail the greatness of His Feet which are placed on my head in affirmation of love and friendship.” (*Tiruvadi Perumai*, stanza 24; The Tamil text of other stanzas are quoted at the end of chapter 5).

Note:

- a) It is also significant to note that the next stanza of the said poem proceeds to describe the supra-physical psychological ranges of existence in continuation of the physical. Of course, everything, from the physical to the psychological and the spiritual, is constituted and organized by the rhythm of the creative movement of the divine Lord through His Force, the Supramental Shakti.

மண்பூத முதற் சத்தி வால் அணுவில் அணுவாய்  
மதித்த அதன் உள் ஒளியாய் அவ்வொளிக்குள் ஒளியாய்  
எண்பூதத்து அவ்வொளிக்குள் இலங்கு வெளியாய் அவ்  
வியல் வெளிக்குள் ஒரு வெளியாய் இருந்த வெளிநடுவே  
பண்பூத நடம் புரியும் பதப் பெருமை .....

(திருவடிப் பெருமை பி. 24)

Now in stz. 27 of the said poem the Swami again refers to the aggregation of atoms (*val anu* koottangal) as the basis for supporting a stable physical form of substance and its light and secret life - energy. Molecules of atoms form the basis for the living cells of physical life. மண்வண்ணத்து ஒளி உருவம் உயிர்ப்பினொடு தோன்ற வால் அணுக்கூட்டங்களை அவ்வகை நிறுத்தி ..... Further, in stz. 23, atom (*val anu*) is said to be a force, apart from its form of substance and quality, even as the five elements are said to have the two main features of form of substance and force of nature, and their nature is expressed as the force of atom, and that atom cannot be seen by sense-perception of eyes. மண்ணாதி ஐம்பூத வகை இரண்டின் ஒன்று வடிவு, வண்ணம், இயற்கை, ஒரு வாலணுச் சக்தி இயலாய் கண் என்னும் உணர்ச்சி சொலாக் காட்சியவாய் நிற்ப Thus from the foregoing stanzas of the poem '*Tiruvadi Perumai*' and according to the context of the seven kinds of atoms and atomic particles mentioned in *Upadesha*, it is evident that "*val anu*" signifies the basic atom, the atom as known to science, and "*anu*", signifies the electron. The Swami had an "atomic sight" to see the atom, and its particles and the forces operating in them, though they are not perceptible to the human eyes and even to the ultra modern electronic microscope.

- b) *Vibhu anu* the all - pervading atomic particle, which is the physical causal source for matter, is the ethereal substance of space. In stz. 42 of the said poem, it is referred to as "*Vinn anu*" the atomic particle of space or ethereal sky. Within or by its substance as the causal, are formed the moon, sun, and the stars, and the fire" (*Agni*, the fire here possibly referring to the causal heat forming the gaseous nebulae and galaxies at high temperatures) which are different kinds of radiating bodies of heat and light. We treat neutrino and graviton as *vibhu anu*, the causal ethereal atomic particles of no mass but of two different grades. From *Vibhu anu* is derived *Paramanu*, the causal - effectual atomic particle, which is the photon and from it arises *anu* the nuclear electron, which is the derivative or effectual atomic particle of the least mass and through it all other particles of heavier masses so as to form the atoms of various elements. We may remember that all the seven kinds of atoms and atomic particles are spoken of in a general way as those of the physical nature (*bhuta akasa anu*). Gaseous state is derived from ether, fire (light and heat) from gas, liquid from fire, and solid matter from liquid. Therefore each contains the other in essence.

More details and cross-references are given in chapter 5. Now we continue the text of *Upadesha* under consideration.

3. “The three kinds of souls have three kinds of bodies, because of the differentiation made by the three forces of will, knowledge and action (*Ichha, Jnana and Kriya Shaktis*) which arose in the presence of the Grace-Shakti (i.e. the Supramental Power). They are (1) *Karma deha*, the physical body (with gross matter and physical life as the field) (2) *Pranava deha*, the subtle body (with subtle sound and light of spiritual mind as the field) (3) *Jnana deha* the knowledge - body (with spiritual and supramental light and substance of knowledge as the field). The reason for the formation of three bodies is like that of the formation of moon, sun and fire (*Agni*) due to the different gaseous states prevailing in the phenomenal etherial sky (*bhuta akasa vayu bheda*). If we elaborate on the etherial space we may say that it is manifoldly various. Likewise the gaseous states are also manifold in kind, and roughly speaking these are as many as 640 million kinds of gas or gaseous states. Among them are the distinctions of *amrita bhaga, visha bhaga, bhuta bhaga and ushna bhaga* - the positive or constructive nature, the negative or destructive nature, the physical nature proper (i.e. as related to the immediate physical earthly condition and the body) and the heat - giving nature of the gaseous states.”

Notes:

- a) The pure souls have the deathless knowledge-body (*Jnana deha*) which will necessarily imply the possession of the transformed subtle body and physical body. The pure - impure souls have access to the subtle body (*Pranava deha*) which has its transformatory influence on the physical body (*Karma deha*). The impure soul is confined to the gross physical body only as the field of his experiences in life, though the other two bodies are secretly hidden in it.
- b) The four gaseous states or the four gaseous varieties constituting the gaseous elements in general namely the *amrita, visha, bhuta and ushna* parts or varieties (*bhaga*) seem to correspond with the nuclear atoms of hydrogen, helium, carbon and nitrogen, and oxygen. They are in an increasing order of atomic weight. Hydrogen is the lightest gas forming almost 90% of the content of the physical universe. It is the most active element, the building unit of the universe largely present in the sun and stars and galaxies. Helium is the inert gas four times heavier than hydrogen and forms 9% of the content of physical universe; all other elements form the rest of 1%. Approximately the same percentages given above hold good for the primary products of cosmic radiation in the upper atmosphere of earth. Hydrogen is *Amrita Vayu*, because it is the builder, the constructive and active and hence life - giving. Helium is *visha vayu* not in the sense of poisonous gas, but as the impeding element sluggish in reaction and slowing it down because of its heaviness and inertness of mass and plays a destructive role if largely accumulated or if in excess over the *Amrita Vayu* of the energetic hydrogen. *Ushna vayu* is the heat - giving oxygen. *Bhuta vayus* are carbon and nitrogen, which are more directly connected with the physical earthly conditions of life and the body. Part of nitrogen in air colliding with neutrons of cosmic radiation is converted into carbon that combines with oxygen to form carbon-di-oxide. In the earthly

conditions of life carbon-di-oxide may also signify *Visha Vayu* in a secondary sense, as it is heavier than oxygen.

4. “These above said atoms are manifoldly various; innumerable atoms aggregate to form a seed (of a plant) or the seed-state for plant life. This seed when associated with the liquid atom (or molecule of liquid, *drava anu*) and the heavy atom (*guru anu*, i.e. the heavy material atom of silicon and other molecular heavy elements and compounds of the earthly soil) grows as a plant life by absorbing the heat of sun ray which is *bhuta karya anu*, the basic and effectual physical atomic particle (i.e. the electron radiating in the form of photon of sun light and giving heat as in the electro-magnetic range). Therefore, the plant life gives different kinds of color, taste etc. Similarly the atoms of the body (*pinda anu*, i.e. cells of the body) have taken formation as the body by absorbing heat of *jeeva* (i.e. heat of the evolving soul) and this heat corresponds to the causal heat of the sun (*Surya karana ushna* possibly such as the heat in nuclear fusion). But the atomic cells of the body (*bhautika pinda anu*) live by the supreme cause, which is the divine compassion itself. In some epochs, seed is the first origin and in other epochs the tree. But sun ray is the basic physical atomic particle which is yet a derivative or effectual substance (*adi bhuta karya anu*) and stands as the origin of all material creation.”

Notes:

“*Bhuta karya anu*” is the *anu* proper mentioned as one among the above said seven kinds from *val anu* to *vibhu anu* of which “*anu*” is the effectual (*karya anu*), *paramanu* the causal - effectual (*karana-karya anu*) and *vibhu anu* or *vinn anu* the causal (*karana anu*) possibly corresponding respectively with electron, photon and graviton the last including neutrino also. By causal heat of the sun, i.e. at the ultra-high temperature in the interior of the sun are produced neutrinos, the all-permeating massless particles shooting off at the velocity of light; by the causal-effectual heat of the sun and its effectual heat as in the exterior part of the sun and in the solar surface respectively, photons and electrons escape into the space and they are electromagnetic wave-particles of light and heat of different grades. Atom as known to science is called by the Swami “*val anu*” and it is the basis for aggregation of not only physical matter but also organic matter as the living cells of plant and animal life and of the human body. Here in the text, a seed is said to be an aggregation of various of atoms or atomic cells resulting in the growth of plant giving different colours and tastes.

5. “Likewise by the will of the Divine, the Grace-Shakti, once extended Herself or Itself in the Sky of spirit, and the souls (*anmas*) at once came into existence to do the five fold functions. The sky or space of spirit became full of children (*santhana*) because souls-parks (*anma anu*) of the Divine manifested themselves into existence. So, the five-fold functions (of creation, maintenance, destruction, involution and evolution) will not be impeded at any time. Souls have fallen into low state of Ignorance, not because of their inherent force of nature, but because of a casual force of artificiality in manifestation (i. e. because of involutory force of descent into Ignorance by

formation of ego-consciousness). The secret truth of this is to be grasped or realised by the help of a spiritual master". (p. 55-56 Book of Upadesha on 'Srishti Jnayam').

## சிருட்டி ஞாயம்

(உபதேசம்)

ஆகாசம் அனாதி. அதுபோல் அதற்குக் காரணமான பரமாகாச சொரூபராகிய கடவுள் அனாதி. அனாதியாகிய ஆகாசத்தில் காற்றும் அனாதி, அனாதியான வெளியில் காற்று எப்படி அனாதியோ, அப்படிக் கடவுளிடத்தில் அருட்சத்தி அனாதியாய் இருக்கின்றது. ஆகாயத்தில் அணுக்கள் நீக்கமற நிரம்பியிருக்கின்றன. இதுபோல் கடவுள் சமூகத்தில் - ஆன்மாகாசத்தில் அணுக்கள் சந்தானமயமாய் நிரம்பியிருக்கின்றன. அந்த அணுக்களுக்கு ஆன்மாவென்றே பெயர்.

பூதாகாயத்திலிருக்கும் சாதாரண அசாதாரண அணுக்கள் எழுவகையாய் பிரியும். அவையாவன: வாலணு, திரவணு, குருவணு, லகுவணு, அணு, பரமாணு, விபுவணு. மேற்படி அணுக்கள் அனந்தவண்ண பேதமாய் இருக்கும். இவற்றில் காரியவணு, காரிய காரண வணு, காரண வணு மூன்று வகையாய், பக்குவ, அபக்குவ, பக்குவாபக்குவமென நிற்கும். இவைபோல் ஆன்மாகாயமான கடவுள் சமூகத்தில் ஆன்மாக்களும் மூவகையாய் நிற்கும். யாவையெனில்: பக்குவ ஆன்மா, அபக்குவ ஆன்மா, பக்குவாபக்குவ ஆன்மாவென மூவகைப்படும். ஆகாயத்திலிருக்கும் அணுக்கள் மூன்று விதமானதற்கு காரணம் அங்குள்ள காற்றேயாம். அதுபோல் ஆன்மாக்கள் மூவிதமானதற்குக் காரணம் கடவுள் சமூகத்திலுள்ள அருட்சத்தியேயாம்.

அப்படி மூவகையான ஆன்மாக்களுக்கு - அருட்சத்தியின் சமூகத்தில் தோன்றிய இச்சை, ஞானம், கிரியையென்னும் பேதத்தில் ஆன்மாக்களுக்கு தேகம் மூன்றுள. யாவையெனில்: கர்மதேகம், பிரணவதேகம், ஞானதேகம் என மூன்று விதம். அப்படி மூன்று தேகம் உண்டானதற்குக் காரணம்: பூத ஆகாயதாலுண்டான வாயுபேதத்தினால் சோம சூரியாக்கினியென மூன்று வகை நிற்பன போலுணர்க. அந்த ஆகாயத்தை விரிக்கில் அனந்த பேதமாம். வாயுவின் பேதம் அது போலனந்தம். ஒருவாறு அறுபத்து நான்கு கோடி பேதம். இவற்றில் அமுதபாகம், விஷபாகம், பூதபாகம், உஷ்ணபாகம் எனப் பலபேதப்படும்.

மேல்படி அணுக்கள் அனந்த வண்ணமாதலால், அனந்த அணுக்கள் சேர்ந்து ஒரு வித்தாய், இவ்வித்து திரவவணு சம்பந்தமாய் குரு அணுவோடு சேரும்போது, பூதகாரிய அணுவாகியகாரண உஷ்ணத்தில் ஜீவிக்கும்.

ஜீவித்த ஓஷதி முதலியன இந்த ஞாயத்தால் வர்ணம், ருசி முதலிய பேதப்படுகின்றன. இவ்வண்ணமே, பௌதிக பிண்ட வணுக்கள் காரண சூரிய உஷ்ணமாகிய ஜீவஉஷ்ணத்தில் வடிவமாய், பரம காரண தயையால் ஜீவிக்கின்றன. சில காலத்தில் வித்துக்களாதியாம். சில காலத்தில் விருகூடிமாதியாம். எல்லாவற்றிற்கும் ஆதியாயுள்ளது பூத காரிய அணுவாகிய சூரிய காரணமேயாம்.

இவ்வண்ணமே ஒரு காலத்தில் கடவுள் பிரேரகத்தால் அருட்சக்தி ஆன்மாகாசத்தில் விசிரிப்பிக்க, ஆன்மாக்கள் வெளிப்பட்டுப் பஞ்ச கிருத்தியத்

தொழிற்படும். மேற்படி ஆன்மாக்கள் வெளிப்பட்ட அக்கணமே, மேற்படி ஆகாயம் சந்தானமாதலால், ஆன்மாக்கள் நிரம்ப நிற்கும். ஆதலால் பஞ்சகிருத்தியம் எக்காலத்திலும் தடையுறாது. ஆன்மாக்கள் தாழ்ந்த கதியடைவது அனாதி இயற்கையல்ல: ஆதி செயற்கையே யாம். ஆணவம் அனாதி இயற்கையேயாம். இதன் ரஹஸ்யம் குருமுகமாயறிக.

குறிப்பு:- பக்குவ அல்லது சுத்த ஆணவம், அபக்குவ அல்லது அசுத்த ஆணவம், இவற்றின் விளக்கங்களை மூவகை உயிர்கள், சிவமாதல், கன்ம பேதமும் சிருட்டிக் கிரமமும் முதலிய உபதேசப் பகுதிகளை பார்த்துத் தெரிந்து கொள்ளவும். (உபதேசம் ப. 254, 255). ஆன்மாவின் தனித்த பிரத்தியேகத் தன்மையை (psychic or soul's pure individuality as in the psychic state of realization) சுத்த ஆணவம் என இயற்கைக் குணமாகவும், பாச அஞ்ஞானத்தில் கட்டுண்ட ஜீவனின் அசுத்த ஆணவம் செயற்கையாகவும் விளக்கப்பட்டிருப்பது தெரிய வரும்.

## 4. Amrita and Visha - Vayu

### CREATIVE AND DESTRUCTIVE GASES AND ECLIPSES

1. “Many varieties of *vayu*, i.e. gases or gaseous states have been created originally by the Divine so that this world and its living and non-living existences or entities and in particular the earthly beings, animal as well as the human, may live and thereby progress continuously (in evolution) over aeonic periods of millions of years. Among them *amrita vayu*, the positive or constructive gas (i.e. also life-giving) and *visha vayu*, the negative or destructive gas (i.e. bringing about destructive process) are the more important. They are especially more pervaded (than the other or others). Of these two, the constructive gas is more extensively extended in *Brahmanda*, i.e. in the stellar bodies and in *Bahiranda* or in the outer space, i.e. in the solar body (including its realm of space), but only partially extended in this our wide earth (*Maha anda*) and in the earthly embodied beings. But the destructive gas is partially extended in the stellar bodies and galaxies and in the sun (including their spaces) for some time only, varying from a few minutes to one and half hour or on special occasions for three hours at the most, where as it is more prevalent in the wide earth and its beings.”
2. “As *amrita vayu* (literally, gas of elixir or ambrosia i.e. life-giving and nourishing, hence constructive), the constructive gas, is specially pervaded in the immense physical universe, the stars, sun and moon do not decay in a short period (i.e. they have a long life period of aeonic times, because of the abundance of *amrita vayu*, which in the context, and according to modern astronomers, refer to hydrogen) even though *visha vayu* the destructive gas (i.e. possibly helium, the inert and heavy gas or more properly its nuclear atom called alpha particle) is partially prevalent in them. But they too will decay, and come to an end (i.e. lose their power of radiating light and heat and even collapse) when at the close of the kalpas or aeonic times of their life-period, the destructive gas becomes pervaded and immanent in them (i.e. when *visha vayu* gets accumulated in excess over *amrita vayu*)”

(Upadesha P.249-250)

Notes:

In the above text we have added here and there our own explanations or elaborations within the brackets. Notes are also given under each para of the text. In the first para, the Swami observes that *amrita vayu* is more extensively pervaded in the sun, stars and galaxies than *visha vayu* which has very short life period of three hours at the most. Therefore, stars and sun are said to be without decay, i.e. to be self-sustaining in their powers, the radiating powers of light and heat. The context seems to suggest the principle of fusion of four nuclear atoms of hydrogen (*amrita vayu*) releasing energies of radiation and resulting in the formation of one heavier nuclear atom of helium (*visha vayu*) along with two positrons. It seems to be suggested in the context that *vishva vayu* of helium, after a short life-period ranging from few minutes to three

hours, break up by process of fission into hydrogen nucleus, so that helium may not accumulate in excess so as to become a destructive agent by forming more and heavy elements. There seems to be a cycle of fusion followed by fission. At any rate, according to astronomers, 90 percent of the content of stellar bodies and the sun is made up of hydrogen, 9 percent by helium and 1 percent by all other elements and they are in a state called “plasma State” of matter so as to allow fission and fusion of nuclear atoms at ultra-high temperatures in the core of their bodies.

We may explain the more extensive prevalence of hydrogen,  ${}_1\text{H}^1$  (with one proton and nil neutron) over helium  ${}_2\text{He}^4$  (With two protons and two neutrons the subscript showing proton number or atomic number and the superscript the total number or mass number of protons and neutrons) in the sun and stars. In regard to the earth which has cooled down to support evolution of plant and animal life, the prevalence of oxygen  ${}_8\text{O}^{16}$  over hydrogen may be considered, because oxygen is derived eventually from helium and is four times heavier than helium. It is found in the periodic table of the elements that helium is followed by element shaving an increasing order of atomic weight due to increasing number of the nucleons of protons and neutrons. Thus carbon  ${}_6\text{C}^{12}$  is followed by nitrogen  ${}_7\text{N}^{14}$  and oxygen  ${}_8\text{O}^{16}$ , all of which are most commonly existing in the present conditions of the earth. The symbols with number are meant to indicate the nuclear structure of atoms.

In man-made experiments on chemical evolution of the earth, by simulating its ancient primitive atmospheric conditions when it was in a gaseous state exceedingly hot and radiating its light and heat and absorbing more freely the high energy shortwaves like ultra-violet rays and x-rays and gamma rays from the sun, it has been shown that its primitive atmosphere was a reducing atmosphere with hydrogen as the reducing agent readily and most actively combining with carbon, oxygen and nitrogen to form simpler and lighter compounds of methane  $\text{CH}_4$ , water or water vapour  $\text{H}_2\text{O}$ , Ammonia  $\text{NH}_3$  respectively. Hydrogen in its free state was prevalent in the atmosphere while oxygen and nitrogen in their free states, were not known to exist. Unlike those distant ages, our present atmosphere of the earth after the evolution of life has changed into an oxidising atmosphere in which oxygen and nitrogen are obtaining in their free states whereas hydrogen has become rare and negligible in its free state. Now, in the changed atmospheric conditions of the earth, oxygen combines with hydrogen to form water; and with carbon it forms the heavy gaseous molecule of carbon-di-oxide  $\text{CO}_2$  which is eleven times heavier than helium. Carbon-di-oxide, by its concentration, leads to suffocation and the destructive process of life. It is the heaviest known gas in practical life. The symbols with numbers in this para are meant to indicate chemical structure of atoms and molecules.

Therefore, the above facts agree with Swami’s findings when constructive and destructive gases are interpreted duly in relation to the stars and sun which are unchanged even today and for which hydrogen is the constructive gas and helium in its accumulation the destructive, and in relation to the earth after it has cooled down to support evolution of plant and animal life when oxygen the heavier gas (four times heavier than helium) has gained upper hand over hydrogen, the most active and simplest of all gases. But still comparatively oxygen remains the active and heat-giving gas and more active than nitrogen. But this activity is clogged when it is in combination with carbon as carbon-di-oxide, the heaviest known gas of our

atmosphere in and around, and within our body. So, for the earth, carbon-di-oxide in its accumulation is destructive, and hydrogen remains the most constructive gas always and oxygen the next in order. However, due to photosynthesis of plant life, carbon-di-oxide and water are absorbed by plants and converted with the aid of solar energy into starch, which they use as food for growth. Oxygen, the chief waste product is then let out into the atmosphere and it is absorbed and used by the animal life for their energy and released as carbon-di-oxide. Thus more or less a stable balance is maintained between oxygen and carbon-di-oxide due to these processes.

3. “*Visha vayu*, the destructive gas, has two states of which one is black and the other red, They are called *Rahu* and *Ketu* (i.e. the invisible shadowy forms imagined to cause the eclipse of sun and moon according to ancient Hindu astronomy). This occurs for a time varying from one and half an hour to three hours. ... *Visha vayu* extends over sun and moon during the astronomically calculated period of solar and lunar eclipses, and these periods are the periods of impurity and darkness (*dosha kala*), when light is obscured for a whole or part period of eclipse. Soul of this earth (*anda purusha*) gets obscured in regard to the mind (*karana sthana*) by the eclipse of moon; and in regard to its very being, the soul itself (*jeevasthan*) by the eclipse of sun, Hence the eclipse of light of moon or sun is called an impurity (*dosha*). Further, *dosha* means darkness, ignorance, obscurity of consciousness. Because of the extension of *Visha vayu* in the earth and in *Jeevas* the beings of the earth, many crores of these beings are often affected easily and become subjected to deterioration (in the vigor of their life and energy”) - Upadesha P, 250.

Notes:

- a) Unlike the traditional belief of *Rahu and Ketu* swallowing up sun and moon during eclipse, the Swami observes that they are two gaseous states of *visha vayu*. Possibly they are at two energy levels or they are two isotopes of the same gas or two different gases closely connected to each other.
- b) Earth (*anda*) is considered to have a soul of its own. This is referred to as *anda purusha*. In its evolution, earth has built up not merely a physical structure of existence, but also formulated in it other planes such as the subtle - physical vital life and mind which have successively brought their pressure on earth from their own free worlds to develop their respective planes in it.
- c) *Visha vayu*, in the context, does not mean poisonous gas. It seems to be used in the sense of a destructive gas or an energy - reducing gas sluggish in reaction and in this respect we have associated it with helium. In the stars and the sun, as well as in the cosmic particles that are hurled out from them into outer space, the proportion of hydrogen nuclei to helium nuclei is more or less the same, forming a ratio of 90:9. Possibly during the eclipses, when sun, earth and moon fall in one line involving a change in their total gravitation and in their magnetic fields, there might be a slightly excess percentage of helium nuclei (the heavy alpha particles) over hydrogen nuclei (the energetic particles) in the contents of charged cosmic particles that primarily reach the earth through its upper atmosphere where they also come into collision with the nuclei of the atmosphere inducing nuclear reactions and producing

particles of a secondary radiation. For example, the secondary cosmic particles such as neutrons collide with nitrogen atoms (N-14) of air and form carbon (C-14) a part of which combines with oxygen to form carbon-di-oxide. Proton of hydrogen is also a product of the collision. This proton is the common building unit in all the elements. This combines with electron to form hydrogen called hydrogen-1 with one proton as the nucleus. Thus hydrogen formed, protons in the primary and secondary cosmic radiation combining with the electrons, may be taken in the context to be the *amrita vayu*. The plants absorb carbon-di-oxide to build up tissues containing carbon. This process of plant life would be affected by solar eclipse, apart from the lack of sunlight to support its growth by photosynthesis of its cells. Further, the shadow of the moon falling on solar surface during eclipse, might tend to reduce even though to a very negligible extent, the temperature of its surface, and thereby slow down the escape or emission of the energetic protons of hydrogen from the sun as cosmic particles; or at the least it may slow down the nuclear reaction of the heavier cosmic particles like helium nuclei in their interaction with the upper atmosphere of the earth, and as a result there might be a fall out of more alpha particles on the earth.

- d) The Swami in his *Upadesha* points out even in regard to ordinary drinking water that it has three levels or parts, though contiguous - *visha*, *bhuta* and *amrita*. These levels are more sought to be explained in terms of the minute energy levels of heat. The surface part is cold, hence it is *visha*; the middle part has a little heat and it is *bhuta* part; the bottom portion of water has more of special heat and it is *amrita* part. *Amrita* part of water gives pranic force or the vital life-energy, *bhuta* part nourishes the substances of the body (*tatva vridhhi*); *visha* part gives rise to the impure fluid contents of the body. However, the Swami advises to take in, the best of the drinking waters which are rain water and dew drops of water formed on plants, possibly because they have gained energy of minute radiation and heat due to contact with cosmic particles of radiation. Spring water is also good according to him, possibly due to heat absorbed from the underground. These views of the, Swami seem to be based not on the consideration of taste, but on the energy content in it in the form of heat and radiation for supporting life-energy. (See *Upadesha* on “*Purappura Amrita* of Water” and on “Sanmarga food” and “Drinking of hot water” p. 325, 326).

Similarly he mentions three parts or levels in the seminal fluid called *shukla*. The *amrita* part of Semen called bindu is made to be discharged by the divine grace from the last part of *Kosa* (the testes of male organ) by bringing a pressure on the corresponding nerve or nerve centre called “*amrita bhaga nadi*” but keeping the *visha* and *bhuta bhaga nadis* in restraint. This will definitely result in a fertilising conception. If the *visha* part of semen is discharged from the first part of *Kosa* it will have on the body a wasting effect; the *bhuta* part of semen from the next or middle part of *Kosa* results in disease, Bindu, the *amrita* part of semen coming from the last part of *Kosa* with power of fertilising ovum, evidently refers to the sperms coming from the distal end of epididymis of the testes, which according to medical science, have the maximum fertilising power, twice as high as that of sperms from the proximal end. The Swami adds further that the mere presence of sperm

(*Kirumi*) in the *shukla* is not enough for fertilisation, thereby implying that the *bindu* should come from the last part of *Kosa* by divine grace. The Swami further observes in *Upadesha* thus. The quantity of lymph or *shukla* which is analogous to semen (or its essence) formed out of the essence of food absorbed after two hours of digestion is stored up in *brahmarandhra*, the top of the head (i.e. in the higher mental centre in the brain part), and in *nabhi*, the umbilical region (i.e. in the higher vital centre), and in *Kosa*, the internal male sex-organ (i.e. in the seminal vesicle in the ratio 1:2:2. The same ratio is mentioned for the semen proper in man in regard to its *amrita* part or *bindu*, its *bhuta* part and the *visha* part. So, it is evident that the discharge of *amrita* part of semen is essentially connected with the brain matter and nervous centres in *brahmarandhra*. He also observes that similarly there are the *amrita*, *bhuta* and *visha* parts of the *Shronita* the ovulatory and uterine discharges in women (see *Upadesha* on “*Shukla*” and on “Conception in the womb” p. 260 - 262). There are also similar deposits of *shukla* drawn from food and stored in women in the brain, navel beneath the breast and in the female sex-organ i.e. in the vagina. The meaning of construction gaseous state (*amrita vayu*) and the benevolent or life-energising part and level of water (*amrita bhaga* of water) mentioned by the Swami becomes more clear in the background of the scientific knowledge given herein below particularly with reference to hydrogen.

There are three forms of hydrogen called isotopes of hydrogen which have chemically the same properties, though physically they differ. They are hydrogen-1 with one proton as its nucleus, hydrogen-2 with one proton and one neutron as its nucleus and hydrogen-3 with one proton and two neutrons as its nucleus. They are chemically the same, because the positive charge of the single proton is balanced by the negative charge of the single electron, which is orbiting around the nucleus in each case, though the number of neutron differs. The atomic number of hydrogen is 1 in all the three cases, because it is based on the number of proton or the same number of electron. The mass number of hydrogen differs as 1, 2 and 3 because it is based on the total number of protons and neutrons (neutrons being electrically neutral) taken together. Hydrogen-1 is the most stable; hydrogen-2 is also stable; hydrogen-3 is unstable and hence radioactive in nature. Each forms water when combined with oxygen-16, forming light water, heavy water, and still heavier water respectively. It is known that in the high-energy primary cosmic particles at high altitudes of earth's atmosphere, protons of nuclear hydrogen-1 are found in large quantities and the alpha particles of nuclear helium to a far less extent, about one-tenth of the former. Most of them break up eventually into electrons and positrons before they reach the sea level. In the secondary cosmic radiation hydrogen-1 is also formed, apart from carbon-14 that is produced by the reaction of free cosmic neutron with nitrogen-14 of the atmosphere. Very small quantities of hydrogen-3 are also found due to another type of interaction of free neutron with nitrogen-14 in which carbon-12 is formed as the residual. These small traces of hydrogen-3 find their way into ordinary water. Heavy water formed by hydrogen-2 is also found in natural water, forming 0.015% of it. As can be naturally expected, heavy water because of its heaviness will be at a lower level of water than that of ordinary water which is formed by hydrogen-1. Further, the former has a slightly higher boiling point hence capable of retaining heat absorbed, for a little longer time. Evidently in this background, *amrita vayu* and *amrita* part of water seem to be connected with hydrogen and its different isotopes. We have already

pointed out the Swami's observation that in a given quantity of water, the lowest part is the *amrita* part and it contains a little heat. Even in regard to ordinary drinking water the Swami advises us to take it warm, after exposing it to sun light or better still, after boiling the water so as to evaporate three fifths of its content and adding sugar or jagger, and in this case the residual hot water for drinking should necessarily have some concentration of heavy water containing hydrogen-2. He recommends also rain water, spring water and dew water on plantain tree for drinking. Thus his advice seems to be based not merely on hygienic reasons, but due to its energy giving substances. Such water is to be taken by observing or following the breath through the right side of nose (*surya chara*) or taken in with a meditative concentration in the head - See Upadesha on "*Purappura Amrita* of Water", "Sanmarga food" and "drinking of hot Water" - p. 325- 326.

Again, hydrogen-1, which is the simplest and lightest gas is not so readily available in its natural free state. Air we breathe contains nitrogen, oxygen, carbon-dioxide and water vapour. So the importance of free hydrogen as the energising gaseous element, is directly connected with life-energy of the nerves, even more than oxygen. It may be so acting by its electron transfer through "Electron transfer particles" in the different kinds of cells in the body particularly in the "Mitochondria part of the cell" which is the power plant of the cell providing, through the action of its enzymes and transport of hydrogen and its electron by the respiratory chain, for the metabolism of nutritive substances and for the energy transformations in substances. The hydrogen which passed along the respiratory chain of the cell combine with oxygen to form water, generating energy, supplying substances called ATP. Especially the muscles of heart abound in mitochondria. In the medical science, it is considered possible that H ions play an important role in the automatic and rhythmic excitation of the heart, which is a neuro muscular organ. However it is well to remember that the heartbeats of the foetus begin even when there are no nerves or nerve fibres in the heart as yet; so, hydrogen and its electron seem to be behind the automatic impulses of the muscles of heart. Again a child in the womb does not breathe through the lungs but through the placenta of the womb and this even may also be connected with the motive forms of hydrogen and its electron.

4. "*Amrita vayu* the constructive or life-energising gas or gaseous state prevails on the earth at the break of dawn and lasts until the sun has arisen in the horizon. In that hour it is specially good for the human beings of the earth to be wakeful and active in good pursuits (of thought and action), because the good and benevolent gaseous state extends into the human body. It may happen that we may get into consciousness of the Divine in a second of such time and got the knowledge of the Divine consciousness, which is so rarely obtained. If the good gaseous state were not to prevail over the earth even for such a partial time, earthly beings and men (*jeevas*) will not have even the small quantum of life - energy for their growth which they are now getting and instead they will be subject to the ever prevalent destructive gas. When the constructive gaseous state prevails over immanently and outwardly (i.e. within and without the embodied beings), men gain the growth of consciousness, the moved feelings of heart and mind, control over senses and devotion to the Lord. Such a period shall be regarded as the period of extension and prevalence of the constructive gas (*amrita vayu* for absorption by us). When

there prevails a state of darkness and obscurity of consciousness and clouded ignorance, that shall be considered as the period of the destructive gas.”

Notes:

- a) As the vibration of life-energy through the impulse or pulsation of nervous system is represented by the outer movement of breathing, the extremely fine constructive gaseous state is itself treated as life-giving and life-energising substance. The movement of air in the lungs and in the body is a gross outer indication or form of the energising operation of *amrita vayu* or hydrogen, possibly by its electron transfer as explained already.
- b) It is well known that sunlight reacts with water vapour in the atmosphere to produce oxygen and hydrogen. Therefore, at the break of dawn when ultra-violet rays of the sun are easily available for our absorption, and the light weighted hydrogen in its free state is produced in the atmosphere around, one should wake up and remain active in pursuits of good thoughts and action. After the sunrise, air becomes more and more heated and the small content of free hydrogen so formed at dawn may escape into the outer space because of its lightness or enter into reactions with other gaseous elements to form compounds.
- c) Possibly hydrogen in its free state has some direct action upon the nervous current and substance, whereas oxygen absorbed through the lungs energises the body somewhat by an indirect process, i. e. by exchange of gases in the cells. It may be relevant to point out that as between the two important nucleic acids namely DNA and RNA, DNA (deoxyribos nuclei acid) has an oxygen atom less in its make-up, while RNA (Ribos nuclei acid) has five oxygen atoms. DNA controls the production of RNA, which in turn guides the production of proteins from their amino-acid building blocks. Thus though they are chemically similar as the hydrocarbons of proteinous molecules, containing a chemical base, a sugar and a phosphate as the three nucleotide units, the sugar part of DNA has one oxygen atom less than that of RNA. Further in the chemical base DNA has more of hydrogen and carbon atoms. Thus DNA starts its action in a state of reduction by a gain in Hydrogen or its electron. The pyramid of cell life rests on DNA, a huge molecule containing genes, which stays inside the cell nucleus, i.e. as a nuclear nucleo-proteid. Genes provide hereditary information that guides the manufacture of proteins found in every cell, tissue and organ of the body. DNA serves as chemical template for making RNA, which migrates to the outer parts of the cell. Hence RNA is known as the cytoplasmic nucleo-proteid. RNA in turn is the template on which proteins are synthesized. RNA is found in greater abundance in the neurons of the nervous system than in any other cells of the body. Its connection with learning, memory and other brain functions becomes very realistic. In effect, any protein produced in any living cell depends directly on DNA. Found in the genes, the DNA molecule transmits through RNA molecule all genetic information from parent to offspring. Any change in a small portion of that hereditary DNA molecule must be followed by a change in the protein such as, cytochrome C, which the cell produces. Cytochrome is considered to have been present from the very moment oxygen was first used

by organisms to burn their foodstuffs to obtain the chemical energy necessary for life. It removes electrons from foodstuffs that enter the cell, links them with an oxygen molecule and finally manufactures a substance called ATP (adenosine triphosphate) which is the body's chief storehouse of chemical energy.

5. "As there are solar and lunar eclipses of light on the earth, there is also the impurity by obscurity or eclipse of consciousness in the embodied human being (*Pinda Purusha*). When outer consciousness of mental knowledge is immersed in pursuits of sense-pleasures, the instrument of mind, which is represented by moon is said to be subject to partial eclipse of light. It is like gathering of rust over iron. This is ignorance. Now there is also solar eclipse of consciousness in man which is total, when the embodied human being is totally lost in the obscurity of darkness by becoming so wholly immersed in sense-pleasures as to cloud his very inner being (*jeeva*) which like the sun otherwise causes illumination of knowledge. This obscurity of inner consciousness is like the formation of verdigris on copper. Though the impurities of ruts of iron and verdigris of copper are natural in the phenomenal nature, they can be removed or purified by chemical processes as in the transmutation of baser metal into silver and gold. Likewise even though the obscurity of consciousness in man is natural in the phenomenal nature of *Maya*, the force of ignorance, it can be removed by the good discipline of compassion to fellow beings, It can also be washed away by the grace of Guru, the spiritual master. This is the truth behind the impurity of obscurity caused in man's nature (*pinda grahana dosha*) as well as in the physical phenomenal nature of earth (*anda grahana dosha*). (Book of Upadesha – "on eclipses of sun and moon and in relation to obscurity of consciousness in man" - p. 249 - 250).

பிரமாண்ட பகிரண்ட வியாபக சந்திராதித்திய கிரகண பரிச லக்ஷண விவரம்.

இவ்வுலகமும் இவ்வுலகத்திலுள்ள சராசர பேதங்களில் சரமாகிய ஜீவராசிகளும் கற்பபேதமும் தோன்றி உய்யும் பொருட்டு, அநேகவிதமான வாயுபேதங்கள் அநாதியில் கடவுளால் உண்டு பண்ணப்பட்டிருக்கின்றன. அவற்றில் முக்கியமானவை அமுதக்காற்றும் விஷக்காற்றும், அவை விசேஷ வியாபகமாயிருந்து கொண்டிருக்கின்றன. இவற்றில் அமுதக்காற்று பிரமாண்ட பகிரண்ட கடாகத்தில் விசேஷ வியாபகமாயும் இம்மகா அண்டத்திலும் பிண்ட ஜீவரிடத்திலும் ஏகதேச வியாபகமாயும் இருக்கின்றது. விஷக்காற்று மேல்படி பிரமாண்ட கடாகத்தில் - ஏகதேசம் நிமிஷ காலம் அல்லது முகூர்த்தம், அசாதாரணத்தில் ஜாமம் வரையில் வியாபகமாயும், இம்மகா அண்டாதி ஜீவராசிகளிடத்தில் விசேஷ வியாபகமாயும் இருந்து கொண்டிருக்கிறது.

பிரமாண்டாதிகளில் அமுதக் காற்று விசேஷ வியாபகமாயுள்ளதால் அவ்வண்டங்களிலுள்ள சூரிய சந்திர உடுக்கள் முதலியவைகளும் சொல்ப காலத்தில் அழிவடைதலின்றி இருக்கின்றன. விஷக்காற்று ஏகதேச வியாபகமாதலால் கற்ப காலத்தில் வியாப்பியமாயும் வியாபகமாயும் இருத்தலால் அந்தக் காலங்களில் அவை நஷ்டப்படுகின்றன.

மேல்படி விஷக்காற்று கருமை வண்ணமாயும் செம்மை வண்ணமாயும் இரண்டு பாகமாய்ப் பிரியும். இவைகளை இராகு கேதுக்கள் என வழங்குகின்றனர். இது ஒரு முகூர்த்தம் ஒரு ஜாமம்..... அதற்குமேல் இவ்வண்ணமாய், இவ்வண்ட கணிதப்படி, அவ்வண்டங்களிற் கணித காலத்தில் வியாபகமாயிருப்பதுதான் சந்திராதித்த கிரஹண தோஷ காலம். தோஷகால மென்பது பிரகாசமின்றி இருள் வண்ணமாய்ச் சிலகாலத்தில் முற்றும் மறைந்தும் சிலகாலத்தில் ஏகதேசம் மறைந்தும் இருப்பதால், இவ்வண்ட புருஷனுக்குக் கரணஸ்தானமாகிய சந்திரனும் ஜீவஸ்தானமாகிய சூரியனும் பிரகாசம் மழுங்குகின்றபடியால் தோஷமென்ப பெயர். மேலும் தோஷம் என்பது இருள், அறியாமை, அஞ்ஞானம், விஷக்காற்று வியாபகமாயுள்ளது. ஆதலால் ஜீவகோடி ராசிகள் சொல்பத்தில் இவ்வண்டத்திலும் ஜீவர்களிடத்திலும் அடிக்கடி நஷ்டப்பட்டுக் கொண்டிருக்கின்றன.

அமுதக்காற்று இவ்வண்டத்தில் இரவில் அருணோதயந் தொடங்கி உதய பரியந்தம் வியாபகமாய் இருக்கின்றது. அக்காலத்தில் ஜீவர்கள் நன்முயற்சியிலிருப்பது விசேஷ நலம். தேகாதி விண்டத்தில் மேல்படி அமுதக்காற்று வியாப்பியமாயிருக்கும். ஒரு கால் ஒரு கூண நேரம் அந்தக் காற்று வியாபகமாயிருக்குங்கால் ஜீவர்களுக்கு இதுவரையில் தாங்கள் அறியாததான கடவுள் விளக்கம் உண்டாகும். மேல்படி காற்று வியாபகம் ஏகதேசமும் இல்லாவிடில் ஜீவர்கள் விஷக்காற்றினால் சதா வியாபகமடைதலால், இந்த சொல்ப ஜீவிப்பும் விர்த்திக்கு வரமாட்டாது. அமுதக்காற்று வியாப்பியமின்றி வியாபகமாயிருக்கும் காலத்தில் ஜீவர்களுக்கும் அறிவு விளக்கம் மனநெழ்ச்சி இந்திரிய அடக்கம் ஈசுரபத்தி முதலியனவும் விளங்கும். அக்காலத்தை அமுதக் காற்றின் வியாபக காலமென்று அறிய வேண்டும். இதன்றி இருள்மயமாய் முன்பின் தோன்றாது அறிவின்றியிருக்குங் காலம் விஷக்காற்று வியாபகமாயிருக்குங் காலமென்று அறிய வேண்டும்.

அண்டத்தில் சந்திராதித்த கிரஹண தோஷம் போல் இப் பிண்டத்தில் கிரஹணதோஷம் யாதெனில்: பிண்ட புருஷனுக்குப் புறமாகிய காரணமென்னும் சந்திரனாகிய தோற்றும் அறிவு, இரும்பில் துரிசு ஏறுவது போல், விஷய வாசனையில் அமுந்தி ஏகதேசப் பிரகாச விளக்கமுடையதுதான் சந்திர கிரஹணம். இஃதறியாமை சூரிய கிரஹணமென்பது அகப்புறமாகிய ஜீவனென்னும் சூரியனாகிய தோற்றுவிக்கும் அறிவு செம்பிற்களிம்பு ஏறுவதுபோல், விஷய வாசனைமயமாய் யாதுந்தோன்றாது அறிவின்றி நிற்குங்காலம், சூரிய கிரஹணம். இஃது மாயாசிருட்டிக்கு இயற்கையானாலும் இரும்பையும் தாமிரத்தையும் பரிசனாதி வேதிகளால் ரவுப்பியாதி ஏமங்கள் செய்வது போல் நன்முயற்சியாகிய ஜீவகாருண்யமாம் பரிச்சயஞ் செய்வது மேற்படி துரிசு நீங்கும். மேலும் ஆசாரிய அனுக்கிரகத்தாலும் நீங்கும். இது பிண்டாண்ட கிரஹண சித்தாந்தம்.

- உபதேசம் 249-251

### புறப்புற அமுதம்-வெந்நீர்

அண்டத்தையும் பிண்டத்தையும் ஒருங்கே வளர்ப்பது புறப்புற அமுதம். ஆதலால் அஃதே கொள்ளவேண்டும். யாதெனில்: ஊற்றுநீர், பொற்றலை, வாழை, தென்னை முதலியவற்றின் பேரிலுள்ள பனி ஜலம், மழை ஜலம் - இவைகள் கொள்ளலாம்; சாதாரண ஜலம் கொள்வது கெடுதி. ஏனெனில் மேல்படி ஜலத்தில் மூன்று குணமுண்டு. எவை எனில்; விஷம், பூதம், அமுதம். இம் மூன்றும் ஒன்றாகவே

இருக்கும். எப்படியெனில்: மேம் பாகத்தில் சிலிர்ப்பாகிய விஷமும், அதனடியில் ஏகதேசம் சுடுகையுள்ள பூதமும், அதனடியில் விசேஷ உஷ்ணமுள்ள அமுதமும் கூடி ஒன்றாயிருக்கும். மேல்படி ஜலத்தினது குணங்கள் ஆவன: பூத ஜலம் தத்துவ விருத்தி செய்யும்: அமுத ஜலம் பிராண சக்தி செய்யும்; விஷ ஜலம் தத்துவ துரிசைப் பற்றும் (அதாவது விஷ ஜலம் ஆபாச நீர்களாகப் பற்றும் எ-று வெந்நீர் என்னும் தலைப்பிலும் உபதேசம் செய்யப்பட்டுள்ளது). ஆதலில் இடபேதத்தால் மேல்படி நீர்கள் தனித்தனியாகவுமுள்ளன; ஒவ்வொன்றிலும் மும்மூன்றாகவும் விரியும். ஆதலால் மேல்சுத்த அமுதம் கிடையாத பட்சத்தில் இதர ஜலங்களைப் பச்சையாகக் கொள்ளப்படாது; வெந்நீராகக் கொள்ளுதல் வேண்டும். அந்நீரும் ஐந்து மூன்றும் ஐந்து இரண்டுமாகக் காய்ச்சி, சர்க்கரை வெல்லம் கற்கண்டு இவைகள் சேர்த்துக் கொள்ளவும். நேராத பகூத்தில், தென்னை, நாயுருவி, வாழை முதலிய வஸ்துக்களை சம்பந்தப் படுத்தியாவது, சூரிய கிரகணத்தில் வைத்தாவது, சூரிய சரத்தால் பார்த்தாவது, சிகரத்தை உன்னியாவது கொள்ளல் வேண்டுமேயல்லாது பச்சையாகக் கொள்ளப்படாது. சநி நீராடென்று சொல்லுவது சநி போன்ற கருமையான கருகிய நீரில் ஆடென்று சொன்னது யாதெனில் வெந்நீர் ஒருவாறு ஊற்றுநீர். இதன்றி மற்றபடி சொல்வது (குறிப்பு: சூரிய நாடியாகிய பிங்கலையில் அல்லது வலது மூக்கு வழியே பிராணவாயு சுவாச நடையை கவனிப்பது; ஐந்தும் மூன்றும் ஐந்து இரண்டுமாகக் காய்ச்சி என்பது நித்திய கரும விதி என்னும் தலைப்பில் விளக்கப்பட்டுள்ளது. அதாவது ஐந்து பங்கில் மூன்று பங்கு நீர் சுண்ட இரண்டு பங்கு நீர் நிற்கக் காய்ச்சி அதை சாப்பிட வேண்டும்)

## கரு உற்பத்தி

மேற்படி கருத்தோன்றும் சுக்கில ஞாயம். அது யாதெனில்: மேற்படி சுக்கிலம் இரண்டரை வரிகன் எடையளவியிருக்கும். அதில் விஷபமாகிய சத்தி-1; சாதாரணமென்னும் பூதமாகிய அறிவு-1; அசாதாரண அமுதமாகிய விந்து அரை (1/2)- ஆக இரண்டரை. இதுபோல் பெண்பாலிடத்தும் சுரோணிதமுள்ளது. மேல் கண்ட சுக்கிர சுரோணிதம் இரண்டினும் கடவுள் ஆவியுள்ளது. கோசத்தின் முன்விஷம். அதைஅடுத்து பூதம், இவ்வாறு பெண்பாலிடத்தும் உண்டு. முன்னுள்ள விஷபாகம் புணர்ச்சிக் காலையில் வெளிப்பட்டால் தேக நஷ்டம்; பூதம் வெளிப்பட்டால் வியாதி; அமுதம் வெளிப்பட்டால் சந்ததி விர்த்தி. கடவுளருளால் காலச் சக்கரம் போல் ஏகதேசத்தில் கோச உபஸ்தங்களின் அமுதபாக நாடியை முன்னே தள்ளி விஷாதிகளைப் பின்னே சேர்த்துக் கருத்தரிக்கச் செய்விப்பார். இந்த ஞாயத்தால் இடைவிடாது புணருகிறவர்களுக்குக் கர்ப்பமில்லை. மேலும் விந்து வளம், இடவளம், வண்ணி கிருமி, மோக விசேடம் இவற்றிலும் கர்ப்பமில்லை.

மேற்படி சுக்கிலம் உண்டாவதற்குக் காரணம். தினம் ஆகாரங் கொண்டால் அவ்வாகாரம் மார்பிடத்தில் ஓர் தட்டில் தங்கும். அந்தத் தட்டின் மேல் கடவுள் கடவுளி என்று இரண்டாயிருக்கிறது. உண்ட அன்னத்தை இரண்டரை நாழிகையில் அந்த அன்னத்திலுள்ள அமுதைப் பிரித்து ஊட்ட வேண்டிய தத்துவத்திற்கு ஊட்டுகின்றது. மறுபடியும் ஐந்து நாழிகைக்குள் மேல்படி அன்னத்தினது மத்திய தரமாகிய நெகிழ்ச்சியைக் குறித்துச் சுக்கிலமாக்கி இரண்டரை வரிகன் எடையில் கோச நுனியில் ஒன்றும் நாபியில் ஒன்றும் பிரம்மரந்திரத்தில் அரையுஞ் சேர்த்து மற்றவைகளைக் கொண்டு நகத்துாசு, தொப்புள் அழுக்கு, கண் பீளை முதலின அழுக்கை வெளிப்படுத்துகின்றது. மேற்படி அன்னத்தை ஏழரை உதிரமாக்கி யூட்டுகின்றது. ஏழரைக்கு மேல் மேற்படி சக்கையை மலபாகத்தில் தள்ளிவிடுகின்றது.

இதுபோல எந்த வஸ்துக்களையும் பிரிக்கின்றது. ஆதலால் ஆகாரங் கொண்ட ஏழரை நாழிகைக்கு மேல் ஆகாரங் கொள்ள வேண்டும்.

- உபதேசம் ப. 248-260

(குறிப்பு: இரண்டரை நாழிகை என்பது ஒரு மணி நேரம்.)

## 5. Proton, Electron, Photon, Neutrino, Graviton as in Swami's Literature

We have seen that Swami Ramalingam has distinguished atomic particles of the physical elements broadly into three classes, the causal, causal-effectual and effectual namely (1) *Vibhu anu*, the substance of ether of space (corresponding to graviton and neutrino), (2) *Parama anu*, a fine atomic substance (of light and heat corresponding to photon of visible and invisible light), and (3) *anu*, the atomic substance of light and heat as of sub ray (corresponding to electron emitting light). The atoms have been classified into *val anu* the basic atom of science, *drava anu* to atoms or molecules of liquid, *guru anu* the atoms of metallic elements or molecules of heavy elements of a solid nature, *laghu anu* the atoms of gases or their molecules. Thus seven kinds of atoms and atomic particles have been distinguished.

Heat of the sunray of light is defined in the third chapter *bhuta karya anu*, i.e. as the basic atomic particle, which is yet derivative. This is the *anu*, proper, the atomic particle of electron and it is derived from its original causal source or causal heat of sun (*Karana ushna of surya* referred to in the said chapter possibly corresponding to *Karana agni* of the *Jeeva* as heat of vapour of the heart centre mentioned in the book of Upadesha under “*Pinda Lakshana*”) which is evidently the super heat and light of sun in its core giving rise to ethereal substances possibly of a secondary nature corresponding to neutrinos, and the intermediate substance of photons of light, X-rays and gamma rays.

We have seen under the second chapter dealing with “*Tatva Lokas*” that the five *bhuta tatvas* are the five physical elements of ether, gas, fire (*tejas*), water and solid matter. They are five substances of different grades, energies and forms. The ethereal substance of space is the subtlest of the physical matter and is the permanent causal substance, producing the effect of an outer visible form of the curvature of space, though in its inner nature it is formless (hence massless or having zero rest mass) and extremely superfine in its substance and lightness, so as to become the infinitely all pervasive physical substance or substratum to create and support all the other elements, their various motions and energies and also its own. We have regarded the massless neutrinos as the outer ethereal substance, and massless graviton as the inner, supporting all energy levels of all kinds of substances from zero to maximum. According to the Swami, there are many kinds of *akasa* the ethereal substance, hence implying different grades of spaces. There are also many different gaseous states from the subtlest to the gross. Through the varying light and heat energies of these gaseous states, condensation of matter is made possible resulting in the formation of heavier elements like liquid and solid.

In regard to the generality of *bhuta tatvas* or the physical elements the Swami observes under “*Tatva Lokas*” that the causal substance of atom or atomic particle (*bhuta karana anu*) is extended immanently (*vyapti*) in a free and unimpeded manner in (or into and upto) the effectual substance (*karya anu Paryanta*, i.e. from the causal above and within into and upto the effectual, below and outward) This evidently refers to the involutory manifestation. The causal atom or atomic particle is involved in the effectual. Therefore, the substance of ether is involved in the gross material elements, or in other words solid matter contains ether. Speaking about each

element more specifically the Swami says that *bhuta karana anu* is immanently extended into all the five elements, upto the gross physical matter of earth and the gross physical body.

“*Karana anu karya paryanta sadhyatva bhuta sati samanya vyapti sakti*” ... “*Pinda anda paryanta sati samanya sadhya (Prithvi, ap, tejas, vayu, akasa) vyapti sakti.*”

(“Book of Tatva Loka” - p. 129-213 see under the 1st item of *bhuta tatva* in its general description and in its five *bhutas*).

Again with reference to the generality of physical elements he observes that the effectual atom or atomic particle (*bhuta karya anu*) extends pervadingly (*vyapaka*) upto the causal source (*karana anu paryanta*), but in a fettered and impeded way or under resistance (*upadhi samanya*). This is evidently evolutionary manifestation of matter, from without and below, into or towards the causal source above and within. This shows that ether has in it or possesses a part, which is of the nature of material substance as in wild state of matter.

“*Karya anu karana paryanta sadhyatva bhuta upadhi samanya Vyapaka sakti*”... “*Maya paryanta upadhi samanya sadhya (Prithvi, ap, tejas, vayu, akasa) Vyapaka Sakthi.*”

- (Ibid)

Thus the atoms of the five elements contain each other both in involutory and evolutionary manifestations of matter. As we have rightly taken ‘*bhuta karya anu*’ to mean electron the wave-particle of heat of sun ray, the *bhuta karana anu* will naturally signify ethereal substance which in the discoveries of science can be taken as graviton (including neutrino). As a matter of fact, the configuration of electrons in shells or layers surrounding the nucleus of atom decides the nature of the elements, its chemical and electrical properties and its chemical bond or binding relationship with atoms of other elements to form molecular compounds.

Now we shall consider some stanzas of the poem “*Tiruvadi Perumai*” (12-37). Tamil text of the poem is given at the end of the chapter. They prove that the Swami had the vision, a complete and direct knowledge of atoms, atomic particles, the forces and energies in them, (stz.37) their various densities or masses of matter, the variation in their masses brought about by the force present in atoms, (stz. 32), the stability and unstability of the forces in relation to masses (stz. 35). He saw the space within atoms, the secret substances within electron (*anu*) that formed the light and space, which we have already considered in stanza 24 of the said poem. He knew the forms or shapes of atoms of various elements and their variations and the properties or qualities of matter and their relation to the undeviating fixed order and harmony of light (possibly referring to the characteristic and fixed spectrum of light of each element. வெண்ணிலவே நிறைந்த அவைக்குள் நேர்மை ஒண்மை உறுவித்து.) See stanza 38.

The general nature of the atoms of five elements is described in stz. 37 we have used the term “five elements” to indicate the five states of the physical elements

namely the ethereal, gaseous, thermal liquid and solid or material states of the elements in general. In a gross sense ether, air, fire, water and earth are indicated by the five elements. The atoms of five elements are spoken of as the seed-state *Ayeng Karu* (ஐங்கரு). It contains the heavy nuclei which are the progenitors of atomic particles (*Kulam koll Gurutvigal* குலம் கொள் குருத்துவிகள்) and possess within them “*achalas*” the firm ones அசலைகள் (the firm particles of protons) and “*amalas*” the pure and abundant ones (அமலைகள் the electrically neutral particles of neutrons) which contain innumerable numbers of “*Prakasigal*” the luminous ones (பிரகாசிகள் the luminous particles of nuclear electrons) which are governed by a force as in star (*Taraka Shakti*). Here in this stanza the contents of the nuclei are referred to as stably formed as in the atoms of science. So the protons and neutrons mentioned here are not the free atomic particles but as existing in the nuclei of atoms; and the electrons (and possibly also the anti neutrinos) which are spoken of as *Prakasigal* the luminous ones, innumerable beyond count, are seen within the neutrons. Thus these atomic particles are generated as progeny in the heavy nuclei (*gurutvigal*) of the atoms. As the luminous electrons within neutrons are governed by a force as in star, it is implied that this force is similar to that of radiation of star at ultra-high temperature when electrons emit light and become luminous or are changed into photons of light or photons of X-rays and gamma rays or even into the finer ethereal substance in the form of neutrinos.

In the next stanza 38, the nature and variation of the forms of atoms of the five elements (*Rupa*) are stated.

“In the seed state of the five elements (i.e. in their atoms there are many form-making energies within (i. e., energies formulating or building up inner shapes or forms உறைந்திடும் ஐங்கருவினிலே உருவ சத்தி) and their many variations. These forms are filled with light as of moon light which is imperceptible and beyond comprehension (i. e. luminosities within atoms are by electrons in orbital motion, whose man and charge being distributed within atom, give rise to shapes or forms of atoms). In order to make them (the atoms of the five elements) manifest each its respective individual form, they have been endowed with characteristic and fixed orders of luminosity (நேர்மை ஒண்மை i.e. characteristic fixity of spectrum of light radiated by each) and within those (or by those) fixed orders of luminosity manifoldly various qualities (i. e. properties of matter the gunas) are effectively made to arise and within those qualities are the many formulated signs” - (Possibly the configuration of electrons in their various shells of orbits around the nucleus, and the distribution of electron density giving rise to the characteristic qualities or properties of matter and their forms and inner luminosities) - *Tiruvadi Perumai* stz. 38.

There are innumerable different kinds of *Swarupa Shaktis* or forces of outer forms of the surrounding five states of element (சூழ்ந்திடும் ஐங்கருவினிலே சொரூப சக்தி பேதம்) and each *Swarupa* (i.e. outer material formative of molecular atoms and molecular compounds) is formed and kept up by the *Shakti* (the divine conscious force) in its separate or individual existence (அவை அவையும் தனித்தனி நின்று இலங்க) so as to express itself in the nine modes of expressive features (of outer form and qualities). O maid-friend!

who can really describe the glory of the Feet of the Divine who as the Lord of Heaven (*param param* the comprehending supermind) in the inmost depth moves it in vibration and abides in the shakti to make Her manifest the nine features of the outer existence of the five elemental matter?" – *Thiruvadi Perumai*, stz. 39.

Following the description of the outer forms matter (*Swarupa* of *Ayeng karu*) comes the next stanza 40 which refers to the taste of matter which is more or less an outer quality.

“There are many kinds of tastes, crores of different tastes in the greenness (possibly referring to humidity of the five states of matter which are all the result of the creative forces of taste (*udbhava shaktis*). Abiding in the creative taste-forces are the crores of red or golden red energies (of the color of earth or five *Vasu Niram*) which are classifiable into nine groups or kinds. In the nine is found *Adi Shakti* (the cosmic Maha Shakti), the universal power of Nature, in her ten colours in each of which a distinct sound-force of *Omhari*) plays. In the *Adi Shakti* is found the uniquely supreme and universal *shakti*. (*Thanip parai*) who has become verily the sky (i.e. the supreme sky of Truth-knowledge) O maid-friend! who can describe the greatness of the glorious Feet of the Divine who plays the Dance or plays of creative Truth-knowledge in Her?" – *Thiruvadi Perumai* stz. 40.

Thus we find that stanza 37 speaks of *swabhava* the dynamic nature of atom as in the nucleus with its contents and energies whereas stanza 38 refers to the inner forms or shapes (*Rupa*) the moon-like (pale and diffused) luminosities, their fixity of frequency of light, the qualities and signs of atoms-all of which, according to nuclear science, are due to the varying energy-levels of electrons in orbital motion around the nucleus and due to the characteristic configuration of electron shells of orbits, The two stanzas may be read together because of the sequence of description of the nucleus and the form-nature of atom: Stz. 39 refers to the *swarupa* of matter i.e. the outer form and nature of matter as found in the molecular atoms and compounds (*swabhava* of *bhuta tatva*). Stz. 40 speaks of the many kinds of tastes in the fine states of elements, taste being more or less an outer quality of matter or material compounds. Thus as seen in chapter 2 the Swami uses the terms *swabhava*, *Rupa* and *swarupa* with reference to the physical matter of the five states of elements (*bhuta tatva* or *Ayeng karu*) in the same sense in the stanzas of this poem also i.e. respectively in the sense of essential nature (or essential dynamic nature of atom *Iyal* or *Iyarkai* or *swabhava*) essential form (*Rupa* or inner form or atom) and form i.e. outer form (*swarupa* the outer form of matter as in molecular of atoms or molecular compounds which surround us (சூழ்ந்திடும் ஐங்கருவினிலே சொரூப சக்தி)). We may explain further the supreme *swarupa* of Sat the Divine Being and substance of the supreme existence, has descended to become in the earthly evolution of matter visible, tangible or recognisable phenomenal outer form of matter. The outer form of matter with its contents is the inversion of the *swarupa* of sat. Similarly the form of the invisible material atom is the inversion of the *Rupa* of Sat. The *Swabhava* of Sat has become the dynamic inner nature of atom as in its nucleus. Here in this context and according to the Swami's text of *Karanateeta loka*, *Rupa* and *swabhava* of Sat of Sat loka bear the original meaning of words namely the essential form or true essence, form and essential nature of Sat respectively. By inversion in matter, Sat has

respectively become the *Rupa*, *swarupa* and *swabhava* of matter in the former sense of the terms.

The inner nature of structure of atoms of the elements referring to the nuclei, and their contents of protons, neutrons and electrons as given in stz. 37 are reproduced: For an easier understanding of the text, scientific explanations have been made within brackets here and there.

“In the phenomenal seed-state of the five elements there exists an indescribable nature (*Iyarkai or Iyal or Swabhava* the inner nature of atoms) containing the many crores of progeny-forming heavy nuclei (*Kulam koll gurutvigal* குலங்கொள் குருத்துவிகள்). These self-contained stable formations of nuclei of atoms have their many crores of achalas, the firm ones (அசலைகள் i. e. the firm particles of energy called protons which are very stable). In the well-formulated nuclei are the others which are the innumerable amalas the pure and abundant ones (அமலைகள் i. e. neutrons which are considered pure because of their neutrality to electric charge and readiness in their free states to break up into components energy-particles of proton, electron and neutrino and which are more numerous and abundant in the nuclei than the protons. See chart 1) In the “*amalas*” which are in full abundance (comparatively the neutrons being more numerous than the protons in the formed nuclei of all the known-elements taken as a whole are found the *Prakasigal* (பிரகாசிகள்) the energy-particles of light (i.e. the electrons that give light of electricity and in their highest energies radiate light as sun rays in the form of photons: *prakasigal* may include electrons and photons and possibly also the neutrinos) which are too innumerable to be counted. In them is firmly established the original basic force as in stars (*Taraka Shakti*) in the centre or core of that force is the Feet of the Divine Lord. O maid-friend! Who can describe the glory of the divine Feet?” - (*Tiruvadi Perumai*, stz. 37).

Notes:

The nuclei contain neutrons and protons. The mass of atom is almost wholly concentrated in the nuclei. The mass of neutron is 1839 a.m.u. (atomic mass unit) and is almost the same as that of proton which is 1836 a.m.u. The mass of electron is only one a.m.u. Neutron contains nuclear electron of negative electric charge; proton contains the nuclear positron or positive electric charge having the same equal mass of an electron. In the nuclei of heavy elements neutrons outnumber protons. But the nuclei itself is considered heavy because of concentration of the mass of atom in it. Hence the description of nuclei as the source of achalas, amalas and prakasigal, in fact as the “progeny-forming heavy nuclei” (*kulam koll gurutvigal*) which is quite proper; guru means heavy; the Swami in his Upadesha mentions *guru anu* the heavy atom of solid matter as one among the seven kinds of atoms and atomic particles. But here in the context *gurutvigal* as the source of progeny of atomic particles means the heavy nuclei containing neutrons and protons which in turn contain and emit the other nuclear particles namely the electrons and positrons and the massless high-energy particles of photons and neutrinos, It is also significant to note that the Tamil terms, *gurutvigal*, *amalaigal*, *achalaigal* and *prakasigal* indicate *shaktis* or energies in relation to their substances or particles (*Amala and Achala* become respectively

*Amalai and Achalai*) in short they signify particles of energy or wave-particles. In the above light of understanding, the electrons of various inner and outer shells which orbit around the nucleus may be considered to have come or sprung up originally from the nucleus itself, because the nucleus is known to emit nuclear electrons and positrons respectively from its neutrons and protons, besides emitting photons of light and the neutrinos, under excited states of the nucleus involving change of energy levels in it. This is true when considering a closed system of atom with its nucleus and orbital electrons, but once the atom is broken up and the nucleus gets disintegrated into free neutrons and protons, the unstable free neutron would in turn disintegrate into a proton, nuclear and neutrino (See Chart 1). However, one may say that electron is the building-block of the mass of nuclear matter in proton or neutron; and within the electron is the subtle energy-particles of photon, such as the photon of visible light and the photon of invisible X-ray and gamma ray. Photon seems to be the mediating energy between electron and neutrino which is the massless ethereal physical substance, even as life the vital energy mediates between the physicality of matter and the ethereality of mind. Within the electron is the photon and within photon the neutrino. Now we shall pass on to consider some stanzas of the poem related directly to densities or masses of matter.

“The qualities or properties of matter beginning with those of the earthly gross solid matter (here referring to the properties of the five elements of matter) run into many crores. A still greater many of the properties of matter are brought about by and through the groups of forces or energies (acting on the former). In or behind the harmonious forces of properties are a crore of densities or masses of matter. For innumerable masses of matter (i. e. particles of matter having various densities or masses) have been brought about by the groups of very highly powerful forces. O maid-friend! who can really speak of the greatness of the Feet of the Divine Lord who plays bringing about the many masses of matter and all their modifications so that each of them may also exist and operate individually, Himself remaining detached from them in the manner of the ethereal space though yet united with them as well.” – (*Tiruvadi Perumai* stz. 32.)

This stanza evidently speaks of the qualities or properties of the elements of matter, as in their free states as atomic elements and in their combined states as molecular compounds. These properties are spoken of as forces and many more are brought about by the interaction of the grouping of forces. According to science, these properties are brought about by electrons orbiting in different layers or shells around the nucleus of atoms, and also because of the outer orbiting electrons entering into chemical bonds with those of other atoms of the same elements or different elements. In stanza 38 forms or shapes, luminosities, fixity of the frequencies of their light, the qualities or properties of matter and even their characteristic signs are ascribed to *Rupa Shakti* the form making force of atoms, the atoms being the seed-state of the five elements. The shapes, luminosities as of moon light qualities (*guna*) and signs or said to be one within the other (as a chain of cause and effect) in a successive manner. So these effects of the form and quality of atoms are evidently due to the varying energy levels of electrons in orbital motion around the nucleus and due to the configuration of electrons in shells of orbits, and in the case of compounds, the outer forms and qualities are due to the interaction of orbital outer electrons with those of

other atoms and molecules and this is more specifically referred to in stz. 39 dealing with *Swarupa* Shakti of matter.

The stanza now under consideration further points out that there are many densities or masses of matter behind their qualities, which are due to form-making forces (of orbital electrons) of atoms. So, the visible solid outer form of matter is not meant here by the term density or mass. It means the mass of nucleons (protons and neutrons) in the nucleus of atom that supports from behind or from within, as it were, the force of orbital electrons, which give rise to forms and qualities of atoms. Again it is said that these masses are governed by very highly powerful forces or energies, that is to say, these forces are far greater in intensity than the forces behind the properties or qualities of matter. (பண்ணுறும் அத்தன்மையுளே திண்மை ஒரு கோடி பலித்த சத்தி கூட்டத்தில் பணித்தன ஓர் அனந்தம்.) and by their interaction many more masses and their modifications are brought about. This clearly implies that the nuclear forces abiding and acting in the dense masses of nucleons are immensely more powerful than the forces governing motion of orbital electrons or the chemical bond of our electrons. We know that the intensities of nuclear energy are locked up in the nucleus of atoms and they are released in the processes of fission of nuclear atoms (as in modern nuclear reactors, or as in explosion of atom bomb) or in their fusion (as in the fusion of nuclear hydrogen or heavy hydrogen to form nuclear helium, which takes place in sun and stars). The intensely powerful forces in the nucleus seem to be referred to in stz. 37 as Taraka Shakti powerful primary force as in star governing the “innumerable luminous energy-particles” (Prakasigal i. e. nuclear electrons and neutrinos) which are found in the “abundant pure energy-particles” (Amalai or amalai-gal, the abundant pure particle, signifying neutrons outnumber achalas or achalaigal the “firm and stable or permanent particles” which are protons, and the outnumbering of protons arise when the five elements of matter, both light and heavy, are taken into consideration as a whole)

Then again, the said powerful forces are said to the cause for bringing about not only the said densities of mass but also their innumerable variations or modifications. From the above facts, it is seen that they are already existing in the nuclei (possibly as the so called nuclear forces of strong interaction), and by their play more and more atomic particles with different masses and their variations arise. This seems to solve the problem facing the modern nuclear physicist as to whether the growing number of particles found out by them exist in some strange form within the nucleus or that they are created from the release of mass and impact energy.

With the emission and absorption of alpha or beta particles or of gamma rays, masses of nuclei change so as to constitute altogether different elements. This may be done by using natural radioactive elements (or isotopes) or the high-energy cosmic particles. Now-a-days in man-made experiments, nuclei of deuterium (heavy hydrogen containing proton-neutron nucleus) nuclei of helium (or alpha particle) protons, neutrons or electrons (beta particle), are accelerated virtually to the high velocity of light and made to collide with atoms of given elements to produce all kinds of nuclear particles or more of particular variety of nuclear particles or antiparticles such as anti-protons, anti-neutrons. Thus these nuclear interactions. involve change of mass and energy or charge in nuclear particles. Particles and anti-particles are also allowed to collide so as to annihilate themselves as to mass, through successive stages of reduction of mass, until they become even massless particles

such as gamma rays (or photons of light) or neutrinos and anti-neutrinos. The natural and quick decay or break up of positive and negative pi-meson eventually in electron pairs and neutrino pairs (via mu-mesons) and the quickest break up of neutral pi-meson into massless gamma rays forming electron pairs are examples of the powerful nuclear forces in their highest energy levels and they are also cases of natural annihilation and transmutation of matter. - (See Chart 1).

Thus the above set of nuclear interactions, natural or induced, involve change of mass in nuclear particles which are, so to say, repositories of powerful nuclear forces. In other words the powerful nuclear forces, which are naturally and inherently available as in the radio-active natural elements like radium and uranium, and in the charged cosmic particles or in nuclear particles having the shortest half-life (for example the pi-mesons), are directly used or applied in the nuclear and intra-nuclear interactions of man-made experiments by which the incident or impinging particles are artificially induced to high-energy levels by accelerating them to a high velocity as that of light and then made to collide with or impinge upon the object. Because of this, as we have already explained elsewhere, particles enter into a critical state of exchange with the basic, formless and subtle etherial substance of matter and thus they get transformed as to mass and energy and charge of their material substances proper. The last part of stanza-32 even states that the masses of particles are changed by powerful forces in the medium of ether of space which is in contact with the particles and yet remain unaffected or detached (எண்ணுறும் இத்திண்மைகளும் - தனித்தனி நின்றிலங்க. ... விண் என்னும் படி அவற்றில் கலந்து கலவாது). Thus the build-up of masses of nuclear particles from the more or less equal masses of protons and neutrons into the still higher masses of hyperons and their break-up into the intermediary mesons of K-mesons, pi-mesons and mu-mesons and still further into the smallest sub-atomic particles of electrons and into the massless photons and neutrinos (See Chart 1) are explainable with reference to the powerful forces in the nucleus itself.

Even there seems to be a definite relation between protons or neutrons of the nucleus with pi-mesons which are aptly called the exchange particles of nuclear forces. According to Swami's atomic insight as revealed in stanza 37 of the above poem, all nuclear particles are formed within the nucleus *gurutvi* (குலங்கொள் குருத்துவிகள்) and more properly within the nucleons of neutrons or protons or both together (அசலைகள், அமலைகள் *achalas, amalas*).

According to nuclear science, seven times the mass of neutral pi-mesons ( $7 \times 264.2 \text{ a.m.u.} = 1849 \text{ a.m.u.}$ ) equal roughly the mass of neutron (1839) or of proton (1836). The electron is the basis for calculation of mass and it has unit mass of one a. m. u. The rough mass of 1849 atomic mass units in regard to a neutron or proton seems to be related to the enigmatic number 43 mentioned by the Swami in one of the stanzas of the poem now under consideration. Forty three is indicated as the representative number of all *tatvas* or principles of existence, not merely the physical matter, but also the vital, mental and psychological and spiritual substances or rather their substance - energies. Incidentally we may note that this number agrees with the 43 triangles representing energies (shaktis) of Sri Chakra. So a simple permutation ( $43 \times 43$ ) gives 1849 possible combinations of the forty-three *tatvas*. So the neutron mass of 1849 should represent all the possibilities of combinations of forces or

energies from the physical upto the spiritual. In fact, the spiritual contains the physical matter and is immanent in it. The neutrons are considered “Pure energy-particles” (*amalas* அமலைகள்) because they can readily break up or decay into a proton, an electron and anti-neutron or they may be considered to break up alternatively into the quick and pure forms of direct energy as seven pi-mesons which are known to break into electron pairs, neutrino pairs and gamma pairs. These ultimate sub-atomic particles are evidently referred to as the ‘Luminous energy-particles (இலங்கு பிரகாசிகள் *Prakasigal*) and they are seen by the Swami as contained within the “pure energy-particles” i.e. neutrons (அமலைகள் *amalas*) and that they are governed by *Taraka shakti*, the primary shakti as in the nuclear forces of a star (i. e. nuclear forces of strong interaction). The possibility of breaking neutrons and protons into pi-mesons is proved in the experiment with beryllium used as target for the high energy accelerated protons in such a way as to generate mostly streams of pi-mesons from the nuclei of beryllium. However, the fact remains that even though free pi-mesons as such is extremely short-lived, seven of them may combine to form comparatively a more stable unit of neutron or even the most stable proton. Any excess combination over seven pi-mesons may not make the resultant hyperons yield, by their break-up, more stable protons or neutrons than already obtaining, Here in this context the significance of the number seven may be broadly correlated with the seven fields or planes of existence or with their substance energy from the physical to the spiritual, viz., (1) solid (2) liquid (3) gaseous state (4) plasma state or the more subtle state of physical matter (5) the vital or life (6) the mental (7) the spiritual. The first four come under the gravitational and electro-magnetic forces and the nuclear forces of the strong and weak interactions, the “weak nuclear forces” proving to be the subtler and possibly linking directly with the vital, mental and spiritual forces. Now we quote below the stanza referring to the 43 *tatvas*.

“Of the two things or factors namely the form and color of substance, and the nature, (*Iyal*, the dynamic inner nature of force as force of substance or substance-energy) in regard to the five elements such as earthly solid matter, the true nature (*Iyal or Iyarkai*) of the elements is constituted of the basic atoms *val anu*, literally meaning the new - born basic atom which is the atom of science) as atoms of force (இயற்கை ஒரு வாலணுச் சக்தி), and they, the atoms, cannot be seen by eyes but can be seen by intuitive vision. Within them, their parts inner and outer, below and above, and the sides are united at the centre and filled by 43 forces or energies (mentioned in mathematical way of formula as  $3 \times 5 + 4 + 3 \times 8$ , i. e. representing 43 *tatvas* or principles of existence) which become the nine forces or group of nine forces, and uniting and acting through them, the fundamental causal force (*adhara shakti*) gives its energy to all the originally stated (43) forces. O maid-friend! Who can really know the greatness of the Feet of the Divine Lord who is in dynamic play of dance giving support to the causal force?” - (*Tiruvadi Perumai* stz. 23).

The forty-three forces represent all the *tatvas* from the physical to the spiritual and these in turn are represented by the five elements of matter and even in each atom of the elements. Again the said 43 *tatva* - forces fall under nine forces or nine groups of forces. The nine fields of forces may correspond to the total of the five *tatva*-forces of the physical five elements, and the four *tatva* - forces of the vital life, the mental,

the evolving inner being in nature (*jeeva*) and the spiritual mental field up to overmind we have explained in volume II of the Book “Arut Perum Joti and Deathless Body” and also at the end of the second chapter of this book as to how the 103 *tatvas* listed “*Tatva Lokas*” can be reconstituted into 43 which the Swami explains in his book of “Upadesha” as the total number of states which have to be mastered in experience in order to attain deathlessness of body which is a result of triple deathlessness of the physical, vital and mental and spiritual substance. Incidentally we may say that the 103 *tatva lokas* or states might have some bearing on the 103 elements of matter shown in the periodic table. Again, the said nine representative forces should be characterised by each atom and more properly by the nucleus or even by the neutron or proton which may be taken roughly as equivalent to the mass of nine mu-mesons but as in a fused integral state ( $9 \times 206.7 = 1860.3$ ) so as to acquire a stability within the nucleus or a comparative stability as free nucleon. We have already seen that the mass of a nucleon of neutron or proton is also roughly equal to seven times that of pi-mesons as in a fused state within the nucleus.

Thus the nuclear forces in nucleons can be visualised as operating in groups of nine or seven according to the base of nuclear particle with which we choose to correlate such as muons (mu-mesons) or pions (pi-mesons), i. e. on the basis of some known scientific data of their masses. But grouping of forces within the nucleus or atoms can take any number of forces and sets of combinations with one or more nuclear particles as the basis, or even with massless particles as the basis which are in the forms of more direct physical energy-groups or with admixture of the vital, mental and spiritual energies. Each energy has a corresponding substance of its own. In fact the possibility of very many kinds of grouping of similar or different forces for example, in twos, threes, fives, sevens, nines and so on and in fact in infinite variations of grouping is suggested in some stanzas of the said poem. We quote some stanzas to prove the point.

“There is unity behind the phenomenal appearance, though many different *tatvas* exist. Each *tatva* has a characteristic nature of its own, but not restricted to or limited in one form or mode of existence only. The *tatvas* (i.e. forces in *tatvas*) are combined in-groups of twos, threes and up to sevens by the conscious force (i.e. a form of *cit shakti*) operating at the centre. This conscious force is neither one nor two (but two-in-one, i. e. supramental shakti in its mode of subjective - objective working) and in it is the grace (the Supreme Grace Shakti, i.e. *Cit Shakti* the Supreme consciousness Force) and in that again, the Lord plays the transcendental and universal dance or creative dynamic rhythm of movement. O maid-friend! Who can really know the greatness of the Divine Lord of dance. He himself does not measure it to know. How can you know of it?” - (*Tiruvadi Perumai*, stz. 18).

“The flower is one. It has blossomed into (groups or bunches of) three, five, seven, nine and twenty-five flowers (i.e. different groups or combinations of *tatvas* or *tatva*-forces) but with different colours and fragrances – all closely connected around one centre or string (as in garland) which gives its good and unified supreme result (i.e. the spiritual essence), and therein play the Divine Feet of the vast comprehending knowledge to which this song of unity is consecrated. O maid-friend! Who can really speak of the Greatness of the

Divine Lord who so plays? Is it possible for me, a humble devotee of the Lord?" – (*Tiruvadi Perumai* - stz. 45).

“There are many forces of phenomenal apparent nature and they are innumerable crores in number. Behind them and as their cause stand many countless crores of forces. Behind or within them exist in turn as their cause, many forces, innumerable crores in number and creative of the world (i.e. the inner world of universal existence). These are aggregated and in the same way also disaggregated by the causal forces, which are many crores in number. O maid - friend! My lord is the master of all these forces-the Divine Lord who plays in a blissful form in the beautiful world of Truth-knowledge. Who can really speak of the Greatness of the Lord? – (*Tiruvadi Perumai*, stz. 16).

In the above stanza the Swami speaks of four levels of forces, each being the cause for the next in succession. In each level there are many forces; and the “innumerable crores of them” indicate generally that they are too many in each level. At the top or the inmost level are the more causal or original forces, which operate to cause aggregation or grouping of the force under them and similarly their disaggregation. The first level may be taken as the outer-most phenomenal and gross physical nature, the second as the subtler range but yet physical i.e. the field of atoms and atomic particles, overlapping with the subtle-physical, the third as the vital life and the fourth as the mental. Beyond the mental is the pure spirit, the divine lord.

The Mental is the directive force of mental substance directing by aggregation and disaggregation (or grouping and fragmentation) of all forces under it and particularly acting through the vital force of vital substance. It has its formulations in the physical range through other (*vibhu anu or vinn anu or bhuta karana anu*), the subtlest all-pervading and all-permeating etherial substance of physical space. We associate graviton and neutrino with physical etherial substance. The vital is the creative force of substance acts upon and reacts with the mind and is acted upon by the directive force of Mind and it has its formulation in the physical range possibly through the nuclear sub-atomic particles like photons (*parama anu or paramaya anu* may be associated with photon of light the life-giving energy of light and heat). The subtle-physical which is the form - making force of its own substance in its own world or plane has its formulations in the physical range also possibly through the plasma state of matter, i.e. through the electron (*anu* proper or more specifically *bhuta karya anu*) and by and through it in the nucleons like neutrons and protons. The physical has its formulations in the gross physical through atoms (*val anu*, the nascent atom), molecules of physical substance resulting in and as the gross five elements. *Vinn anu, paramaya anu* and *anu* and *val anu* and *Val anu* kootangal are mentioned in stzs. 17, 23, 24, 27 and 42. *Val anu* refers to atom whereas *Val anu* Kootangal to molecules of atoms.

Stanza 36 also echoes more or less the same sense as in stanza 17.

“In the evolving seed-state of the five elements (i.e. evolution of matter) innumerable forces of objectification (i.e. *Vishaya Shaktis* which are essentially the mental forces and through them the vital forces of senses and the subtle - physical forces of forms) operate with many phases to make manifoldly various formations and modifications. The manifold objective

formulations and modifications are characterised by the many crores or the characteristically divisive or separative forces of ignorance (i.e. forces of division and disaggregation in the lower nature, forces of repulsion and fission பிரிந்திடுமின் இலக்கணங்கள்) and by the many many crores of the characteristically powerful indivisible forces (i.e. forces of aggregation unifying forces or forces of attraction and fusion பிரியாப் பெருஞ்சக்தி இலக்கணங்கள்) and they are made to move out into the manifestation, from within into the well-known four levels or states (i.e. the inner, inner-outer, and outer and outermost levels of existence -the mental, vital, subtle-physical and the physical states) because of the many actions of the conscious will-force of the Divine Lord who plays in the center of the burning Flame of Light in the transcendental and universal Space (the supermind). O maid-friend! Who can really speak of the measure or limit of the divine feet in play?" – (*Tiruvadi Perumai*, stz 36).

The forces of repulsion and separation (fission) and those of attraction and aggregation (fusion) which are proper to atoms, atomic nuclei and particles of matter extend into the realm of the senses as pain and pleasure, in the vital emotional life as hatred and love, and in the mind as disregard and regard.

“Due to the dynamic play of the divine Light in the High - seated *Tiru Ambalam*, the divine supermind or sky of truth knowledge, *para shakti* (the cosmic overmental *Maha Shakti*) has under the time movement, operated in and upon the rich and sovereign seed-state of the five elements (representing the five essential principles of the physical, subtle - physical, vital, mental and the spiritual) and as a result *tatva anus*, the minute atomic particles and substances of all the *tatvas* (i. e. of the principles and powers and existence) have mutually entered into (permuted) combinations with each other, but under an ignorant mode or stress of working or interaction of *nada and bindu* (sound and light which have their formulations in the vital and mental fields also) and have arranged themselves into three parts - a base or bottom, a middle and a top or end - bringing forth three kinds of existence namely a solid supporting base of physical matter or body, the energy of life in the middle energising and acting in and upon the physical, and a manifesting growth of consciousness (i. e. by and through mind). Who can speak really of the glory of the will of the Divine Lord dancing in the *Tiru Ambalam*? Is it ever possible for a humble being like me to tell about it?" - (*Tiruvadi Perumai* stz. 43).

Stanza 35 is directly related to the stability and instability of physical matter in the five physical states of the elements. It speaks of the powerful grouping of forces governing the densities or masses of matter (i. e. masses of atoms and atomic nuclei and particles) so as to make the forces inseparable and bring about states of stability or equilibrium (possibly to make it possible for matter to have in the earthly field of evolving matter the manifestation and growth of the *tatvas* of life and mind.) When the forces become saturated or satiated and cloyed so as to make them clogged or get obstructed in their characteristic individual operation within the frame work of group they are resolved or made to separate and perform thereby many works. This evidently refers to radio-active decay of elements in their excited states - a condition brought about by an excess imbalance of neutrons over protons or of protons over

neutrons within nucleus of atoms of an element and set right by emission or absorption of beta particles or alpha particles as the case may be forming thereby more or less stable elements of the same kind (i. e. isotopes) or of different kinds altogether. For example Uranium-238 ( ${}_{92}\text{U}^{238}$  with 92 protons and 146 neutrons) is unstable and throws out an alpha particle of 2 protons and 2 neutrons and becomes Thorium-234 ( ${}_{90}\text{Th}^{234}$  with 90 protons and 144 neutrons). This process may continue through several transmutations of the element from one to another until finally Lead-210 (with 82 protons and 128 neutrons) or its most stable isotope, Lead-206 (with 82 protons and 124 neutrons) is reached. All the intermediary elements from uranium onwards are radioactive elements and emit characteristic radioactive rays of light during their decay. This is called alpha radiation. To take another example Heavy Hydrogen-3 ( ${}_{1}\text{H}^3$  with one proton and 2 neutrons) emits out a beta particle i. e. an electron and becomes transmuted into Helium-3 ( ${}_{2}\text{He}^3$  with 2 protons and one neutron). This is called beta radiation.

With the emission of an alpha particle or a beta particle, new atom of a different element with characteristic radioactivity may be formed and it will be at a nuclear energy level above the ground state, that is to say it will be in an excited state. In some cases the excited nucleus will drop to the ground state by simultaneously emitting a gamma ray. In others, the radio - activity may continue for a more or less time, followed by further emission of either beta or alpha particle resulting in the transmutation of element until a most stable element is reached. There are also the possibilities of absorption of an alpha particle or beta particle resulting in transmutation of matter. Thus Nitrogen-14 ( ${}_{7}\text{N}^{14}$  with 7 protons and 7 neutrons) absorbs the fast-moving alpha particle of Helium ( ${}_{2}\text{H}^4$ ) and gets changed into Oxygen ( ${}_{8}\text{O}^{17}$ ), releasing also a proton of Hydrogen  ${}_{1}\text{H}^1$  in the process. Again, Nitrogen-14 ( ${}_{7}\text{N}^{14}$ ) may absorb a neutron from cosmic radiation and get changed into Carbon-14 ( ${}_{6}\text{C}^{14}$ ) emitting or releasing a proton of Hydrogen ( ${}_{1}\text{H}^1$ ). This radioactive Carbon-14 is the essential base in all the living cells of plants, animals and human beings, forming hydrocarbons of living substances. A neutron emits an electron (beta particle) and changes into proton. A proton emits a positron (positive beta particle) and changes into a neutron. So, Copper nuclide  ${}_{29}\text{Cu}^{64}$  may emit an electron and change into Zinc  ${}_{30}\text{Zn}^{64}$  or emit a positron and change into stable Nickel  ${}_{28}\text{Ni}^{64}$  or it may capture an orbital electron and change into Nickel  ${}_{28}\text{Ni}^{64}$  leaving the daughter product into an excited state which emits a gamma ray to gain the ground state of stability.

Thus the above examples show the processes of disintegration of the atomic nuclei of elements and their regrouping or rearrangement in order to bring about stability in the mass of matter which had been affected by saturated or cloyed states of excessiveness of forces which are connected with the excess masses of neutrons over protons or of protons over neutrons than their needed proportions for stability. The text is now quoted below and it indicates the stability of the atomic nuclei of the elements with powerful groups of forces supporting their various densities of mass and, also the cause of their instability when there is a saturation of the forces followed by disintegration of the forces and their rearrangement to make them stable again resulting in the performance of many works of energies during these processes.

“In an evolutionary seed-state of the five flowers (i.e. the evolved seed-state of the five elements) the mass or density of each progressively increases over that of the other; and each mass of substance (i.e. of atoms or of atomic particles)

is closely attracted and held by the other, being supported by groups of powerful forces, which are made inseparable and yet allowed to have each its individuality of existence and working. When these forces become saturated or satiated and cloyed (i.e. become excessively disproportionate and disharmonious in relation to mass) at particular locations because of their individuality of existence and working movement, they are disintegrated or dispersed in their grouping (and rearranged) and made thereby to perform many works; and these are done by the Divine Lord. O maid-friend! Who can really speak in detail the glory of the divine Feet playing with rhythm and harmony in the transcendental and Universal Space of Light (the Supermind) which is Light as much as Spam of Grace?" (i.e. performing many functions so as to keep or hold the said forces of matter in their discrete states but yet within an inseparable harmony of group combinations or doing the works in the course of their disintegrations which arises because of their saturation)" – (*Tiruvadi Perumai* stz. 35).

The stanza clearly speaks of the powerful forces connected with masses of matter. So it should relate to nuclear forces within atomic nuclei of the elements. Mass of each nuclear particle is cemented or closely connected with that of the other or others through the operation of forces in groups and thus there arise strong binding energies within nuclei of elements. In the disintegration of nuclei or the forces connected therewith emission and absorption of energies such as X-rays and gamma rays and emission and absorption of alpha and beta particles (i.e. forms of radioactivity) are involved. According to modern scientific discoveries, emission of beta particles is always accompanied by emission of neutrinos also which are massless but high-energy particles. The binding energies between molecules and molecules, atoms and atoms, and between different atomic particles interse within the nucleus and within the atom as a whole so as to gain stability of matter (i.e. stable relationship between mass and energy of atomic particles and atoms, are meant and included by the description namely, "the grouping of inseparable forces to support the stability of each mass of matter within the elements and yet give each force an individuality or discreteness." Thus each force seems to have a collective as well as an individual existence and function at the same time. Even considering the electrons alone, for example, we find that in the spectograph of beta particles (electrons), the background of the spectrum indicates beta particles present in all the different velocities while the lines signify groups with discrete and definite velocities or energy-levels. Here group as well as individualistic function of electrons or their forces are implied. Again, high-energy charged particles travelling through matter in the solid, liquid or gaseous state excite and ionize atoms and molecules and thus the energy of the particles get absorbed in matter and eventually dissipated. Thus many kinds of works involving emission and absorption of energies are initiated by radioactive decay of the unstable elements which emit particles.

Now we may pass on to another stanza of the poem that seems to correlate the spectrum of colours with the essential true nature of the elements.

"The true essence and nature of the substances of matter are found in the core of the elements, beginning with the golden matter (i.e. golden matter representing solid matter and they are made to manifest the riches of harmony and beauty which are now secretly contained in the seed-state. (i.e. in the

nucleus of atom of the element தன்மை உண்மை அகத்தே பொற்புறமா கரு விளக்கம் பொருந்த) by or through the display of white, deep blue, green, golden (or golden green) and red colours, all of which are mixed with or shaded by black (indicating spectrum of white, i e. bluish white or violet white at one end and red at the other end and golden green in the middle which is தன் வண்ணப் பசுமை அதாவது பொன் வண்ணப் பசுமை an intermediary color between green and yellow all of these colours being mixed up with or shaded by black which is due to absorption of colours). These properties of colours, as shaded by or overlapped with black and forming the essential nature of the elements, arise into expressive manifestation due to atoms of the elements being grouped as molecules (வால் அணுக் கூட்டங்கள்) so as to express stable form (shape), light and life-energy (literally breath of life. ஒளி உருவம் உயிர்ப்பினொடு தோன்ற). O maid-friend! who can really speak of the true nature of the Feet of the Divine Lord playing in the Truth-World of Light (the Supermind) so as to bring into existence the atoms of the elements and move them to function in groups (molecules) so as to express shape of form, light and breath of life?" – (*Tiruvadi Perumai* stz. 27).

The shapes and forms, colours and light and the breath of life within matter are also referred to in *Joti Agaval* Poem. There are forces in solid matter (i.e. heavy element as solid) which cause forms and shapes, physical light and a breath of life or a secret vibration of physical life-energy (மண்ணில் உருச்சத்திகள் ஒளிச் சத்திகள், கலைச் சத்திகள், கலை அதாவது இட கலையும் பிங்கலையும் கலையுணர்த்தும் சக்திகளும் எ-று) which implies the evoking of an undercurrent of an elementary sub-consciousness in matter. There are seed-forces, i.e. nuclear forces in the nuclei, and forces that form into groups (மண் கருச்சத்திகள், மண் கணச்சத்திகள்). Densities or masses of solid matter, its golden form (and color) its evoking of the sense of smell, its five-fold nature signifying the natures and qualities of the five elements contained within it, its formulation as the foundational substratum (in evolution) are also mentioned (மண்ணில் திண்மை, பொன்மை, நாற்றம், ஐம்பூ அல்லது ஐந்து இயல், மண்ணினில் அடிநிலை வகுத்த அருட்பெருஞ் ஜோதி). Many material objects are said to be formed from the solid state of matter (i.e. from the atoms of the heavy elements;) and in the womb of matter (i.e. in the atoms or in the nuclei) living beings arise (மண்ணில் பொருள் பல, மண்கரு உயிர்த்தொகை). So far in regard to the solid elements. The Swami gives similar details in respect of the other four elements. He sees light and the other qualities of matter also in the liquid. Though fire (*agni*) is the element which gives heat and light, the Swami has seen a physical light and its colours and the related qualities within solids and liquids also. He has seen the seed-state of each of the five elements (கருநிலை), that is to say he has seen the respective atoms or the nuclear atoms and particles within the five elements. Solid matter is considered to contain the five elements (ஐம்பூ) or their natures and it is the starting point for evolution.

From the above it is evident that the Swami had the direct sight or insight and saw in atom a natural spectrum of the constituent colours interspersed by the overlapping mixture of black. This vision must be in regard to the atoms of the elements in their solid, liquid and gaseous states and in the supra-gaseous state of ether. This natural spectrum may be taken as a combination of emission spectrum and

absorption spectrum. We may explain the absorption of light producing black shades as a result. Due to electronic structure, atoms have definite frequencies of vibration to which they vibrate in resonance (as in the resonance of sound of two tuning forks of the same frequency). The emission of light, by atoms of a given element, as some definite colours or as a particular prominent color is due to the vibration of electrons therein which are of the form of electro-magnetic waves. When light of one of these frequencies, for example, a particular color of the sun ray or of carbon are light as done in experiments, passes through the atom or experimentally made to pass through the vapour of the heated atoms, it responds to the said electronic vibration due to sameness of the frequency and there-by absorbs the particular light energy of the electronics and consequently producing a black shade. The stanza mentions the spectrum of essential colours in the range of VIBGYOR, but as shaded by the interception of black. Thus there is a natural emission and absorption of colours within the atom or rather atoms of several elements as seen by the Swami. The stanza also speaks of the breath of life within the atom indicating a secret life-energy in it, which is the cause for the evolution of life in plant, animal and man. The physical counter-part of life-energy seems to be represented by the electro-magnetic waves of photons of light and heat.

We have already seen that in stanza 43 of the poem, the triple basis of the physical, vital and mental existence has been clearly indicated as arising from the combination of atomic substance of all the *tatvas*. In *Joti agaval* Poem, the principles of life and mind are said to be within the physical elements of matter. It seems that the physicality, vitality and mentality have their counterpart - formulations in the physiological system as the three inter related component parts of a nucleotide, one within the other, namely a chemical base, a sugar and a phosphate. The nucleotide units go to make up the chain or molecules called nucleic acid of which Ribos nucleic acid (RNA) and Deoxyribos nucleic acid (DNA) are the most important and they contain the hereditary memory of every living cell. Possibly the said three component parts of a nucleotide unit may respectively correspond to the "*sleshma, pitta and vata*" of the Indian medical system, i e. the three different modes of vibration of nervous current.

Stanza 42 speaks of *Vinn anu* the etherial atomic particle or substance of space, (elsewhere in *Upadesha* named as *Vibhu anu*, the all-pervading atomic substance) as forming the base for the existence of fire (a causal heat), stars, sun and moon and all other things i e., the base of existence for the rarefied gaseous states of radiation of high energy light and heat in the form of galaxies, stars and sun for the more cooled and condensed gaseous states in the form of planets containing the other states of matter. According to the book of *upadesha*, this is the *bhuta karana anu*, the causal physical substance of ether, from which the other states of matter are derived, namely, the plasma state of gas possessing high-energy light and heat, the ordinary gaseous state possessing light and heat, then liquid and solid states of matter. We have held that *vibhu anu*, the etherial atoms, correspond to gravitons which may be taken as including the neutrinos and that the principles of mind has its first physical formulation in the etherial substance.

Stanza 17 refers to *Paramaya anu* (elsewhere in *Upadesha* named as *Parama anu*) the intermediary atomic particle or substance of a very refined or rarefied kind. This is the *karana karya anu* the causal-effectual atomic substance. The principle of

life-energy has its first physical formulation in this. We have held that *Paramaya anu* corresponds to photons of light in its high energy levels such as in the form of X-rays and gamma rays or at the least as ultraviolet rays. *Anu* proper is the electron or high-energy electrons carrying heat and light corresponding to the visible sunlight with its heat. *Anu*, the atomic particle of electron is *bhuta karya anu*, the derived or effectual physical substance, from and by which all the more massive atomic particles of the nuclei are further constituted. So this is the true physical basis of material creation tending towards its grosser states, such as atoms (*val anu*) and molecules (*laghu anu*, *drava anu*, *guru anu*) of gas, liquid, and solid. *Anu* the electron is the basic stuff of matter creating, by its nuclear electron an inner nature in the form of nucleus of atom with characteristic light within, and by its outer or peripheral electron a more outwardly expressible nature of qualities and colours and shapes and phenomenal appearance of physical matter. The electron may be supposed to contain or form all the nuclear atomic particles in as much as it has a double phase as it were, one tending towards the gross massive states of matter as explained above and the other tending towards the subtler and massless states such as photons of light and the neutrinos. Now we quote stz. 17.

“There is a phenomenal form of appearance (as perceptible to the sense of sight). (Behind or within it) there is the form or shape of substance. (Behind or within it) there exist the color and quality (of matter). (Behind or within it) there is the light (i.e. the characteristic spectral light of an element of: “the truth or orderliness of light” ஒளியின் வாய்மை நேர்மை ஒண்மை in stzs. 38 and 34). Behind or within it is a nature (i. e. an inner nature of atom as in its nucleus which may be here considered for the sake of simplicity as made wholly of the nuclear neutrons which contain electrons). Behind or within it (the nuclear electron) is *paramaya anu*, the highly subtle substance (possibly possessing more direct energies of light and forming a base for the expression of life - energy and which could be associated with photons of light, more especially with the photons of invisible light). This is only a part (i.e. the middle part of a deeper and wider range). Within that part, i. e. within *parama anu*, the atomic substance of light forming also a physical base for life - energy, is the core, the inner seed (*karu*, i.e. the causal seed or essence corresponding to *vinn anu* - or *vibhu anu* - the etherial substance of space, forming also a physical base for the expression of mind and which may be associated with gravitons and the neutrinos). In that highly evolved seed is the Shakti, the divine spiritual Force who or which is in turn governed by the One Divine, the Supreme Lord. O maid-friend! There is none else supreme than my Lord. He plays dynamically in Truth-World of knowledge. Who can speak of His Greatness and Magnanimity?” – (*Tiruvadi Perumai*, Stz. 17).

The above stanza essentially agrees with stanza 24 which successively speaks of atom (*val anu*), and within it the atomic particle of electron (*anu*, the electron), then the light within the electron, and the inner light within that light (i.e. the inner light arising due to *paramanu*), then the etherial space within the inner light, (i.e. an outer etherial space possibly formed by neutrinos) and an inner space within that space (i.e. arising due to causal etherial substance or *vibhu anu*) These substances are said to be yet in the physical realm. But there are also purer realms of life and mind. *Paramanu*, the intermediary, is the substance of life having its formulation in the physical in the form of photons of light, but it has its own purer and more direct levels

of existence. One such level or state of *Paramanu* is referred to in connection with the principles of time (*kala tatva*) and determinism (*nyati tatva*) in the subliminal range “*Suddhasuddha Paramanu Karya Kala Tatva*” “*Suddhasuddha Paramanu Karya Nyati Tatva*” of “Atutperun Jothi & Deathless Body” - Vol. II of the Author - Swami’s “*Tatva Lokas*”.

The principle of time is related to motion, and particularly to motion of the inner and outer breath of life, which is represented by the motion of wind or gaseous states gross as well as rarefied (vide *Joti Agaval* poem quoted under chapter 7). Thus *Paramanu* becomes the substance of the life-energy represented in the physical by the frequency of a subtly vibrating gaseous state. Similarly, *Vibhu anu* the causal seed or the causal substance of physical etherial space, supporting the mental and vital principles to have their formulations in the physical realm, is derived from the purer overmental substance called *Pranava anu - Suddha Maya Karana Pranava Anu Siva Loka* (see the Swami’s text and Ch. *Adi Nitya Preraka Mukti Lokas*). The purest force and the purest substance are of a supramental and spiritual nature and they are referred to as the inseparable Shakti and the Lord of Play in the world of Truth - Knowledge, which is described as the Supreme Sky or Space of Supreme Ether (*Paramakasa*), not the physical ether of the physical space which is only a distant derivative from the supreme Ether through the intermediary skies or spaces of Mind and life, for the purpose of forming the more material substances and elements successively.

There are other stanzas (stzs. 33 and 34) which are in agreement with the sense of the above stanza. Stanza 33 mentions the development of substance from the Spirit to the physical in a descending order whereas stz. 34 traces it in an ascending order. The latter is given first herein below. We have however added the scientific explanations within brackets here and there.

“There are many forms or shapes of matter in the richly evolved state of the five elements. Many are the colours and qualities – (forms, qualities and colours are due to outer electronic configuration and structure of atom). Many are the merited natures; and many are the lights each with a characteristic (i.e. the inner nature with its characteristic spectral light due to nuclear electrons and nuclear structure of atoms). Within the light are the many friendly forces (i.e. forces of attraction in nuclear particles giving rise to photons of light such as X-rays and gamma rays). Within the forces are the many sounds (characteristic, and rhythmic sounds of etherial spaces, there being many variations etherial substances forming their corresponding spaces such as mental, vital and physical, the gravitons and neutrinos and possibly such others characterising the etherial substances of physical spaces). Within the end-point of sound or at the transcending border of sound is unity of knowledge where arise the many refined movements or harmonious vibrations governed by the many overseeing and ruling godheads i. e. in the overmind summit or overmind gnosis where the sounds of even mental vibrations cease and are replaced by pure vibrations of knowledge). But the supreme Master and Overlord of all the Godheads, being united with them by an all seeing Eye of Vision, but yet unconnected or detached from them, plays in Podu, the transcendental and universal space of equal self-extension (the supermind). O maid friend! Who can really speak of the harmony and glory of the Feet of the

Divine Lord and dance of creative rhythms of universal movement?" –  
(*Tiruvadi Perumai*, stz. 34).

“There blossomed a three-fold flower in the space of the Heaven (the principles and powers of spirit, creative force of spirit and their extension as space-*anma*, *Prakriti* and *Akasa* - or in other words, spiritual substance, Force of spiritual substance and their extension as spatial or etherial substance force). In that another flower blossomed (*vayu* the Principle of life and the subtle vibration of gaseous state). In it again is manifested another flower (*Agni*, the Principle of heat and light, in the gaseous states, and the energy of expressive dynamisms of life.) In this five-fold flower (containing the principles of spirit, force, space, gaseous state and heat – *anma*, *prakriti*, *akasa*, *vayu* and *agni*) arises another flower (*Ap*, the principle of liquid and the rasa of taste). In that blossoms another flower (*prithvi*, the principle of dense physical matter as in its solid state and of the firm base of physical body and physicality in general). The seven flowers are undivided but divided as it were into four in the female (i.e. *vayu*, *agni*, *ap* and *prithvi* as the four female principles) and into three in the male (i. e. *anma*, *prakriti* and *akasa* as the three male principles) and they become a complete whole, as a formed and living unit of body and mind in a proper place (i. e. in the womb). In the core or centre of that built-up organism of body and mind, abide (the Feet of) the divine Lord. O maid-friend! Who can speak the glory of the divine Lord?” –  
*Tiruvadi Perumai*, stz. 33.

Notes:

(a). In the Upadesha the Swami explains the four female principles and the three male principles which together constitute the human adhara, the physiological and psychological and spiritual system. The male principles are *anma*, *prakriti* and *akasa* - spirit or soul, conscious power of spirit and the space-extension first as Mind-space but with power to formulate life - space and the physical etherial space of matter. The female principles are *vayu*, *agni*, *ap* and *prithvi*. *Vayu* is the life-principle associated with the inner gaseous state, i. e. with the vibration of nuclear forces of gaseous atoms. This life-principle has its formulation also in mind, and it is outwardly represented in the physical as the inhaling and exhaling breath of life. *Agni* is the energy aspect of life expressing itself as the energy of dynamic activities of life with its desires and passions. In its outer physical form, *agni* is the heat and light of the ordinary gaseous states. In its inner nature it tends to rouse consciousness. *Ap* is the principle of water and the taste of *rasa*, the essence or sap of sense – perceptions and aesthetic delight of the senses. *Prithvi* is the firm stability of the earthly physical matter and the physical body containing all the *tatvas* or principles involved in it.

(b). However, the female principles and male principles are not really separated. The stanza points out that the first three principles of *anma*, *prakriti* and *akasa* develop and become and manifest as the seven principles in a descending order of involution. The classification into the female and male principles arises only after the manifestation of the seven principles and that too in relation to the forming of the human embryo due to fertilisation of ovum (containing the female principles) by the sperm containing male principles. Therefore, it is evident that each contains the other principles. So, the female principles contain or possess the male principles and vice -

versa. The former are predominant in ovulatory discharge of ovum thus forming an evolutionary basis starting from the physical upward: the latter are predominant in seminal fluid, thus forming an involutory basis starting from the spiritual or the psychic downward. Elsewhere in *Joti Agaval* poem the Swami declares that male nature is in the female and the female nature in the male. So, it is Clear that each is in the other implicitly or explicitly.

(c). The stanza clearly mentions the grouping of different *tatvas* or *tatva* - forces, first as the three-fold, then as five-fold and seven-fold. It mentions again the break-up of the grouping and re-arrangement of the seven *tatvas* into four-fold and three-fold orders of the said male and female principles. Thus, it is in accord with stanza 18, which generally mentions the grouping of *tatvas* in twos, threes, and upto sevens. The operation of forces or energies within the nucleus and the atom and in the molecules may have to be considered as in a group or groups, apart from their discrete or separate existence. It is in this light that the Swami considers the atoms of the five elements namely ether, vapour, heat (including light), water, and solid (possibly corresponding on a rough basis with graviton, neutrino, photon, electron and proton – the five atomic particles) as the unit or the seed-state in its involutory as well as evolutionary manifestation and creation (ஐங்கரு, ஐம்பூ *Ayenkaru, Ayampoo* – the five-fold seed-state, the five-fold flower-state). In short, in many stanzas of the poem the opening word refers to the five elements as a whole or their seed-state or their flower-state as the integral basis for the manifestation of not only (1) the Physical aspects of existence such as the outer form, color and quality, and the characteristic orders of light and space, one within the other, denoting the inner physical truths of atom or atomic particles and substances, but also (2) the vital life-element, (3) mind element and (4) the supramental element which in turn contains and expresses forms of Sat, Cit and Ananda, (5) Sat, the spirit, the essential spiritual substance (6) Cit, the conscious power of spirit and (7) Ananda, their delight which has descended into creative universe through supermind (the fourth) in the forms of Sat-anand and Cit - anand representing a grouping in twos or in short as Siva-Shakti or Spirit-conscious Force.

(d). Stanza 31 refers to the seed-state of the five elements as the basis and source of plant life; stzs. 33 and 43 make it the embodied basis of the human being with a soul, mind, life and body. Stz. 27 refers to the grouping of atoms as molecules (வால் அணுக்கூட்டங்கள்) to hold and support not only physical light and color and shape but also a breath of life and growth of consciousness; stanza 28 refers to the five-fold seed-state of the elements as the basis for the formation of six inner instruments of mind and their multiple ramifications into sixty, six hundred, six thousand and so on upto six crores. i.e. the six forces or faculties of mind (*adhara karanas*) or the mind as descended in involution of the creative Shakti developing into innumerable facets. But stz 29 refers to it also as the basis for the evolutionary manifestation of seven instrumentations of mind and their multiple ramifications into seventy, seven hundred, seven thousand and so on upto seven crores, i.e. the seven outer faculties as formed in evolution of the earth-nature (*paguthi karanas* - ஏற்றமுறும் ஐங்கருவுக்கு இயல் பகுதிக் கரணம்) developing into innumerable evolutionary facets of mind. *Adhara karanas* or faculties of inner mind are described as wide in their range (*vyan karana shaktis* வியன் கரண சக்திகள்) thus denoting their inner levels which are causal for sub-sequent development of “the causal force of the wide space of Mind,” ஒரு

காரணமாம் விண் கரண சத்தி stz. 25). Elsewhere in the Upadesha the Swami refers to the dividing and distinguishing Mind as a causal source of creation, i.e. the lower creation (காரணமென்பது கரண சம்பந்தமுடையது, கரணமென்பது ஒற்றுமை வேற்றுமைத்தொழில் தன்மையுடையது). The ramifications of the six *adhara karanas* or inner faculties or functions of mind are said to be concerned with sounds and words and knowledge (விற்பு ஒலியும் அறுபது). Possibly the six formulations of the inner nature of Mind, acting on each *tatva* and multiplying into innumerable facets, may be correlated with the (1) *udbhava adhikarana Shakti*; (2) *Udbhava karana Shakti* (3) *Udbhava Parva Shakti*; (4) *Udbhava Karma Shakti* (5) *Udbhava upakara Shakti* and (6) *Udbhava upakara preraka Shakti* mentioned in the chapter of “*Tatva Lokas*” under each *tatva*. Refer them in the second chapter. These seem to correspond respectively with the inner levels of *buddhi*, *ahankara*, *manas*, *citta* (the well - known faculties of mind but here as in their inner levels and the inner vital mind and the inner physical mind. *Buddhi* is the reasoning intelligence, *ahankara* the separative consciousness of ego in mind, *manas* the thinking mind and *citta* the storing power of mental impressions in time. The outer instrumentations of Mind as manifested in the evolution are the corresponding formulations of the said six inner forms of Mind in the earth-nature or in our outer nature, along with the additional formation of a mind in the nerves and cells of the physical body. Thus arise the seven outer faculties of mind.

“In respect of the magnificent seed-state of the five elements there arise the six crores of formulations of the basic inner mental faculties (*adhara karana* as formed and descended in involutions). They are based upon six lakhs of formulations. These again are based on the knowledge-giving sixty thousands (i.e. sixty thousand sciences of learning). These again are successively reduced into their more and more original and causal states of a six thousand, a six hundred, a sixty the last of which are the words or sounds of knowledge (விற்பு ஒலியும் அறுபது) and finally into a bare six. O maidservant! Who can really speak of the magnanimity of the Feet of the Divine Lord playing in the beautiful and harmonious world of Truth-knowledge (*Cit Param, Mani Manru*) so as to develop causal forces of a very wide mental knowledge (*vyana karana shaktis*, i.e. the six wide and inner mental faculties) into their manifold ramifications of (involutionary) manifestation” - *Tiruvadi Perumai* Stz. 28.

“In respect of or on the basis of the evolving seed-state of the five elements there arise the seven crores of formulations of outer mental faculties (i.e. an infinite number of *Paguti Karanas*). They are based upon the seven lakhs of formulations. These again are based upon the formulated seventy thousand. They are successively traceable to their more and more original and causal states of a seven thousand, a concentrated or closely knit-up seven hundred, a seventy of powerful forces (of mind) and finally to the seven forces of mind (seven *karanas*) - all of these the Divine Lord has formed and kept up in their firm and separate existences so as to manifest the innumerable forms and shapes, colours and qualities, and enjoyable tastes and sense-perceptions of the things of nature (i.e. organic and inorganic physical substances giving rise to many forms, colours and tastes due to the many and varied evolutionary mental forces working behind). O Maid-friend! Who can really speak of the glory of the Feet of the Divine Lord?” – (*Tiruvadi Perumai* stz. 29).

We have already observed that stz. 17 agrees with stz. 24 which is now reproduced. The five elements, atoms, electrons, photons of light, neutrinos and gravitons of physical space indicated in stz. 24 are followed by supra-physical and psychological and spiritual ranges of existence, which are mentioned in stz. 25.

“The earthly gross physical matter (solid) is the first of the five elements. It is constituted by the basic atom (*val anu* the nascent or young atom as the basic atom of science). Within it is *anu* (the electron, *anu* being associated by the Swami with the heat or heat-particle of the sunray). Within the *anu* or electron is the much valued light (the photons of visible light produced or emitted by the high-energy electrons of the nucleus or those in orbital motion around the nucleus); within that light is another light which is yet a physical light (photons of invisible light such as X-rays and gamma rays). Within that merited inner physical light (*bhuta oli* எண் பூதத்து அவ்வொளிக்குள்) as distinguished from supra physical light such as mental light or spiritual light) is the pace (the etherial physical space which may be considered to be caused by the massless neutrinos). Within that natural or phenomenal space (இயல் வெளி *Iyalveli*) is another space (i.e. a less gross or subtler inner space but yet physical, possibly the space formed by gravitons extending into and overlapping with the subtle physical space); and in that space the Lord plays in dance (*bhuta natana*) giving the physical rhythm of music (*Pann bhuta natana* the musical rhythm of the etherial physical space, the finest or subtlest sound being associated with the etherial space பண்பூத நடம்புரியும் பதப் பெருமை) O Maid-friend! Who can really speak of the mastery and goodness of His action in play? None can know in detail the greatness of His feet which are placed on my head in affirmation of love and friendship.” – *Tiruvadi Perumai*, stz. 24.

Notes:

(a). The Swami observes in his Upadesha that there are many different etherial spaces (*ananta akasa bheda*) and so it is proper to infer that different etherial spaces are constituted by their respective etherial substances, each without mass, i.e. with a zero rest mass, and travelling at the velocity of light (or perhaps at a still greater velocity to become ubiquitously pervaded) and reaching every place and pervading in no time as it were, as if pervading in vacuum. These etherial substances seem to be characterised by neutrinos and gravitons. The neutrinos are again of two kinds namely those derived from the nuclear particles of “muons” and those from electrons. Thus the possibility of different etherial substances constituting their respective etherial spaces seems to be proved even through the latest discoveries of nuclear physics. Physical science may have to give a new interpretation to these discoveries. The etherial space we conceive is known to science as the vacuum, the motionless medium. It supports all substances and bodies and objects at all energy levels from zero to the maximum, under all circumstances. It is the *vinn anu*, the etherial particle of sky, that supports and holds in it the great fire (*agni*, the causal physical heat of the gaseous galaxies), stars, sun and planets like moon (vide stz. 42 of the poem). It is called “*bhuta karana anu* or the *vibhu anu*” that is “the causal all-pervading physical particle of substance” encircling, englobing, encompassing and permeating the whole

physical universe in no time and forming its substratum at the same time. (vide Srishti Jnaya in the Upadesha and the *Bhuta Tatva* under the *Tatva Lokas* respectively quoted herein under chapters 3 and 2). It forms a connecting base also with the supra-physical which is developed in stz. 25 of the poem *Tiruvadi Perumai*. Before considering the stanza we shall deal with the “vacuum particles” of science.

The current physical science has already begun to think aloud in terms of “vacuum particles, vacuum oscillations, vacuum corrections, polarisation of vacuum” and so on which indicate rather the existence of massless etherial substance of space - the space of the so called vacuum which is the meeting place or the common ground and substratum where birth and death, origin (Generation) and annihilation of all material particles and antiparticles with or without mass take place. We give an extract from a modern book on nuclear physics to prove the point.

“In the theory of elementary particles a vacuum may be regarded not as a void a nothingness, but as a peculiar state of all particles that have so little energy that they cannot be perceived in any way either by the human sense organs or by the most delicate instruments. But “vacuum particles” feel that influence of “real particles”. They rearrange themselves due to the presence of real particles, thus incidentally resulting in experimentally observable effects. If the effect is sufficiently energetic then the particle is transferred from the “invisible vacuum state” to the ordinary real state. Outwardly this appears as the generation of a particle (its birth). In exactly the same way, we can picture the “annihilation of particles” as their transition into the vacuum state..... Meanwhile a vacuum is pictured as an endless sea permeating everything, out of which particles jump up here and there like monsters. The sea of the unknown, one might say, of infinite depth.”

“We have said that interaction consists in the fact that one particle emits quanta and another particle absorbs them. Now can a particle absorb the quanta that it emits? Well, there is no reason why it cannot. Such processes result in the interaction of a particle with itself. This is sometimes interpreted differently; as the interaction of the particle with the vacuum. Though it may sound paradoxical, the expression is fully justified. The point is that when we speak of self-action we mean that the particle is acted upon even when it is all alone, when there is nothing around it not a single “real particle”. In other words, when a vacuum or void surrounds it” - (from “The forces of nature” - Mir Publishers).

Giving an example to explain the seeming contradiction between vacuum and the particle of matter arising in it, the text quotes thus.

“In spring when the grass begins to grow, how do we answer the question. Is there any Grass? It will be there when it comes green when shoots come out of the ground, you may say. And before that, when the shoots have not come up yet, when they are still in a subterranean existence?... but there is a bare field when the shoots have not come through yet – a kind of “vacuum” or emptiness in a certain sense of the word.”

Now we pass over beyond the limitations of physical science. According to the experience of the yogi, there is a closely connected hierarchy of ascending planes from the physical matter to the Spiritual substance. So the so called vacuum of the physical etherial space is the mediating link overlapping and interconnecting with the subtle-physical, then likewise with the vital life, then with the mental and finally with the spiritual-all of these being formed also immanently one within the other, and spiritual remaining at the core of each and everything. Now we take up the stanza 25 for consideration. Stanza 24 already deals with the physical realms.

“In the *sandhi shakti* or mediating force (of the subliminal realm) that gives the rich interacting combination (linking the physical with the subtle-physical i.e. linking the essential or causal physical substance of ether with the subtle-physical substance) there is a developing light of unity which is a yet greater force (ஒருமை வயங்கு மா ஒளி சக்தி *Orumai vayangu ma oli shakti*). In that greater light and force is a causal substance and force of an expansive space of Mind (*karana vinn karana shakti*, referring to the Mind of Nature at its highest called the overmind which is the universal cause for a secondary creation, say, from the overmind upto the physical matter through the well-known levels of mind and life). Within that wide space of overmind and at its head and source is the force of enlightenment of knowledge (*guru shakti*, the substance force of overmind gnosis which is the summit overmind as in communication with the divine supermind) that plays or functions in the soul as *Guru Shakti* the Master guide (குரு சக்தி). It has within it the great force of eight qualities that are formulations of Truth (the supramental conscious force manifesting eight aspects or qualities of Truth). Within the Shakti (the conscious force) is the divine lord who plays in compassion of grace to become each and everything and exist as such in full identity with them. O Maid friend! Who can verily speak of the glory of the body of the Lord, when it is difficult to know the greatness of the rhythm of His Creative Feet in Dance? (*Tiruvadi Perumai* stz. 25).

Notes:

This stanza has to be read along with the earlier stz. 24. The eight qualities manifested by the great consciousness Force of Truth-knowledge are, according to the tradition, (1) purity or absense of any trace of ignorance (2) consciousness soul in one’s nature (3) self-awareness of being or self-existence as a spiritual being (4) purity of body (evidently implying transformation of the physical body, as the ancient Thirumoolar insisted deathlessness of body as one of the eight siddhis or virtues to be attained) (5) possession of an infinite power (6) infinite and eternal bliss (7) integral wholeness and fulness of divinity. They are called the *ashta gunas* of the Divine (vide Tamil lexicon). Thirumoolar also refers to the eight gunas or qualities of the Man of God in his *Tirumantram* (TM 668 - 671).

அட்டகுணம் - கடவுட்குரிய எண் குணம். அவை இயல்பாகவே பாசங்களின் நீங்குதல், இயற்கையுணர்வினனாதல், தன் வயத்தனாதல், தூய உடம்பினனாதல், பேரருளுடைமை, முடிவிலாற்றல் உடைமை, வரம்பில் இன்பமுடைமை, முற்றுணர்தல் - (ஆனந்த விகடன் அகராதி).

Now the Swami observes that the Divine is the smallest of the small atomic particle and he puts this sense in an inimitable way of description in stz. 20 which also serves to be a brief summary of the foregoing stzs. 24 and 25.

“The creation (the phenomenal universe) is one, and it is based on or contained in the small *anu* (particle of electron). Smaller than it (atomic particle of electron) is the causal seed (*Karana karu*) or embryonic source of matter (which is the etherial physical substance of space) forming also a base for the mind. (*akasa* as the formed causal source of matter) Smaller and subtler is the fear-giving ignorant force of *Prakriti* (i.e. the subliminal force of Nature). Smaller and subtler still is the force of intelligence (of overmind). Smaller and subtler is that which shows the vast Flame of Space (the soul-spark of *atma anu* that sees in vision the vast Light or Flame of the Supermind). Smaller and subtler is the shakti (that abides in the soul-spark and enlightens) illuminating with its consciousness. A crore of times smaller and subtler is *Tirucittrambalam* (the true centre of the transcendental and Universal Manifestation of the Supreme Divine) where My Lord plays to manifest Grace. O Maid-friend! Who can speak of the greatness of the Grace of my Lord? Do you? You do not know of it.” – (*Tiruvadi Perumai* - stz 20).

*Thiru Cit Ambalam* is the comprehending Supermind and in that poise the infinite and eternal Divine extends Himself as the Universal Divine and constitutes as and supports at the same time each and everything from the greatest to the smallest, the infinitesimal. It becomes on the one hand *atma anu* the soul-atom or soul-spark of each being and on the other the atom and the atomic particle of electron and even the massless neutrino of material nature. His infinite and eternal Nature upholds the Infinitesimal.

Now the Swami proceeds to express another aspect of the Divine that He is the greatest of the great or the largest of the known large things, but yet could be contained in the smallest of the small.

“The earthly solid mass of matter is crores times larger or greater (than any known material object). Water (liquid) is a hundred and one crores of times still larger. Fire or heat is a crore of crores times still larger. Air (or gaseous state of existence) is one lakh and eighty-four crores of times still larger. Ether or etherial space (sky), *Moolam* i.e. *Moola Maya* (the phenomenal Nature), Life (the vital *Prana uyir*), *Maha Maya* (the pure-impure Nature), *Sudhasuddha Maya* (the subliminal range of Nature), *Kutilai* (the purer Nature), *Suddha Maya* (of the universal overmind with its formed ranges of Mind, life and the physical in the lower levels, i.e. in the subliminal and phenomenal natures) and *Bindu*, the Shakti of light of *parabindu* which is the pure *suddha Maha Maya* in the summit overmind (*parabindu* coming after *kutila* in the ascent) - the measure of the largeness or expansiveness of these cannot be said in words. But all the above said existences are contained (in a compact way) in the smallest place or point in the nail of a small toe of the divine Feet. If so, O maid - friend! Who can really tell about the greatness of the Divine Lord? – (*Tiruvadi Perumai* stz. 22).

“The phenomenal world of the elements which we consider and exaggerate in our ignorance as large or extensive is only a small part of cosmos. There is a larger part (i.e. the subliminal and universal) of which our world or the known physical universe including life, forms a small part. All the concentrated and unified worlds and forces beginning with the said larger part and ending with *Kutula (Suddha Maya, the Overmind Nature)* who bears within her heart as her causal source the great shakti called *Parai* (the universal *Maha Shakti*) are supported and sustained by the slightest vibration of the luminous Lotus-Foot of the Divine in a rhythm of Dance in the transcendental and universal Truth-World of equal self-extension (*Poduvil Turya Natam*). O Maid-friend! Is it possible for me to comprehend the greatness of the supreme Truth who or which plays by the creative rhythm of Universal Dance?”- (*Tiruvadi Perumai*, stz. 26).

We quote some more stanzas of the poem that may be of general interest to the reader; but they lend themselves to an interpretation based on physical matter, apart from their inseparable connection with the ultimate spiritual basis of things.

“In the rich *vinn anu* the atomic particle of substance of ether forming space (*vinn anu* being the causal physical etherial substance of space and creative of the physical matter in its gaseous, liquid and solid states), arise the fire (causal) heat bringing about the original gaseous states of matter in the form of nebulae and galaxies, luminous stars, sun and moon (the moon representing planets which have cooled down to become solid base of matter). Thus have been formed into existence all; each and everything have their firm base in the luminous conscious force of Para Shakti (*cit jwalitha para shakti, the creative universal Maha shakti*) and in the substance and Being of the Universe, represented by the Universal Lord or cosmic Ishwara (Shakti man). All *tatvas* (the principles, powers and substances of the universal existence) have their access or entry into the very heart or core of the transcendental and universal real of Truth knowledge where the Supreme Divine plays. O Maid friend! Is there any one who can really speak of the glory of the harmonious Feet of the Divine Lord playing in creative rhythm of dance or dynamic movement, when the books of knowledge (the vedas) admit their inability to do so? Is it possible, then for me, a humble being, to do the same? – (*Tiruvadi Perumai* stz. 42.)

Notes:

- a) *Vinn anu* is the same as *vibhu anu* mentioned in upadesha that is the all-pervading physical substance of ether that is the cause for the material or physical universe of the five elements. It is also called *bhuta karana anu*, the causal atomic particle or substance of ether. *Val anu* is the atom proper, and *anu* the electron. *Anu* the electron is also called *bhuta karya anu*.
- b) The fire (*agni*) mentioned here is the causal heat (*karana agni*) that is the cause for the formation of the physical Universe at first as nebulae, galaxies, stars and sun. This is not the ordinary fire and heat of nature as in the fuel and electricity. It is the extraordinary light and heat associated with the fusion of

nuclear atoms or atomic particles of gases as in the nebulae, galaxies and stellar bodies.

- c) The gaseous state of matter has two forms. One is the Plasma state of gases associated with the super-intensity of heat and light in which nucleus and electrons are separated at ultra-high temperatures. The other is the ordinary gaseous state as atoms or molecules of gases giving light and heat while burning or interacting. The Swami mentions these two states as the subtle seed-state and the gross state of gas, in 'Joti Agaval' poem supporting the nature of motion, breath and life and consciousness, (காற்றினில் பெருநிலை கருநிலை காற்றிடை அசைஇயல் கலை இயல் உயிர் இயல் காற்றிடை உயிர்பல கதிபல கலைபல - காற்றிடை உணரியல் கருதியல்; கலை = இடகலை பிங்கலை சுவாச நடைகள்-ஜோதி அகவல்; 467-483). The inner vibration in the nuclear structure of gases and the spreading movement of the gaseous atoms find their expression in the physical life as the inner impulse of life-energy (nervous energy or its current is an example), and as the outer movement of breath in the lungs. It is like the earth possessing a two-fold movement, one as its self-spinning motion around its own axis and the other as its orbital motion around the sun.
- d) All the *tatvas* have their true birth and dissolution, or beginning and end, in the Truth-World. So their issuing forth and returning back, being a simultaneous to and fro movement of all *tatvas* (cf: *tatva tatvika layodaya*), take place in the supramental world of Truth. *Tatva tatvika layodaya vyapaka vyapya suddha Jnana ateeta loka* - see the Swami's text in Ch. *Karanateeta Lokas*.

“There is a formed creation (phenomenal universe of matter). In that there is the structure of physical body which is the outer cover of matter (Param here used in a physical sense as the physical body of matter or outer cover of matter, i.e. as atom பரம் + உடல், கவசம் Param literally means body or kavacha the armour for body). There is a causal part in the said param (body or atom) which determines manifold functions (implying force behind the works or functions in the nuclear part of atom or the vital and mental forces in the body). Within it is an inner sanctum (puram indicating antahpuram) which is accessible to the big and strong forces or stuffed forces for a to and fro movement (possibly referring to the core or inmost part of the nucleus of atom into which the great or stuffed forces enter and move about புடைத்த அவை புகுந்து உலவும் புரம் ஒன்று - reminding about the intranuclear particles of matter such as protons, neutrons and pi-mesons or even electrons). There is a governing ruler in the said inner room (bhupati literally means ruler of the earth and so of earthly matter too, but here indicating possibly the secret psychic element abiding within the physical body or within the core of atomic substance, just as there is the undeveloped psychic or soul entity in plants and animals) who is guided by the supreme conscious force (poorana Cit). All these closely connected and concentrated formulations (i.e. psychic, mental, vital and physical substances and their governing forces in the physical body as well as in the physical matter) are contained in a very small point of place in the gracious Feet of the Divine Lord who plays in Chittrambalam, the comprehending supermind, so as to make them, each and everything stabilised

in the manifestation, but the Lord Himself remaining detached from all these. O Maid friend! Who can really know of the greatness of the Divine Being?" - (*Tiruvadi Perumai* - stz. 19)

Notes:

Possibly the stanza may be interpreted differently taking param as the heaven of overmind which formulates Mind, life and physical principles in the various levels of existence below and under it puram, in that case, and context, would mean "overmind gnosis", the summit overmind at the border of supermind and in touch with it and communicating with it. This sense would be justified because the terms புடைத்த அவை புகுந்து உலவும் புரம் signify the inner sanctum where the great forces commissioned to do various functions enter into and move about to and fro (i.e. for receiving truths of the Supermind through an over lord of the sanctum called Bhupati, who may be identified with the cosmic Ishwara). The overlord who governs these great forces is guided and controlled by the Supreme shakti (*Poorana Cit*), the Supramental consciousness Force.

The above stanza may be interpreted in a lesser significance also, taking Param as the physical body that is governed by the causal part, i.e. the subliminal forces of mind, life and the subtle-physical. These forces have access to the innermost level (Puram) where Bhupati, the psychic being or soul of man, rules and governs them, and they receive directions of truth from the soul. Bhupati, the psychic being, is itself guided and controlled by the Divine Shakti.

Possibly, the secretly hidden and unmanifest psychic entity (soul element) within the con of the atomic nucleus of matter and abiding in a subtle state of physical ether, which is the causal physical substance creating the phenomenal physical universe, exists not only as Bhupati of atom, but also as Bhupati of man (i.e.) as the developed manifest soul of man in his inmost heart. The Mother of Sri Aurobindo Ashram refers to the soul element not only in man, animal and plants, but also in the core of matter. Swami Ramalingam observes in his prose works of *Vinnappam* that his undeveloped soul-spark lay in a swoon of unconsciousness for aeons of time in the dense darkness of the inconscient Maha Pasa Abdgakara before it was lifted out of the Darkness by the grace of the Lord and put into the evolutionary journey of life in a physical body. We know that the Inconscient Darkness is the starting base of inconscient earthly physical matter. Sri Aurobindo too speaks of the same point in his "Savitri epic" thus: - "The endless hope that made my soul spring fourth out of its infinite solitude and sleep."

அருட்பா

திருவடிப் பெருமை பாட்டுகள்

16. தோன்று சத்தி பலகோடி அளவு சொல ஒண்ணாத்  
தோற்று சத்தி பலகோடித் தொகை உரைக்க முடியா  
சான்று உலகம் தோற்றுவிக்கும் சத்தி பலகோடி  
தனை விளம்பல் ஆகா அச்சத்திகளைக் கூட்டி  
ஏன்ற வகை விடுக்கின்ற சத்தி பல கோடி

இத்தனைக்கும் அதிகாரி என் கணவர் என்றால்  
ஆற்ற மணி மன்றில் இன்ப வடிவாகி நடிக்கும்  
அவர் பெருமை எவர் உரைப்பார் அறியாய் என் தோழி.

17. தோற்றம் ஒன்றே வடிவு ஒன்று வண்ணம் ஒன்று விளங்கும்  
சோதி ஒன்று மற்று அதனில் துலங்கும் இயல் ஒன்று  
ஆற்ற அதில் பரமாய அணு ஒன்று பகுதி  
அது ஒன்று பகுதிக்குள் அமைந்த கரு ஒன்று  
ஏற்றமிக்க அக்கருவுள் சத்தி ஒன்று சத்திக்கு  
இறை ஒன்றாம் இத்தனைக்கும் என் கணவர் அல்லால்  
ஆற்ற மற்றோர் அதிகாரி இல்லையடி மன்றில்  
ஆடும் அவர் பெருந்தகைமை யார் உரைப்பார் தோழி.
18. ஒருமை பெறு தோற்றம் ஒன்று தத்துவம் பல்வேறு  
ஒன்றின் இயல் ஒன்றிடத்தே உற்றில இங்கு இவற்றை  
இருமையினும் மும்மை முதல் எழுமையினும் கூட்டி  
இலங்கிய சிற்சத்திநடு இரண்டொன்று என்னாத  
பெருமை பெற்று விளங்க அதின் நடு அருள் நின்று இலங்கப்  
பெரிய அருள் நடு நின்று துரிய நடம் புரியும்  
அருமை எவர் கண்டு கொள்வர் அவர் பெருமை அவரே  
அறியாரே என்னடிநீ அறைந்த வண்ணம் தோழி.
19. படைத்த படைப்பு ஒன்று அதிலே பரம் அதில் காரணமாம்  
பகுதி அதில் பகுக்கின்ற பணிகள் பல பலவாம்  
படைத்த அவை புகுந்து உலவும் புரம் ஒன்று அப்புரத்தில்  
பூபதி ஒன்று அவர்க்கு உணர்த்தும் பூரண சித்து ஒன்று  
மிடைத்த இவை எல்லாம் சிற்றம்பலத்தே நடிக்கும்  
மென்பதத்து ஓர் சிற்றிடத்து விளங்கி நிலை பெறவே  
அடைத்து மற்ற இங்கு இவைக்கெல்லாம் அப்புறத்தே நிற்பார்  
அவர் பெருமை எவர் அறிவார் அறியாய் நீ தோழி.
20. சிருட்டி ஒன்று சிற்றணுவில் சிறிது அதனில் சிறிது  
சினைத்த கரணக் கரு அச்சினைக் கருவில் சிறிது  
வெருட்டிய மின் அம்மானில் சிறிது மதி மதியின்  
மிகச்சிறிது காட்டுகின்ற வியன் சுடர் ஒன்று அதனில்  
தெருட்டுகின்ற சத்தி மிகச் சிறிது அதனில் கோடித்  
திறத்தினில் ஓர் சிறிதாகும் திருச்சிற்றம்பலத்தே  
அருட்திறத்தின் நடிக்கின்ற என்னுடைய தலைவர்  
அருட்பெருமை எவர் உரைப்பார் அறியாய் என் தோழி.
22. மண் அனந்தங் கோடி அளவுடையது நீர் அதனில்  
வயங்கிய நூற்றொரு கோடி மேல் அதிகம் வன்னி  
எண்ணிய ஆயிரம் அயுதம் கோடியின் மேல் இலக்கம்  
எண்பத்து நின்கு அதின் மேல் அதிகம் வளியொடு வான்  
விண்ணளவு மூலம் உயிர் மாமாயை குடிவை  
விந்து அளவு சொல முடியாது இந்த வகை எல்லாம்

அண்ணல் அடிச் சிறுநகத்தில் சிற்றகத்தாம் என்றால்  
அவர் பெருமை எவர் உரைப்பார் அறியாய் நீ தோழி.

23. மண்ணாதி ஐம்பூத வகை இரண்டின் ஒன்று  
வடிவு வண்ணம் இயற்கை ஒரு வாலணுச் சத்தி இயலாய்க்  
கண் என்னும் உணர்ச்சி சொலாக் காட்சியவாய் நிற்பக்  
கருதும் அவைக்கு உள்புறம் கீழ்மேல் பக்கம் நடுவில்  
நண்ணி ஒரு மூன்றைந்து நாலொடு மூன்றெட்டாய்  
நவமாகி மூலத்தின் நவின்ற சத்திக்கெல்லாம்  
அண்ணுறும் ஓர் ஆதார சத்தி கொடுத்தாடும்  
அடிப்பெருமை யார் அறிவார் அவர் அறிவார் தோழி.
24. மண்பூத முதற்சத்தி வால் அணுவில் அணுவாய்  
மதித்த அதன் உள் ஒளியாய் அவ்வொளிக்குள் ஒளியாய்  
எண்பூதத்து அவ்வொளிக்குள் இலங்கு வெளியாய் அவ்  
இயல் வெளிக்குள் ஒரு வெளியாய் இருந்த வெளிநடுவே  
பண்பூத நடம் புரியும் பதப் பெருமை எவரும்  
பகுத்து உணர முடியாதேல் பதமலர் என் தலைமேல்  
நண்புணற வைத்து அருளும் நடராஜப் பெருமான்  
நல்ல செயல் வல்லபம் ஆர் சொல்லுவர் காண் தோழி.
25. வண் கலப்பில் சந்தி செய்யும் சத்தியுளே ஒருமை  
வயங்கு ஒளி மாசத்தி அதனுள் ஒரு காரணமாம்  
விண்கரண சத்தி அதனுள் தலைமையாக  
விளங்கு குருச் சத்தி அதின் மெய்மை வடிவான  
எண்குண மாசத்தி இந்தச் சத்தி தனக்குள்ளே  
இறையாகி அது அதுவாய் இலங்கி நடம்புரியும்  
தன்கருணைத் திரு அடியின் பெருமை அறிவரிதேல்  
சாமி திருமேனியின் சீர் சாற்றுவதென் தோழி.
26. பெரிய எனப் புகல்கின்ற பூதவகை எல்லாம்  
பேசுகின்ற பகுதியிலே வீசுகின்ற சிறுமை  
உரிய பெரும் பகுதியும் அப்பகுதி முதல் குடிமை  
உளம் கொள் பரை முதல் சந்தி யோகமெலாம் பொதுவில்  
துரிய நடம் புரிகின்ற சோதி மலர்த் தாளில்  
தோன்றியதோர் சிற்றசைவால் தோன்றுகின்ற என்றால்  
அரிய பெரும் பொருளாக நடக்கின்ற தலைவர்  
அருட்பெருமை என் அளவோ அறியாய் என் தோழி.
27. பொன் வண்ணப் பூத முதல் தன்மை உண்மை அகத்தே  
பொற்புறமாக் கருவிளக்கம் பொருந்த வெண்மை செம்மை  
தன் வண்ணப் பசுமையோடு கருமை கலப்பாகும்  
தன்மையினில் தன்மையதாய்த் தனித்து அதற்கோர் முதலாய்  
மண் வண்ணத்து ஒளி உருவம் உயிர்ப்பினோடு தோன்ற  
வால் அணுக் கூட்டங்களை அவ்வகை நிறுவி நடத்தும்  
மின் வண்ணத் திருச்சபையில் ஆடுகின்ற பதத்தின்

மெய் வண்ணம் புகலுவது ஆர் விளம்பாய் என் தோழி.

28. பொற்புடைய ஐங்கருவுக்கு ஆதார கரணம்  
புகன்ற ஆறு கோடி அவைக்கு ஆறு இலக்கம் அவற்றுக்கு  
கற்பு உறும் ஓர் அறுபதினாயிரம் அவற்றுக்கு கடை  
ஆறாயிரமாம் அங்கு அவற்றுக்கு ஓர் அறுநூறு இங்கு  
இவைக்கே  
விற்பு ஒலியும் அறுபது மற்று இவைக்கு ஆறு இங்கு இந்த  
வியன் கரண சத்திகளை விரித்து விளக்குவதாய்ச்  
சிற்பரமாய் மணிமன்றில் திரு நடனம் புரியும்  
திரு அடியின் பெருமை எவர் செப்புவர் காண் தோழி

(விற்பு ஒலியும் அறுபது - அறுபது வகை ஒலிக்கும் மனோ அறிவுக் கலைகள்.)

29. ஏற்றமுறும் ஐங்கருவுக்கு இயல் பகுதிக் கரணம்  
எழுகோடி ஈங்கு இவற்றுக்கு ஏழ் இலக்கம் இவைக்கே  
தோற்றமுறும் எழுபதினாயிரம் இவற்றுக்கு எழுமை  
துன்னிய நூறு இவற்றினுக்குச் சொல்லும் எழுபது தான்  
ஆற்றலுறும் இவை தமக்கு ஓர் ஏழாம் இக்கரணம்  
அனைத்தினையும் தனித்தனியே தோற்றி நிலைபொருத்திச்  
சாற்றரிய வடிவு வண்ணம் சுவைப் பயன் உண்டாக்கும்  
சாமி திரு அடிப்பெருமை சாற்றுவது ஆர் தோழி

(ஏழ் இலக்கம் - ஏழு இலட்சம்)

30. விளங்கியஐங் கருச்சத்தி ஓர் அனந்தங் கருவில்  
விளைகின்ற சத்திகள்ஓர் அனந்தம்விளை வெல்லாம்  
வளம்பெறவே தருகின்ற சத்திகள்ஓர் அனந்தம்  
மாண்படையத் தருவிக்கும் சத்திகள்ஓர் அனந்தம்  
உளங்கொளநின் றதிட்டிக்கும் சத்திகள்ஓர் அனந்தம்  
ஓங்கியஇச் சத்திகளைத் தனித்தனியே இயக்கித்  
தளங்கொளாண் டவ்வவற்றிற் குட்புறம்நின் றொளிரும்  
சாமிதிரு வடிப்பெருமை சாற்றுவதார் தோழி.

31. காணுகின்ற ஐங்கருவின் வித்தின் இயல் பலவும்  
கருதுறும் அங்குரத்தின் இயல் பற்பலவும் அடியின்  
மாணுகின்ற இயல்கள் பல பலப்பலவும் நடுவில்  
மன்னும் இயல் பல பலவும் பலப்பலவும் முடியின்  
பூணும் இயல் அனந்த வகை புரிந்த பல பலவும்  
பொருந்துவதாய் அவ்வவற்றின் புணர்க்கையும் தான்ஆகி  
ஏணுகின்ற அவைகளுக்குள் பற்றாமல் நடிக்கும்  
எழிற் கருணைப் பதப் பெருமை இயம்புவது ஆர்தோழி.

32. மண்முதலாம் தத்துவத்தின் தன்மை பலகோடி  
வயங்கு சத்திக் கூட்டத்தில் வந்தன ஓர் அனந்தம்  
பண்ணுறும் அத்தன்மையுளே திண்மை ஒருகோடி

பலித்த சத்திக் கூட்டத்தில் பணித்தன ஓர் அனந்தம்  
எண்ணுறு இத்திண்மைகளும் இவற்றினது விகற்பம்  
எல்லாமும் தனித்தனி நின்றிலங்க நிலை புரிந்தே  
விண்ணென்னும் படி அவற்றில் கலந்து கலவாது  
விளையாடும் அடிப்பெருமை விளம்புவது ஆர்தோழி.

33. விண்ணிடத்தே முதன் முப்பூ விரிய அதில் ஒரு பூ  
விரிய அதின் மற்றொரு பூ விரிந்திட இவ்வைம்பூக்  
கண்ணிடத்தே பிறிதொருபூ கண்மலர அதிலே  
கட்டவிழ வேறொருபூ விட்ட எழுபூவும்  
பெண்ணிடத்தே நான்காகி ஆணிடத்தே மூன்றாய்ப்  
பிரிவிலவாய்ப் பிரிவுளவாய்ப் பிறங்கி உடல் கரணம்  
நண்ணிடம் தேர்ந்து இயற்றி அதின் நடுநின்று விளங்கும்  
நல்ல திரு அடிப்பெருமை சொல்லுவது ஆர் தோழி.
34. வண்பூவில் வடிவு பல வண்ணங்கள் பல மேல்  
மதிக்கும் இயல்பல ஒளியின் வாய்மை பல ஒளிக்குள்  
நண்பு ஊறும் சத்தி பல சத்திகளுள் வயங்கும்  
நாதங்கள் பல நாதநடுவணை ஓர் கலையில்  
பண்பாய நடங்கள் பல பல பெயர்ப்பும் காட்டும்  
பதிகள் பல இவைக்கெல்லாம் பதியாகிப் பொதுவில்  
கண்பாய இவற்றினொடு கலந்து கலவாமல்  
காணுகின்ற திருவடிச் சீர் கழறுவது ஆர் தோழி.
35. ஓங்கிய ஐம்பூ இவைக்குள் ஒன்றின் ஒன்று திண்மை  
உற்றன மற்று அது அதுவும் பற்றுவன பற்றத்  
தாங்கிய மாசத்திகளின் பெருங்கூட்டம் கலையாத்  
தன்மை புரிந்த ஆங்காங்குத் தனித்தனி நின்றிலங்கித்  
தேங்கிய போது அவை கலையச் செய்கை பல புரிந்து  
திகழ் ஒளியாய் அருள் வெளியாய்த் திறவில் ஒளி வெளியில்  
பாங்குற நேர் விளங்குகின்ற திருவடியின் பெருமை  
பகுத்து உரைக்க வல்லவர் ஆர் பகராய் என் தோழி.
36. விரிந்திடும் ஐங்கருவினிலே விடயசத்தி அனந்த  
விதமுகம் கொண்டு இலக அவை விகித விகற்பாகித்  
பிரிந்தாடு மான் இலக்கணங்கள் பலகோடி பிரியாப்  
பெருஞ்சத்தி இலக்கணங்கள் பற்பல கோடிகளாய்த்  
தெரிந்திடு நானிலைக்குள்ளே இருந்து வெளிப்படவும்  
செய்கை பல புரிகின்ற திறல் உடைத்தாரகமேல்  
எரிந்திடு தீ நடு வெளிக்கண் இருந்த திரு அடியின்  
எல்லையை யார் சொல்ல வல்லார் இயம்பாய் என் தோழி.
37. தோன்றிய ஐங்கருவினிலே சொல்லரும் ஓர் இயற்கைத்  
துலங்கும் அதில் பலகோடிக் குலங்கொள் குருத்துவிகள்  
ஆன்று விளங்கிடும் அவற்றின் அசலை பல கோடி  
அமைந்திடும் மற்றவைகளுளே அமலைகள் ஓர் அனந்தம்

ஏன்று நிறைந்திடும் அவற்றிற் கணிப்பதனுக்கு அரிதாய்  
இலங்கு பிரகாசிகள் தாம் இருந்தன மற்றிவற்றில்  
ஊன்றிய தாரக சத்தி ஓங்கும் அதின் நடுவே  
உற்ற திரு அடிப்பெருமை உரைப்பவர் ஆர் தோழி.

38. உறைந்திடும் ஐங்கருவினிலே உருவசத்தி விகற்பம்  
உன்னுதற்கும் உணர்வதற்கும் ஒண்ணா வெண்ணிலவே  
நிறைந்த அவை தனித்தனியே நிகழ்ந்திலங்க அவைக்குள்  
நேர்மை ஒண்மை உறுவித்து அந்நேர்மை ஒண்மை அகத்தே  
குறைந்திலவாம் பல்வேறு குணங்கள் உறப் புரிந்து  
குணங்களுளே குறிகள் பல கூட்டுவித்து ஆங்கு அமர்ந்தே  
மறைந்த மணம் வெளிப் படுத்தும் மலரடியின் பெருமை  
வகுத்துரைக்க வல்லவரார் வழத்தாய் என் தோழி.
39. சூழ்ந்திடும் ஐங்கருவினிலே சொரூபசத்தி பேதம்  
சொல்லினோடு மனங்கடந்த எல்லையிலாதனவே  
தாழ்ந்திலவாய் அவை அவையும் தனித்தனி நின்றிலங்கத்  
தகும் அவைக்குள் நவவிளக்கம் தரித்து அந்த விளக்கம்  
வாழ்ந்திட ஓர்சத்திநிலை வயங்கியுறப் புரிந்து  
மதிக்கும் அந்தச் சத்தி தனில் மன்னுசத்தர் ஆகி  
ஆழ்ந்திடும் ஓர் பரம்பரத்தை அசைத்து நின்று நடிக்கும்  
அடிப்பெருமை உரைப்பவர் ஆர் அறியாய் என் தோழி.
40. பசு நிறத்த ஐங்கருவில் பகர்ந்த சுவைத் தன்மை  
பற்பல கோடிகளாம் அவ்வுற்பவ சத்திகளில்  
வசுநிறத்த விதவித நவ சத்தி பல கோடி  
வயங்கும் அவைக்குள் ஆகி வயங்குவள் அவ்வாதி  
தச நிறத்தவாக அதில் தனித்தனி ஓங்காரி  
சார்ந்திடுவாள் அவள் அகத்தே தனிப்பரை சார்ந்திடுவள்  
திசை நிறுத்தப் பரை நடுவில் திருநடனம் புரியும்  
திருவடியின் பெரு வடிவைச் செப்புவது ஆர் தோழி.
41. பூத்த சுடர்ப் பூ அகத்தே புறத்தே சூழ் இடத்தே  
பூத்து மிகக் காய்த்து மதி அமுதொழுகப் பழுத்து  
மாத்தகைய பெருஞ்ஜோதி மணிமன்றுள் விளங்கும்  
வண்ணம் ஒரு சிறிதறிய மாட்டாமல் மறைகள்  
ஏத்துவதும் ஏறுவதும் இறங்குவதும் ஆகி  
இருக்கின்ற என்றுணர்ந்தோர் இயம்பிடில் இச்சிறியேன்  
தோத்திரஞ் செய் தம்மை கண்டு மகிழ்ந்திட அம்மன்றில்  
துலங்கும் அடிப்பெருமையை என் சொல்லுவது தோழி
42. வளம் பெறு விண் அணுக்குள் ஒரு மதி இரவி அழலாய்  
வயங்கிய தாரகையாய் இவ்வகை அனைத்தும் தோற்றும்  
தளம் பெறு சிற்சொலித பராசத்திமயம் ஆகித்  
தனித்த சத்திமான் ஆகித் தத்துவம் எல்லாம் போய்  
உளம் புகுத மணிமன்றில் திருநடம் செய் தருளும்

ஒரு தலைவன் சேவடிச் சீர் உரைப்பவர் எவ்வலகில்  
அளந்து அறிதும் என மறைகள் அரற்றும் எனின் சிறிய  
அடிச்சி உரைத்திடப் படுமோ அறியாய் என் தோழி.

43. புரவிய ஐங்கருவினிலே பருவ சத்தி வயத்தே  
பரை அதிட்டித்திட நாத விந்து மயக்கத்தே  
விரவிய தத்துவ அணுக்கள் ஒன்றொடொன்றாய் ஒன்றி  
விளங்க அவற்று அடி நடு ஈறு இவற்றினில் மூவிதமாய்  
உரவு இயலுற்று உயிர் இயக்கி அறிவை அறிவித்தே  
ஒங்குதிரு அம்பலத்தில் ஒளி நடனம் புரியும்  
தரவு இயலுற்ற இது என யிர் தெரிந்துரைப்பார் சிறிய  
தமியள் உரைத்திடுந்தரமோ சாற்றாய் என் தோழி

(உரவு இயல் - திண்மையான இயல் அதாவது உடல்)

44. சோதி மலை ஒரு தலையில் சோதி வடிவாகிச்  
சூழ்ந்த மற்றோர் தலைஞான சொருப மயமாகி  
ஓதிய வேறொரு தலையில் உபயவண்ணம் ஆகி  
உரைத்திடும் ஐங்கருவகைக்கு ஓர் முப்பொருளும் உதவி  
ஆதி நடு அந்தம் இலா ஆனந்த உருவாய்  
அம்பலத்தே ஆடுகின்ற அடி இணையின் பெருமை  
வேதியனும் திருமாலும் உருத்திரரும் அறியார்  
விளைவு அறியேன் அறிவேனோ விளம்பாய் என் தோழி

(ஓர் முப்பொருள் பஞ்ச பூத கருவுக்கு சத், சித், ஆனந்தம் ஆகிய முப்பொருள்  
வழங்கி)

45. பூ ஒன்றே முப்பூ ஐம்பூ எழுபூ நவமாம்  
பூ இருபத்தைம் புவாய்ப் பூத்து மலர்ந்திடவும்  
நா ஒன்று மணம் வேறு வணம் வேறு வேறா  
நண்ணி விளங்குறவும் அதின் நற்பயன் மாத்திரையில்  
மேவொன்றி இருப்ப அதின் நடு நின்று ஞான  
வியன் நடனம் புரிகின்ற விரைமலர்ச் சேவடியின்  
பா ஒன்று பெருந்தகைமை உரைப்பவர் ஆர் சிறியேன்  
பகர்ந்திட வல்லநன் அல்லேன் பாராய் என் தோழி.

## 6. Neutrinos and Gravitons

Now we would like to give a few extracts of observations by modern nuclear physicists and authors on the latest developments in regard to neutrinos and gravitons. Physicists and astronomers consider neutrinos as the massless and chargeless particles permeated and accumulated in the universe for aeons of time without ever being absorbed and that neutrinos are intimately connected with the expansion of the universe and even with the curvature of space making it a finite and bounded universe, though yet infinitely large in expanse. They are said to determine even the curvature of earth. Neutrinos are massless in the sense that they have a zero rest mass, but they are ever in movement at the velocity of light. Unlike photons of X-rays and gamma rays which are also considered massless (i.e. with a zero rest mass) and chargeless particles travelling at the same velocity of light the neutrinos have an infinitely greater penetrating power permeating all kinds of matter, even the densest, such as lead of whatever thickness, without being absorbed, but photons are slowed down in matter and get absorbed. Thus though both travel at the speed of light, there are differences in their energy levels. In this sense neutrinos may be considered as closer to ether (*akasa*) in substance or even forming one kind of ethereal substance perhaps lesser in grade to gravitons. Neutrino was discovered by experiment done in 1956, which is the same year when Mother of Sri Aurobindo Ashram brought the divine light into direct manifestation on the earth. Gravitons are the hypothetical substance considered by scientists to exist ubiquitously with an all-pervasive character, pervading and penetrating all spaces and matter and objects animate and inanimate, because all the moving and non-moving are subject to gravitational forces or material bodies, from the stars, sun and planets down to atoms and orbiting electrons within atoms.

We now quote from “the forces of nature” a book on nuclear physics by Russian authors Grigoryev and Myakishev. We have added our notes and explanations here and there and they are put in numbered brackets.

“Take the role of the neutrino in the universe. We are already used to this particle invading every imaginable sphere. A number of stellar processes are accompanied by the emission of neutrinos. The reason is obvious since the main source of stellar energy is from nuclear fusion. The chain of processes resulting in the conversion of four protons (i.e. protons of hydrogen) into an alpha particle (a nucleus of helium) gives rise to two positrons; and this is always accompanied by the ejection of two neutrinos. Positrons and electrons are annihilated and a neutrino escapes from the star. From the sun alone over 10<sup>11</sup> neutrinos strike every square centimeter of the earth’s surface every second.

Add to this the fact that in the interstellar space, mesons (of intermediate mass) and hyperons (of heavy mass including neutrons and protons) decay, and all the disintegrations are accompanied by the generation of neutrinos and anti-neutrinos.

Deeper in stellar interiors, under great pressure and at very high temperatures (i.e. about 600 million degrees) we find direct production (by electrons) of

neutrino -anti - neutrino pairs, probably in the presence of nuclei. These all-penetrating particles naturally pass right through enormous stellar thickness and carry away their portion of energy even if they got started deep inside the star. Given the low density of the universe, neutrinos would be able to fly for aeons without ever being absorbed. That is why there should be an accumulation of neutrinos in the universe. What is more, it might be (as we shall see later on) that a considerable portion of the universe was made up of neutrinos in the early stages of expansion (according to the hypothesis of Zeldovich, neutrinos play one of the most significant roles along with protons and electrons in or during the first act of evolution or expansion of the universe). In the main, these neutrinos are still intact, having lost a considerable portion of their energy, during the expansion of the universe.

This reasoning leads us to presuppose enormous quantities of neutrinos in the world; the neutrino mass (though with a zero rest mass, it is supposed to acquire a negligible mass when in high velocity of movement as of light) might even compete with the entire mass of visible matter. If that is so, the density of matter of this world and hence its curvature is largely determined by neutrinos. It may be that neutrinos make our universe finite.”

American nuclear scientists have also similar views on the subject. They consider that the anti-neutrinos will have to travel through about 35,000 light years of solid lead or a hundred million times 1,40,000,000 miles of solid matter in order to have a chance of being absorbed. In this background, the chance of absorption being rare, it is considered that all the neutrinos and anti-neutrinos formed during the evolution or expansion of the universe are virtually still in existence today.

Now considering the massless Particle of graviton which is connected with gravitational force in all bodies, from the stars upto atoms, and which is more ghostlier than neutrinos, we may summarize the available data of knowledge about it.

Since gravitation curves the paths of all bodies in the same way as it curves the light that is a wave particle at the highest velocity, we can regard gravitation as a curvature of space-time. The gravitational waves are waves of space-time curvature and they are not only emitted but can also be absorbed like any other type of waves such as the electromagnetic waves. The effects are very feeble though. Gravitational waves pass through all matter with hardly any absorption. Particles called gravitons have been introduced to correlate with the non-quantum image of the gravitational wave, and the followers of gravitation wave theory predict conversion of gravitation or rather transmutation of gravitons into other particles such as electron-positron pairs, proton-antiproton pairs etc., involving simultaneous change (i.e. decrease) in the curvature of space, These transmutations are possible because there are no particles that are insensitive to gravitation.

The light from a receding star near the sun has been observed to take a curved path deflected towards the sun because of the gravitational force of the sun. Based on Einstein's theory of relativity, light travelling at its high velocity moves in a gravitationally curved space and will finally return to when it started from, i.e. it will close in on itself eventually, after having traversed the vast expanse of limitless yet finite space. On this basis, Einstein concluded that our universe is by no means

infinite, it has finite dimensions. At the same time, it is limitless, since no expedition ever found any kind of a boundary - limitless but not infinite. His theory of gravitation also leads to an expanding universe that is an experimental fact in so far as our portion of the universe is concerned. But as expansion has to be followed by a contraction, or both have to be balanced by alternate cycles, there is the hypothesis of a pulsating universe, pulsating (i.e. expanding and contracting) eternally with a period that is still unknown.

Now coming back to gravitons to close the subject we may say that the modern physicists take graviton as the exchange particle in relation to the gravitational field, even as there are exchange particle of photon for electro-magnetic field (of electrons and positrons), pi-meson for strong nuclear field (of protons and neutrons), and another nameless but provisionally called “weak exchange particle” or “W particle” for the weak nuclear field (of neutrinos and anti-neutrinos). We may incidentally note that the exchange particle of pi-meson in the case of strong nuclear field of protons and neutrons, seven times the mass of neutral pi-meson ( $7 \times 264.2 = 1849.4$ ) a. m. u. roughly equals the mass of proton (1836) or of neutron (1839). As already seen in the fifth chapter, 1849 is equal to the permutation of 43 *tatvas* ( $43 \times 43 = 1849$ ). Therefore in the nuclear science the neutral pi-meson has to be considered as the more basic reference particle or as the exchange particle, in as much as it enters into a relationship with the protons and neutrons on the one hand, and with the more high energy particles of electrons and positrons and the photons of gamma rays and neutrinos on the other. However, we like to add that this view is arrived at by considering from the position of the 43 *tatvas* or more specifically from their permutation, because each *tatva* enters into all the others including the vital life and mind principles. The very short life period of pi-meson (ranging from 10-8 to 10-16 second of life time) suggests that it has mental and a vital element in it or that it is amenable to a very quick mental force or a vital life force of working in it, if applied properly. Its disintegration or resolution or resolution into 1) electron (the derivative unit of physical particle *bhuta karya anu*) 2) gamma ray (the photon which is the middle corresponding to *Paramanu* or *karana - karya anu* the causal - effectual *anu*, which can support the middle term of life in body) and 3) neutrino (the massless ubiquitous particle which is closer to *vibhu anu*, or *karana anu*, the causal *anu*, which can support mind in body) has to be given new significance and value so as to fit in with the over all set-up of all *tatvas* or the 43 *tatvas* as an integral whole. Physicists have formed general views on the nature of graviton and its role in the gravitational field. Graviton is considered as the “gravitational exchange particle” and by this concept they visualise bodies exerting their gravitation on each other by the constant emission and absorption of gravitons in vast quantities. The influence of the gravitational field is extended from one body to another through the said exchange particle. Like the electromagnetic field. The gravitational field is also one of long range interaction and therefore its exchange particle namely the graviton is expected to be massless like the photon that is the exchange particle of the electromagnetic field.

In an experiment of nuclear interaction, accelerated high-energy protons streaming virtually at the velocity of light were made to strike the element beryllium as a target; it was found that the element broke down into all kinds of atomic and sub-atomic particles, forming all the ranges of interaction namely 1) the strong nuclear forces involving neutrons, protons and pi-mesons, 2) the electro-magnetic forces

involving electrons and photons, and 3) the weak nuclear forces involving neutrinos. Possibly the weakest of all the forces, i.e. the gravitational force involving the hypothetical substance called gravitons might have been also a result of the total interaction, though it was not specifically detected. Thus the strong nuclear interaction seems to imply the weak interaction and vice versa. The fast or high-energy neutrinos of the weak interaction at last were led into a spark chamber where they interacted with neutrons of the strong interaction and produced protons, which are also of the strong type, along with muons of the weak range. Thus the massless neutrino, incident on neutron, plays with its maximum energy to produce the final products of proton and muon that are comparatively far greater in total mass.

If each force of interaction is considered to have an exchange particle that characteristically bears a quickly operating and dominant form of energy for that range, we may encounter pi-meson as the exchange particle in the range of strong nuclear interaction, and photon as the exchange particle in the electro-magnetic range in which electrons absorb as well as emit photons and in the reverse process the massless photons assume mass to become electrons. Then, there should be a similar exchange particle for the weak nuclear field and it is provisionally called weak exchange particle or "W particle", though it is not yet detected. Similarly, there should be an exchange particle in the gravitational reaction and here graviton serves the purpose. Graviton, the hypothetical substance, by which gravitational force or wave is absorbed and released within atoms or atomic particles, would be its own exchange particle, because it is connected with the weakest of all interactions, that is to say, in as much as it is the particle of the weakest or absolutely weak range comparatively there cannot be yet another separate substance to serve it as an exchange particle. In effect this means that all atomic particles, from the strong to the weak from neutrons to neutrinos, can be exchanged into or as gravitons and vice versa. Possibly the said "W" particle and gravitons may overlap each other and form one kind of substance though with different grades. This substance is perhaps the ether (*akasa*). From a study of the nature of the massless highly energetic neutrinos and the gravitons, we may infer that they are ethereal substances of different grades, or at the least if graviton is the ether proper, neutrino should be the closest substance to ether, as it permeates all spaces and matter, even the densest matter as if it were vacuum, and that in no time as it were, and also because it is considered to form or help to form the curvature of space and of earth.

Again, in the said experiment, beryllium breaks up at first into the nuclei and electrons. The nuclei again disintegrates into the following chain of particles, stable and unstable. Beryllium neutrons, protons and pi-mesons; pi-mesons (highly unstable) mu-mesons; mu-mesons (highly unstable) electrons and positrons, photons and neutrinos and antineutrinos (all of which are stable). See also Chart I. Thus, extremities of time and space, (i.e. the highest energy as of the velocity of light and the quickest transmutation of mass of matter) are reached by the most unstable particles of pi-mesons (or pions) and mu-mesons (or muons) which break up quickly, as it were in no time (in less than  $10^{-8}$  second or one hundredth of a millionth of a second) into free and stable particles of the least mass namely electrons and into the mass - less stable particles of photons and the neutrinos. Apparently, there is a contradiction in terms. What is regarded as most unstable, from the view point of its natural life-time, transforms itself very quickly into the eternally stable, mass-less and unabsorbed neutrinos which pervade the whole universe permeating all matter. Even

though classified by scientists as particles of weak nuclear interaction, we may regard neutrinos as possessing the maximum energy level as they ever travel at the speed of light and penetrate even the densest thicknesses of matter. In effect, the unstable atomic particles like free neutrons, pions and muons possess naturally and inherently within them, the stable neutrinos and anti-neutrinos, apart from the stable electrons and positrons.

It is even significant to note that unlike the negative and positive pi-mesons which together eventually break up into electron-positron pairs and neutrino-anti neutrino pairs, the neutral type of pi-meson breaks up directly into the energy-particles of two photons of light, or a photon of light and an electron- positron pair (See Chart I). Thus the absence of neutrino-anti-neutrino pair in the break up of neutral pi-meson seems to suggest that they have been directly and readily converted into two photon of light in opposite directions. (possibly or theoretically to meet back after curving round the vast space of the universe). So the substance of etherial space (i.e. neutrino-anti neutrino) becomes indistinguishably exchanged as light of the highest energy levels.

Further, anti-particles like anti-protons and anti-electrons (i.e. positrons) are artificially created in man-made experiments by accelerating protons or electrons, as the case may be, to the high velocity of light and making these high-energy particles hit a given target like copper. Thus by application of the maximum energy to speeding particles, they are made to touch and merge as it were with the etherial substance within the atomic particles of the target. As a result the anti-particles are formed as rebounded forms of particle-energy or substance-energy; or the energy gets reversed or curves back to form anti- particles of opposite electrical charge. Thus anti-particles have their birth in a critical state of etherial space within atomic particles with which the accelerated particles come into contact by collision. In this respect we may conceive that each atomic particle has a counter-part of etherial substance corresponding to that of the etherial space within atom.

Similarly when accelerated high-energy particles and anti-particles, for example, protons and anti-protons both speeding at the velocity of light, are made to collide from opposite directions, they annihilate themselves as to their mass, i.e. transform themselves into new particles of lesser and lesser mass as mesons, then electrons and positrons, giving off photons of energy of light in the process of change, until they become eventually particles of no mass as neutrinos and anti-neutrinos, or alternatively transform themselves into particles of no charge though preserving almost the original mass, for example, as neutrons and anti-neutrons, if and when the protons and anti-protons happen to make a near miss to collide. In the case of electron-positron collisions, their mass becomes annihilated and photons of light or of X-rays and gamma rays are emitted as a result. It may eventually result in the transformation into neutrinos and anti-neutrinos. Thus we see that in order to transform the stable particles of protons-anti-protons, or electrons-positrons, into neutrinos and anti-neutrinos, an immense or maximum energy has to be applied to them for collision. In these cases of particles - anti-particles which are stable we may say that “matter or substance part” of the matter-force is evolved into the front whereas “force part” of the matter-force remains within involved or hidden, and that only by an artificial application of immense force, the final massless substances are created. In the other case of the unstable neutrons and the most unstable pi-mesons

and mu-mesons of a very short natural life-time, “matter part” of their matter-force is involved or hidden whereas the “force part” of their matter-force becomes evolved readily into the front, because by the inherent natural force readily available in them, they easily and quickly break up into the final mass-less substances. In both cases the fact observed is that matter is converted into energy, i.e. the substance-energy of matter has been converted into energy-substance of massless matter, in one case (the former) by application of artificial energy and in the other (the latter) by its own natural and inherent energy.

We observe from the above facts that just as anti-particles are born in and from a critical state of etherial space of etherial substance (here ether itself is identified with and as space) within the atom or in the interstitial etherial space within atomic particles, so too annihilation of particles and anti-particles in collision take place in a likewise critical state of etherial space or interstitial space, when they over reach, as it were, by intensity of energy of their velocity in collision, and come into direct effective contact with etherial substance for an exchange, rather an annihilating exchange in mass and charge. Thus space-substance-energy are the triple factors that play in the birth as well as destruction of matter. In short, particles take their birth and also annihilate themselves in a critical or transforming state of etherial space in which etherial substance plays its essential part, because ether is the fundamental and permanent origin and basis of matter and material creation (cf: “Nirantara adhikarana parama atyati laghutva akasa rupa shakti” - *Bhuta Tatva* of “*Tatva Lokas*” See Chapter 2).

Again, there is the lesser phenomenon like the intense scattering of pi-mesons on protons, in which high-energy positive pi-mesons speeding almost at the velocity of light and acquiring a specific energy level are made to collide with protons, when both are said to merge to form quickly a combined or integral state of particle called “resonance particle” during the shortest time of  $10^{-23}$  second and immediately disintegrate again into their original components i.e. pi-mesons and protons, without involving a change in mass or charge in them. The “resonance state” involved a change purely in the energy content of their integral state so as to fit in with the same energy level of the incident pi-mesons. Possibly as the resonance particle with its shortest life-time of  $10^{-23}$  second involves no change of mass or charge but only a change, in the energy content of the said integral state, we may suppose that it has a mental element in it or that it is quickly amenable to a mental force of working without involving any apparent or measurable change in the substances of the system, whether a physical object or a human bodily system. So, we may infer that the resonance was produced because both pi-mesons and protons merged for a very short time so as to enter into direct contact with the core or essence of etherial substance which is the same in both. Resonance was produced due to exchange of energy in and through the ether within them the ether as in a particular state. This resonance is similar to the resonance of sound waves at a given frequency of vibration. According to yoga literature sound in its essential nature, is the inherent property of the ether or etherial space. Sound as heard through the medium of air is of a grosser kind; but the sound that originates from ether due to collision of high-energy particle of pi-meson with proton is of a subtler nature and it may not have been heard, though its existence is proved by the fact of resonance of scattering particles. Again, the hearing of the tiny whisper of anti-neutrino when being captured or absorbed by a proton, in

experiments on interaction of neutrino or anti-neutrino with other heavy particles, is also a pointer to the state of exchange with the common ether in both the particles.

There are varying substance levels (in mass) and energy levels of matter or matter-force. In birth or creative transformation of matter that takes place in a certain state (critical or transforming state) of ether of space within atom, particles assume greater and greater mass beginning from a state of zero rest mass like neutrino, until they reach stability of mass consistent with a given energy level. ஓங்கிய ஐம்பூ இவைக்குள் ஒன்றின் ஒன்று திண்மையுற்றன. மற்று அது அதுவும் பற்றுவன பற்றத் தாங்கிய மாசத்திகளின் பெருங் கூட்டம் கலையாத் தன்மை புரிந்து ஆங்காங்குத் தனித்தனி நின்றிலங்கி. We have already seen in stz. 35 of *Tiruvadi Perumai* about the increasing densities or masses of atoms of the five elements and their stability as supported by a group or groups of forces and about their unstability arising due to disproportionate relationship between mass and energy, and involving the disintegration and rearrangement of forces by changing the mass and releasing the part energy (radio-activity) for doing many kinds of works. That is to say if the atoms or atomic particles over-reach or exceed states of mass inconsistent with energy levels, they become unstable and natural process of annihilation or disintegration by radio-active decay ensues (cf:.....தேங்கிய போது அவை கலையச் செய்து) Ibid stz. 35 i.e. made to disintegrate if stagnant state due to disproportionate excessiveness of mass over its supporting energy so as to regain a new stability of mass and energy. In the induced artificial process of total annihilation because of the collision of particles and anti-particle from opposite directions at high-energy levels, they become totally unstable and completely destroy themselves as to mass and charge. Thus stability and unstability of matter are only relative and they seem to be states of exchange between substance-energy and energy-substance or between excessively massive particles of stored and locked up energy, and the massless particles of highly active energy - these states being brought about by a critical state of ethereal substance within atom or within atomic particles in collision.

If we regard neutrino, or for that matter graviton, as the ethereal substance or both forming different grades of ether which is the fundamental and permanent physical substance in all matter and material creation, then, we have to infer necessarily that either of them or both exist in all atoms and even in the simplest atom of hydrogen which is formed of one proton as the nucleus and one electron as orbiting that nucleus. Now how are we to account for the existence of neutrino or graviton in the hydrogen atom? We know that a free neutron breaks up quickly within a few minutes into a proton, an electron and an anti-neutrino, all of which are stable. It is quite likely that a hydrogen atom with a formed boundary of space of its own has been originally formed by a neutron which was just in a state of disintegration, and that the anti-neutrino should have converted itself into the space or ethereal space within atom so that electron may spin round the nucleus of proton. In more complex atoms like helium, oxygen, copper etc., the different types of neutrinos, namely the electron type and the muon type, may possibly explain the different grades of spaces within atom, the former perhaps forming the outer space of electron shells, and the latter the inner space of nucleus. Graviton, though yet a hypothetical substance, may be considered to be the most equal substance of ether so as to form even the interstitial ethereal physical space within the mass of all atomic particles, that is to say, it forms not only the fundamental constituent part of all atomic particles but also

pervades in and as the so-called empty spaces within and outside atoms. We may say that graviton forms the spaces and hence also the curvature of space within atom, and outside it as the immense expanse of the physical universe. The possibility of many kinds of ether or ethereal space is supported by the words of Swami Ramalingam.

According to Swami Ramalingam *akasa* the ether (which is the same as or one with ethereal space) in its essential nature, constitutes the fundamental and permanent physical substance of an extremely super-ultra lightness so as to be the causal support (or substratum) for all material substances (i.e. gas, heat, liquid and solid). Essentially, it is formless, though in its phenomenal outer appearance it is seen as circular or spherical or as forming the curvature of space (Kundalakara *Swarupa*). Its formlessness and all-pervasiveness are meant to support all the inseparably or closely connected motions and actions of all the material substances (cf: 'nirantara *adhikarana parama atyati laghutva akasa rupa shakti*; kundalakara *akasa swarupa shakti*; nirakara sneha *anutva parama atyati laghutva sukshma sadhana anusyuta karana karmatva akasa swabhava shakti*' - see under *bhuta tatva* of "Tatva Lokas" in chapter 2). In upadesha, the swami further observes that there are many kinds of ether or ethereal space even in the physical realm (ananta *akasa bheda in bhuta akasa*) even as there are many kinds of gas or gaseous states (ananta *vayu bheda*-see item "Sristi Jnyam" in Book of Upadesha quoted in the Third Chapter of this book).

The physical spaces proper may be considered to be variously formed according to the gravitational forces in each range such as the strong and weak nuclear fields, the electro-magnetic field and the overall gravitational field itself, and hence within the atom and even within atomic particles, and outside them in the outer physical universe of space and bodies. There should be a corresponding physical space even when there is absence of gravitation, i.e. zero gravitational force. Now apart from these purely physical spaces formed in the physical nature by its own play of its physical substances and forces, there should be also other kinds of physical space or spaces formed or formulated by the interaction of non-physical or supra physical forces and substances namely the subtle-physical which is the nearest at the border, followed by the vital, mental, spiritual mental, overmental, and supramental, each of which having its own characteristic space of substance and energy and also a characteristic light in its own pure realm. The last three are beyond the reach of the average man and only yogis experience the various skies or spaces of the spiritual mental, overmental and supramental and their characteristic lights in the corresponding depths of their being or in their overhead centres of yogic energy or in both the corresponding planes simultaneously.

Now coming back to the physicality of matter as such and taking into consideration the five essential and stable particles namely graviton, neutrino, photon, electron and proton, we may say that each potentially and secretly contains the others in mass and energy, though each has its own energy level and a manifest form of mass or unmanifest form without mass as the case may be. Thus if graviton is treated as a massless substance of the finest grade with an energy level of its own, it may be considered to have potentially within it the other four energy levels also that by change of energy level, graviton can allow or induce transformation of the other substances or particles from one into the other, to take place in its medium. Graviton may not change in its substance though it may readily move into the other four energy levels in fact into all energy levels from zero to the maximum, because it forms the

permanent substratum of substance not only of the so called empty space without gravitation, but also of the spaces with varying gravitations, and of the inner spaces of material content of all other particles from the grossest or densest to the subtlest matter. It allows all motions and actions of all particles to take place in its medium or presence or pervasiveness, and also their transmutations as to mass, charge and energy in its critical states of exchange with them during birth and annihilation of particles.

Now, neutrino may be considered as the nearest or closest to graviton or its substitute as an etherial substance. It can transform itself from its zero rest mass into the least mass of electron through them massless photon, and then into the massive proton. It can also transform itself, in the opposite way, into or as graviton at the other end. In effect, graviton may be visualised to have two poles of existence of which one end is its permanent unchanging substratum of etherial substance (i.e. not changeable by the interaction of the purely physical grades of substances and forces) and the other its changeable but highly stable and “frontal or surface etherial substance” as or in the form of neutrino - i.e., in principle, changeable to the energy level of neutrino and hence also changeable in the mass, i.e. capable of changing into or becoming other stable particles by and through its own frontal substance, the neutrino. Thus graviton, not involving itself directly in transformation from one particle into the other, can effectuate it at the same time through its own medium or frontal substance namely the neutrino and as a result the neutrino changes into other particles and it happens, as we have already stated, in a critical state of exchange with graviton. Likewise, but in the opposite way proton may transform itself successively until it becomes the massless neutrino.

Thus, physical etherial space, which is associated with neutrino and graviton, is the source and end, or the field for birth and annihilation of atomic particles, whether in their free states or critical states of transmutation or in their bound states within the atom. The weakest nuclear interaction contains the strongest and vice versa. The weakest force curves back to become the strongest. The neutrino and the graviton possess the maximum energies. Matter once born reverses or curves back in the critical state of etherial space to become annihilated as to mass or charge or both. Positive charge curves back to become the negative and vice versa. Spin or angular momentum of particles takes an opposite orientation in such a state; graviton by its gravitational force curves all particles of matter to form the space-time curvature of the pulsating etherial space of universe and to form also the space within atom; Matter curves back to become energy and vice versa; or, matter-force or substance-energy with material substance as the predominant factor curves back to become energy-substance with energy as the predominant factor. Proton gravitates to become neutrino; graviton induces neutrino to curve back to change into proton. The physical etherial space which is the medium for birth and destruction of matter is the junction where we pass on to the supra-physical, and starting from the subtle-physical, we move on to the spiritual through the intermediaries of the vital life and the mind. The positivities and negativities of the physical matter (i.e. particles and anti-particles) as bounded within the infinitely large physical universe are resolved again and put into another state of relation with the next higher or deeper realm, the subtle-physical, where a different set of *values* and dimensions arise and prevail. Similarly again the positivities and negativities of the subtle-physical are taken up into a still higher or deeper and subtler realm i.e. the realm of the vital life, and there they are resolved again into new *values* and dimensions and so on until we reach in the seventh level

the subtlest spiritual substance-energy which as a snake biting its own long tail at the other end, holds in itself, at the other end as it were, the physical matter-force or substance energy of matter and the material universe as itself or as its own true form of another mode.

## 7. Properties of Matter

(Five Elements) and States of Involution and Evolution

(Jothi Agaval poem, lines 168 to 256 and 273 to 276)

In the following lines of “Jothi Agaval” poem, the Swami has exhaustively dealt with the constitution and properties of matter in regard to each of its five elements as ether, gas, fire, liquid and solid, (or rather in its five states of the elements namely, ethereal, gaseous, thermal, liquid and solid or material states), their states of involution and evolution, and further evolutionary possibilities into and as perfect matter, the many forces and energies operating or interacting in them, their seed states or nuclear states of mass of matter, their formless states (i.e. as the invisible form of atoms and the formless or massless atomic particles) and their manifest states (as the formed visible and concrete elements and molecular compounds) - கருநிலை, அருநிலை, விரிநிலை அல்லது திருநிலை அல்லது பெருநிலை and their further developed natures or states of manifestation supporting plant life, animal life and consciousness வித்தியல், உயிரியல், சித்தியல், உணரியல், கருதியல் with thoughts and feelings particularly through the motion and vibration of gaseous matter and its connected breath of life and pulsation of life-energy in matter and physical bodies (காற்றில் அசை இயல் கலை இயல் உயிரியல்). All these states, manifest and unmanifest, are based upon two mutually interacting sub-strata, ethereal and material, one as the crowning summit of ethereal space and the other as the bottom ground of gross solid matter (வெளியின் முடிநிலை, மண்ணில் அடிநிலை) - the other three elements coming up in between.

### அருட்பெருஞ் ஜோதி அகவல்

335. உலகெலாம் பரவ என்னுள்ளத்திலிருந்தே  
அலகிலா ஒளிசெய் அருட்பெருஞ் ஜோதி.  
விண்ணினுள் விண்ணாய் விண்ணடு விண்ணாய்  
அண்ணி நிறைந்த அருட்பெருஞ் ஜோதி.  
விண்ணுறு விண்ணாய் விண்ணிலை விண்ணாய்  
அண்ணி வயங்கும் அருட்பெருஞ் ஜோதி.
341. காற்றினுட் காற்றாய் காற்றிடைக் காற்றாய்  
ஆற்றலின் ஓங்கும் அருட்பெருஞ் ஜோதி.  
காற்றுறு காற்றாய் கானிலைக் காற்றாய்  
ஆற்ற விளங்கும் அருட்பெருஞ் ஜோதி.  
அனலினுள் அனலாய் அனல்நடு அனலாய்  
அனல் உறவிளங்கும் அருட்பெருஞ் ஜோதி.
347. அனல் உறும்அனலாய் அனல்நிலை அனலாய்  
அனல்உற வயங்கும் அருட்பெருஞ் ஜோதி.  
புனலினுள் புனலாய் புனல் இடைப் புனலாய்  
அனை என வயங்கும் அருட்பெருஞ் ஜோதி.

புனல் உறு புனலாய்ப்புனல் நிலைப் புனலாய்  
அனை எனப் பெருகும் அருட்பெருஞ் ஜோதி.

353. புவியினுட் புவியாய் புவிநடுப் புவியாய்  
அவை தர வயங்கும் அருட்பெருஞ் ஜோதி.  
புவியுறு புவியாய்ப் புவி நிலைப் புவியாய்  
அவை கொள விரிந்த அருட்பெருஞ் ஜோதி.  
விண்ணிலை சிவத்தின் வியன்நிலை அளவி  
அண்ணுற அமைந்த அருட்பெருஞ் ஜோதி.
359. வளிநிலைச் சத்தியின் வளர் நிலை அளவி  
அளி உற அமைத்த அருட்பெருஞ் ஜோதி.  
நெருப்பது நிலை நடு நிலை எலாம் அளவி  
அருப்பிட வகுத்த அருட்பெருஞ் ஜோதி.  
நீர் நிலை திரை வளர் நிலை தனை அளவி  
ஆர்வுற வகுத்த அருட்பெருஞ் ஜோதி.
365. புவிநிலைச் சுத்தமாம் பொற்பதி அளவி  
அவையுற வகுத்த அருட்பெருஞ் ஜோதி.  
மண்ணினில் திண்மையை வகுத்து அதிற் கிடக்கை  
அண்ணுற வகுத்த அருட்பெருஞ் ஜோதி.
403. நீரினில் தண்மையும் நிகழ் ஊறு ஒழுக்கமும்  
ஆருற வகுத்த அருட்பெருஞ் ஜோதி.
431. தீயினில் சூட்டியல் சேர்தரச் செலவியல்  
ஆயுற வகுத்த அருட்பெருஞ் ஜோதி.
461. காற்றிடை அசை இயல் கலை இயல் உயிரியல்  
ஆற்றலின் அமைத்த அருட்பெருஞ் ஜோதி.
493. வெளியிடைப் பகுதியின் விரிவியல் அணைவியல்  
அளியுற அமைத்த அருட்பெருஞ் ஜோதி.
545. வானிடைக் காற்றும் காற்றிடை நெருப்பும்  
ஆனற வகுத்த அருட்பெருஞ் ஜோதி.  
நெருப்பிடை நீரும் நீரிடைப் புவியும்  
அருப்பிட வகுத்த அருட்பெருஞ் ஜோதி.  
நீர்மேல் நெருப்பும் நெருப்பின் மேல் உயிர்ப்பும்  
ஆர்வுற வகுத்த அருட்பெருஞ் ஜோதி.
551. புனல் மேல் புவியும் புவிமேல் புடைப்பும்  
அனல் மேல் வகுத்த அருட்பெருஞ் ஜோதி.

After considering a broad outline of the subject of the above text and the essential characteristics of each element, we shall take up stanza by stanza for consideration of the details of each element and its relation with the others.

In stanzas 367 to 711, the five elements of ether, gas, fire, liquid and solid are said to have respectively one, two, three, four and five properties or qualities of matter each succeeding element containing and subsuming the properties of the preceding one, apart from its own characteristic property. Ether is said to have an all-pervasiveness which includes an embracing or uniting contact (i.e. a pervasiveness of ethereal substance and force contacting all other substances and forces in its medium or presence (வெளியிடை விரிவியல்). Ether is therefore identified with space, that is to say, it becomes space itself which is called “veli, vinn or van (வெளி, விண், வான்). Etherial space is characterised by an ethereal sound which fills it (வெளியினில் ஒலி நிறை வியன் நிலை). We may add that this evidently makes it also a base for formulation of mind the thoughts of which are vehicled in the brain in the form of sound of words and so even the sense-perception of physical sound is essentially evoked by ether. Gas or gaseous state has the property of vibration in and of its substance and hence bringing about the breath of life and pulsation of life energy, that is to say, because of its vibration and motion (due to expansion and contraction) it serves also as a base for the manifestation of life energy in matter apart from manifesting the play and interaction of many of its physical forces in matter (காற்றிடை அசை இயல் கலை இயல், உயிரியல் ஆற்றலின் அமைத்த அருட் பெருஞ் ஜோதி). Gaseous state is characterised by sense of contact - a contacting of its substance and forces (காற்றில் உறு இயல்). It brings about contact between force and force, and the varying forces as a result. In the outer sensation, contact of air or gas is felt as a touch. Next, fire or thermal state of substance and force has the property of radiation of energies in the form of heat and light (and electricity) தீயிடை சூட்டியல், ஒளியியல். The intensity of heat is suggested in the white flame of fire (தீயினில் வெண்மை) and its connection with gas as fuel for burning is also indicated (தீயினில் வெண்மை திகழ் இயல் பலவாய் ஆயுள வகுத்த அருட்பெருஞ் ஜோதி) So the whiteness of the fire here seems to suggest the burning white light of sun and stars. The Swami also points out the storing and gathering of heat energy in concentration and its expenditure by release of energy (தீயினில், சூட்டியல், சேர்தர செலவியல்) Thermal state is the middle in the order of the five elements. It evokes the sense of light or the sense of sight. From ether to fire we have not yet reached a stable and tangible form of matter. We reach it in the liquid, the fourth element, which has the property of liquidity, its flowing quality and coolness, (the flow being due to surface-tension நீரினில் தண்மையும் நிகழ்ந்து ஒழுக்கமும்). It is said to have four natures, i.e. four states of existence, though they have not been explained. Water has these four states. It has the states as the natural cool liquid at ordinary temperatures and as hot liquid at higher temperatures. At the freezing point of coolness it becomes solid as ice or snow, At the boiling point it becomes water vapour. Thus gaseous state, thermal state, liquid state and solid state are contained in water which is a liquid (நீரிடை நான்கு இயல் நிலவுவித்து) In all the four states the nature of the atomic or molecular structure of the liquid element, as for example the constitution of water as H<sub>2</sub>O (2 atoms of hydrogen and one atom of oxygen forming its molecular structure) remains unchanged. Similarly liquid hydrogen or liquid oxygen can exist in the four states or forms without a change in its atomic structure as H<sub>2</sub> or O<sub>2</sub>. Liquid is further

said to give sense of taste. Coming to the last of the five elements, the Swami mentions the characteristic property of solid matter as its firm or hard solidity or cohesion of mass to serve as earthly ground for habitation (மண்ணினில் திண்மையை வகுத்து அதில் கிடக்கை அமைத்து). It gives sense of smell. It has five natures or properties (i.e. in it are involved the qualities of the five elements).

In stz. 545 and 547, the Swami traces the involutory development of the states of ether, gas, heat, liquid and solid, one from the other successively, starting from ether. This implies that ether inherently and secretly contains all the other elements but in subtle or rarefied forms, because all the grosser involutory forms of the other elements are said to arise from it successively. In stz. 549 and 551, he hints at the evolutionary order of development and growth of each element from solid matter onwards so as to lead to the birth and growth of life. It is said that heat (அனல் i.e. in a special sense as the heat of evolutionary force) is the cause for an evolutionary development and growth of the outer crust of solid masses and mountains (புவிமேல் புடைப்பும்) from out of earth and of the earth itself in and from out of liquid, and of both the earth and liquid in and from out of heat of fire (i.e. the ancient hot gaseous ball of earth cooling down to form liquid and solid earth and growth of mountain successively). Further evolutionary development again starts from heat of fire that is said to be in liquid and the gaseous state with its breath of life arising from fire. Thus heat of fire has a two-fold drive of evolutionary movement, one forming the outer solid base of matter through liquid and the other creating a subtler action and breath of life through gaseous state.

வானிடைக் காற்றும் காற்றிடை நெருப்பும்  
ஆனற வகுத்த அருட் பெருஞ்ஜோதி.

நெருப்பிடை நீரும் நீரிடைப் புவியும்  
அருப்பிட வகுத்த அருட் பெருஞ்ஜோதி.

நீர் மேல் நெருப்பும் நெருப்பின் மேல் உயிர்ப்பும்  
ஆர்வுற வகுத்த அருட்பெருஞ் ஜோதி. (வரி 545, 552)

புனல் மேல் புவியும் புவி மேல் புடைப்பும்  
அனல் மேல் வகுத்த அருட்பெருஞ் ஜோதி.

Thus it is evident that while stzs. 545 and 547 are suggestive of involution into the nuclear seed-states of the five elements (கருநிலை) stzs. 549 and 551 signify the evolution of atoms and molecules of the elements and their combinations to bring about living cells with a breath of life (விரிநிலை).

In stzs 357 to 365 the Swami traces the five-*bhuta tatvas*, the five elements whether in involution or evolution to their very fundamental causal sources in the divine spirit. He points out that 1) the physical ether of all-pervasiveness is derived from Siva, the Supreme Being and substance of the spirit, 2) the gaseous state of the powers of growth and development from shakti, the consciousness Force of the spirit (inherent in the consciousness of Mind and its energy), 3) the thermal state of heat (with the radiation of energy of heat and light and electromagnetism) from the

conscious force of the spirit (inherent in the dynamism of life), 4) the liquid state in the waves of waters (i.e. its flowing quality from ananda of the spirit (inherent in the flow of love, and in the sap and essence of taste) and 5) the solid state of cohesive and binding quality from the pure golden heaven (por pati) i.e. from the golden Truth-knowledge of supermind which is an integration of the said four formulated states of the spirit for the purpose of involutory and evolutionary manifestation. Though the Swami has not specifically mentioned the sources of heat and liquid as conscious force and ananda respectively, they are unmistakably inferable in the context of the high sources of the other three elements. Thus the earthly solid matter is the meeting ground of both involutory and evolutionary forces, because in it is involved all the spiritual states and it is also the starting point of evolution.

Now in stzs 337 to 355 the Swami traces two intervening states between the supreme spirit and the physical matter they are evidently the overmental and the subliminal, each with its corresponding five states as in the spiritual and the physical. Thus he gives out the involutory descent of the five states of the spirit into the physical (i.e. as the five physical elements) through the overmental and the subliminal levels. To explain the whole involution in a simple way, he adopts the names of the five physical elements to represent the five corresponding subtler states in each of the four levels. Thus we have altogether twenty states in the four levels – supramental or spiritual, overmental, subliminal and the physical. For example, in regard to *vinn* or *akasa* the ether we have the inmost (spiritual) *akasa*, the inner (overmental) *akasa*, the inner outer (subliminal) *akasa* and the outer (physical) *akasa*. The four levels correspond to those of the inmost atma or soul, inner *jeevan* or soul bound in ignorance, inner-outer mental and other instruments and lastly the outer physical senses and body. Likewise for the other elements.

விண்ணின் உள் விண்ணாய் விண் நடு விண்ணாய்  
விண் உறுவிண்ணாய் விண் நிலை விண்ணாய்

Throughout the stanzas of “Joti Agaval” poem, each and every manifestation whether involutory or evolutionary is ascribed to the supreme divine light of Grace, the supramental Light. In particular, the Swami mentions in stz. 335 that the Supreme Divine Light of Grace, Arut Perum Joti, spreads its illimitable Light from within his heart so as to reach into the worlds. We may note that as this is a dynamic creative Light of the Divine, it is said to extend to all the worlds and it is to be distinguished from the static divine light which is ever present everywhere, immutable and unconcerned with the creation, though in an integral state both the lights are present simultaneously and on the substratum of the static light, the other light plays. The Swami refers to the integral light by “Arut Perum Jothi”, the Divine Light of Grace.

Now as the Supreme Divine Light of Grace has extended into all the worlds, from within his heart, these worlds are sought to be described by the Swami starting from the supreme spiritual Ether of Spirit (i.e. Sivam the Being) up to the physical Ether of physical space, from the supreme spiritual Heat (i.e. Tapas, the conscious Force) upto the physical heat and light, from the supreme spiritual liquid (i.e. ananda of the Spirit) upto the physical liquid, and lastly from the supreme spiritual substance (i.e. substance of the Grace - Light of Truth-knowledge, i.e. of the Light of Supermind) upto the gross physical solid matter.

We have already seen that stzs. 357 to 531 and 545 to 551 particularly refer to the involutory and evolutionary manifestations of the spirit into and as the five physical elements of the material nature. With the above introduction to the subject, we now proceed to give herein below the translations of “Jothi Agaval” stzs. to 335 to 531 and 545 and 551.

“Vast Grace-Light (i.e. the supramental Light) that shines in my heart and spreads from within it illimitably so as to extend into and fill all worlds and heavens including our earthly world.” (stz. 335).

Notes:

a) The worlds so illumined and extended are given below:

Vast Grace-light has manifested and extended or pervaded itself as the state of Heaven within the inmost space (i.e manifested in the inmost causal space or the Supramental Space of Existence as the Light of being and substance of supreme Ether), as the state of heaven in the mid space (i.e. the mid space which is the over mental space of being), state of heaven in the large space (i.e. the large subliminal space which reaches and touches and leans upon or presses upon the physical phenomenal space to impress its formulations in the latter உறுவிண் உறு-பெரிய உறுத்தல், பதித்தல், ஆழ்த்துதல், அடைதல், விண் ஆகாயம் and finally as the state of heaven in the firm or stable space. (Our physical etherial space which is formed in by evolution by the pressure of the subliminal subtle space which is wider and larger than ours) -filling all the spaces and interfusing them. (stz. 337 & 339)

b) All the spaces from the physical to the spiritual or supramental extending through the subliminal and overmental spaces are interfused in a hierarchy, upward and downward, inward and outward, vertically and horizontally. Therefore, on the whole it is one space, the supramental space, though with many formulations of spaces under it. The vast Grace-light is spoken of in the poem as becoming all and everything. Here it is said to have manifested and self-extended itself and filled the inmost causal space which contains all the lesser spaces in a hierarchy. Each of the hierarchical spaces is here spoken of with reference to the next successive space until we reach the physical space and its outermost or gross level. “*vinn*” means space, heaven or sky. Space is essentially a space of being, the extension of being or soul or spirit, that is to say, the extended substance of being. There are also spaces of mental being, vital being and physical being.

The above two stanzas (337 and 339) may be also rendered in a simpler way thus:

“Vast Grace-light has self-extended Itself in and as the Space-in and as the inmost space (supra mental), in and as the middle space (overmental), in and as the large space (subliminal) and finally in and as the stable space (physical), uniting each with the other.

“Vast Grace-light has manifested itself as the super Air or Super Gaseous State (i.e. the equivalent state of power of Being) - as the inmost (causal) Gaseous State (the supramental Power of consciousness-Force), as the mid-gaseous state (the overmental power of consciousness-Force in the first state of involutory descent), as the large gaseous state (the subliminal power of the descending consciousness-force) and as the stable gaseous state (phenomenal physical gaseous state), bringing power of being in each (stzs. 341 and 343).

Vast Grace-Light has manifested Itself as the super Heat (i.e. the equivalent state of conscious force of will and energy) – as the inmost (causal) state of Heat (the Supramental conscious force), as the middle state of Heat (the overmental conscious force), as the large state of heat (the subliminal conscious force) and as the stable heat (Phenomenal physical heat, the physical energy of heat, stz. 345 and 347).

“Vast Grace-Light has manifested Itself as the Motherly state of Super Water or Liquid (i.e. as the equivalent State of the flow and wave of nourishing ananda and Love) as the middle state of water (the flow of overmental ananda) as the large state of Water (the subliminal joy) and as the stable water (the nourishing phenomenal and physical water or liquid), stzs 349 and 351.

“Vast Grace-Light has manifested itself as the state or principle of the supreme earth i.e. as form of material substance-as the inmost (causal) Earth of Material substance (the supramental form of matter), as the middle state of Earth (the overmental form of matter), as the large Earth of material substance (the subliminal form of matter of subtle physical matter), and as the stable earth (the physical and gross form of solid matter of our earth) so as to contain in it and manifest all the principles, - from the five physical elements upto the corresponding five spiritual states and substances - in evolutionary manifestation (stzs. 353 and 355)

“Vast Grace-Light has measured by Self-limitation the all pervading infinity of Existence or Being (Sivam) in the firm sky of physical space, and united or linked up all the spaces. (stz. 357)

The infinite divine Existence has self-limited itself to become the physical etherial space of existence.

“Vast Grace-Light has measured by self-limitation the infinite consciousness-force of the Being (shakti) and here illimitable powers of growth and development in the physical gaseous state so as to maintain its powers gracefully. (stz. 359).

“Vast Grace-Light has measured out or limited the intermediary state (i.e. the intermediary state of the Divine Spiritual Being as Conscious Force) in the physical heat so as to bring out and develop life and its force (stz. 361).

“Vast Grace-Light has measured out or self-limited the nourishing State (i.e. the state of the divine spirit as Ananda which causes rasa the sap and essence

of enjoyable and nourishing taste of food) in the physical water (or liquid) and made it richly expressive or wholesome. (Stz 363).

“Vast Grace-Light has measured out its pure Golden Heaven of Truth-knowledge (Por-pati, the pure Golden Supermind as an integral state of formulations of the said four principles of the divine Spirit-existence of being, consciousness-force, conscious force of drive and energy and ananda) forming thereby a golden plane of earth in the physical earth of matter so as to contain in it all principles (for an evolutionary manifestation) (stz. 365).

- c) Now, after the involution of the divine spirit in the physicality of existence, forming in it a golden plane of physical earth, the nature of the solid man of earthly matter, which has arisen in the evolution is dealt with in the following stanzas. Then, the natures of liquid, heat or thermal state of physical substance, gaseous state and physical etherial space are successively delineated.

The infinite divine Existence has self-limited itself to become the physical sky (etherial space), gaseous state, heat, water and earth, involving respectively the divine principles of Being (*Sat*), consciousness-force (*Cit-shakti*), conscious force (*Tapas* or *Agni*), Bliss (*Ananda*) and Golden Truth-knowledge (Por Pati, the golden supermind). All the above principles are involved and hidden in the earthly matter that the Divine has become by and through an involutory descent and by upward evolutionary march. They will be manifested and revealed by a slow process of evolution of the earthly life.

“Vast Grace-Light has self-determined the concentrated density or dense mass of substance in the earthly gross matter (i.e. the closely knit atoms of its heavy elements) so as to make it a firm ground for support and habitation. (stz. 367).

“Vast Grace-Light has self-determined the beautiful golden element (i.e. gold metal) in the earthly gross matter and has formed its compactness of density or its heavy concentration of mass. (stz. 369)

“Vast Grace-Light has self-determined the ‘five-fold flower’ in the earthly gross matter and made it a repository or store-house of five qualities and powers in a close mutual relationship.” (stz. 371)

Notes:

The five-fold flower implies the inter-fusion of the five elements and their corresponding spiritual states. Also the five-fold flower suggests the five powers of creation, maintenance, renewal by destruction, veiling (or involution) and unveiling (or evolution) of consciousness and truths of existence. Further, it suggests the five qualities or properties of ether, air, fire, water and earth which are hidden or involved in earthly gross matter but manifesting by their respective qualities of sound, light, heat, taste and smell.

“Vast Grace-Light has self-determined smell in the earthly gross matter (as its special quality) and formed the many kinds of smell, all of which are closely connected. (stz 373)

“Vast Grace-Light has self-determined various seed-states of soil in the ground and their closely connected natures in the earthly gross masses of matter (possibly referring to the various nuclei or nuclear formations of atoms with different numbers and proportions of protons and neutrons resulting in the many kinds of heavy element (stz. 375). மண்ணினில் பற்பல வகை கருநிலை இயல் iyal or natures.

“Vast Grace-Light has self-determined the five Iyal or nature (distinguishing qualities or properties of the five elements of matter) in the earthly gross matter and their closely connected effects which are many and various (stz. 377). மண்ணினில் ஐந்து இயல் வகுத்து.

- d) The stanza suggests that the respective properties of the five elements are contained even in the gross or solid earthly element itself. So the gross or solid mass of earthly substance may be spoken of even as containing the seed-states (karu) or natures (Iyal) of the five elements. Gross earthly matter evokes not only the response of its own special sense of smell, but also the senses of taste, sight, touch and sound which respectively belong to liquid, fire, gas and ether. In the poem “*Thiruvadi Perumai*”, Iyal the nature of five elemental matter has been described as the substance force of atom (*val anu* shakti iyal) which is the atom of modern science – Ibid stzs. 23, 24, 34, 37, 27, 17. We have already seen the definition of *val anu* in the third chapter as corresponding to the atom of science. This is the nature of elements or elemental matter from which the properties or qualities of matter arise. Iyal or Iyarkai is also called as *swabhava* of matter, which is more concerned with the nucleus of atom. In the following stanza 385 we come across the *Rupa* Shakti or the form-making force of atom and its connected luminosity within the atom, and in stz. 389 the *swarupa* shakti or the outer form-force of matter due to the molecular grouping of atoms (*gana* shakti, *val anu* koottangal), and the said stanzas respectively correspond to the stanzas 38 and 39 of the poem ‘*Thiruvadi Perumai*’ describing the *rupa* and *swarupa* of the five elements.

“Vast Grace-Light has self-determined the earthly solid matter as the base (i.e. the material substratum as the starting base for evolution) and in it the various states which are closely connected. (stz. 379).

- e) When material earth is regarded as the base, sky the physical etherial space, becomes the summit even within the realm of physicality. The subsequent stanzas mention physical etherial space as the summit (மண்ணிடை அடிநிலை, வெளியிடை, முடிநிலை வகுத்து.)

“Vast Grace-light has self-determined the permuted formulations or combinations of the five (elements) in the earthly gross matter in such a closely connected manner as to form twenty-five kinds therein (i.e. for example, the atoms or atomic substances of the five elements enter into

different combinations and proportions to form various compounds and in particular the twenty-five compounded formulations - (stz 381). மண்ணில் ஐந்தைந்து வகையும் கலந்து கொண்டு.

“Vast Grace-light has self-determined the play of natural or essential dynamic forces (*iyal shaktis*) and their executive energies of work (*seyal shaktis*) in the earthly gross matter in a closely inter-related manner (i.e. the powerful intra-nuclear forces in the nuclei of atoms such as those arising in fission and fusion and radiation of the nuclei, and the extra-nuclear forces as the working energies of orbital electrons in the outer atoms and molecular compounds such as the electro - magnetic, chemical and physical energies which give rise to the tangible qualities of matter, are implied in the context (Stz 383) மண் இயல் சத்திகள், மண் செயல் சத்திகள்.

“Vast Grace-Light has self-determined the form-making energies and the energies of light or luminosity (i.e. colours and shining luminosity of form) in the earthly matter in a closely connected manner” (Stz. 385). மண் உருச் சத்திகள் மண் கலைச் சத்திகள்.

- f) The outer form and shape and the luminosity of material objects arise due to the outer or extra-nuclear structure of atoms as in electron-configuration and due to electron-bonds between atoms and atoms. “*Kalai Shaktigal*” (*kala shaktis*) may also be interpreted to mean the energies of secret vibration or breath of life within the atoms, though the significance of shining energies of luminosity seems to be proper in the context here. However light is also the play of a mental or submental knowledge.

“Vast Grace-Light has self-determined the forces of light and the forces of seed-state (*karu shaktis*) in the earthly solid matter in a closely connected way (i.e. the nuclear forces operating in the nuclear masses of atoms of the gross elements and their connected forces of light signifying the characteristic color lights of their spectra. மண் ஒளிச் சத்திகள் மண் கருச் சத்திகள் (stz. 387)

- g) In the poem “*Tiruvadi Perumai*” (stzs. 38, 35 and 27) the forms and shapes of atoms and moonlike luminosity within them due to outer structure of atoms, and the spectral colours due to nuclear masses and inner structure of atoms are mentioned.

“Vast Grace-Light has self-determined the grouping of forces (*gana shaktis*) of many kinds in the earthly gross elements in a closely connected manner (i.e. the grouping of atomic particles into nuclei and atoms, atoms into molecules, and molecules into compounds, are supported by groups of forces working in them) (Stz. 389). மண் கணச் சத்திகள் வகை பல.

“Vast Grace-Light has self-determined the many kinds of beings (*shaktargal*) or their presences in (forms of) the earthly matter in a closely connected way (Stz. 391) மண் நிலைச் சத்தர்கள்.

- h) The energies and forces (shaktigal) playing in the masses of earthly matter are governed by gods or tygal beings or presences in them (i.e. spirits). Man is a being but endowed with the evolving soul-principle and as such he can govern the forces working in his nature and even in the physical body; but there are presences of beings called spirits in and upon the forms and shapes of even material objects and these spirits are tygal beings like the gods without the evolutionary soul principle in them, whereas man and earthly living creatures have the soul-principle in them.

“Vast Grace-Light has self-determined the many kinds and classes of embryonic state or seed-state of life to manifest in the earthly matter in a closely connected manner (Stz. 393). மண் கரு உயிர்த்தொகை.

- i) The many forms of life take their birth in the very core of atoms of elements where there is the secret vibration of life-energy for building up living cells. Stanza 27 of the poem “*Tiruvadi Perumai*” refers to the shapes and forms, luminosities of light and breath of life as formed in the forms of matter by the grouping of atoms (*val anu* koottangal).

This stanza speaks of the living beings of earthly life, the human, animal and plant life, all of which have a soul element in them for purposes or evolution.

“Vast Grace-Light has self-determined the many different kinds and classes of material substances, objects and things to be formed in the earthly matter in a closely connected way (i.e. the many organic and inorganic forms of substances and the physical bodies of living beings that arise out of earthly matter) (Stz. 395) மண்ணினில் பொருள் பல.

“Vast Grace-Light has self-determined the many states that are to be attained by the earthly matter (in evolution) and the many functions and effects resulting from them in a closely connected manner. (Stz. 397). மண்ணுறு நிலைபல.

“Vast Grace-Light has self-determined the many natures of the earthly matter and the many things and results arising from them in a closely connected manner. (Stz. 399) மண் இயல் பல பல வகுத்து அதில் பிறவும் அண்ணுற அமைத்த.

“Vast Grace-Light has self-determined the perfect state in earthly matter (i.e. the perfect state of the earthly material matter attainable in the fulness of evolution) and the many results arising from it in a closely connected manner (stz. 401). மண்ணிடை பக்குவம் வகுத்து அதில் பயன் பல.

- j) The perfect state of earthly matter would indicate the supple and unobstructing form of earthly material matter in which all the elements and forces and principles and powers of existence from the physical to the spiritual, can penetrate and permeate making it plastic to form, hold and express the divinised body, life and mind (இடியாத புளி, தடுக்கப்படுதலில்லாத தனி வடிவம்). This perfect physical matter is considered as a constituent of the

supple and non-obstructing deathless physical body. The other divinised or transformed constituents are non-flowing liquid (cf: condensed blood of Swami's body), soundless fire or heat, non-burning gas (cf: Swami's cool body) and deathless ether (cf: Swami's deathless body) போகாத புனல், ஒலியாத கனல், வேகாத கால், சாகாத் தலை. See stanzas 54, 56 of the poem "Arul Villakka Malai" and p. 332 - ... உபதேசக் குறிப்புகள்.

"Vast Grace-Light has self-determined the coolness, flow and diffusion and moistening qualities of water and its abundant occurrence (Stz. 403). நீரினில் தண்மையும் நிகழ் ஊறு ஒழுக்கமும்.

- k) Water here and in the following stanzas denotes and includes all other kinds of liquids also. Liquid would include water which is the most abundant in nature.

"Vast Grace-Light has self-determined the green-ness or nourishing and life-supporting quality in water, and its many variations as completing the fulness of its existence (i.e. the green-ness of water is due to green moss and weeds growing in water and so it indicates life growing in and by water. Water supports life. Green-ness itself suggests humidity of the elements that give rise to various kinds of taste as mentioned in stz. 40 of "Thiruvadi Perumai" (Stz. 405) நீரினில் பசுமை.

"Vast Grace-Light has self-determined the "flower of water" as a storehouse or repository of the stored qualities and powers of water, for their sustained and progressive manifestation in fulness (even like the flower brings forth its richness of nature, its colours and fragrance and beauty of form, as it blossoms). (Stz. 407). நீரிடைப் பூ இயல் வகுத்து.

"Vast Grace-Light has self-determined as inherent taste and water and the many varieties of taste in waters and liquids in a full measure (taste arises due to the many substances dissolved in water and their absorption in vegetable products). (Stz. 409), நீரினில் சுவை நிலை.

"Vast Grace-Light has self-determined the seed-state of water and its many formulations in full measure (the nuclear state of liquid giving rise to its atoms and molecules which bring out various qualities and powers of liquid as its outer expressions) (Stz 411). நீரினில் கருநிலை நிகழ்த்திய பற்பல ஆருற வகுத்த அருட்பெருஞ் ஜோதி.

"Vast Grace-Light has self-determined four natures or qualities in water and liquid and their many formulations in a full measure.

- l) The four states of liquid are: (1) natural cold liquid; (2) hot liquid; (3) frozen liquid converted into solid; (4) volatile or vaporous liquid or liquid at boiling point of temperature being converted as gas; for example water at boiling point changes into water-vapour. Thus solid state, thermal state, and gaseous state and its own liquid state at ordinary normal temperature are contained in water or any liquid in general. All the four states may be ascribed to variations

in heat that is suggested in the next stanza. The four qualities of water are as follows: நீரில் நான்கு இயல் வகுத்து. Apart from its characteristic sense of taste, liquid evokes the response of sight, touch and sound which respectively belong to fire, gas and ether.

“Vast Grace-Light has self-determined a lower middle position or order for liquid and has made it contain and give out heat, in a full measure. (Stz. 415) நீரிடை அடி நடு நிலை உற வகுத்து அனல் ஆர் தரப் புரிந்த.

- m) Variations of heat from the freezing point to the boiling point of temperatures give rise to the said four states of liquid. The order of the five elements starting from solid matter is given in these stanzas thus: bottom or base for solid, lower middle for liquid, middle and mid-middle for thermal substance or heat, inter middle and last middle for gas and top or summit for ether. Thus we have seven order of levels for the five elements. See also the notes under stz. 471.

மண்ணிடை அடிநிலை, நீரிடை, அடி, நடுநிலை, தீயிடை நடுநிலை, திகழ் நடு நடுநிலை, காற்றிடை இடை நடு கடை நடுநிலை வெளியிடை முடிநிலை.

“Vast Grace-Light has self-determined a nature of light or luminosity in liquid and the many qualities or properties of liquid (as connected with the luminosity) in a full measure (Stz. 417). நீரிடை ஒளி இயல் நிகழ் பல குண இயல்.

- n) The luminosity and the resulting properties of liquid necessarily imply that they arise due to the inner and outer nature of atoms of liquid. See also the corresponding stanza 387 above, relating to the earthly gross matter. Thirumoolar too refers to the characteristic light of each of the five elements

“Vast Grace-Light has self-determined the forms and energies (shaktigal) in liquid and their many formulations in a full measure (stz. 419). நீரிடை சத்திகள்.

- o) The forces in water arise due to pressure, surface-tension, motion, heat and electricity by ionization of water. Nuclear forces and electronic forces within the atomic and molecular structures of water are also indicated.

“Vast Grace-Light has self-determined the typical beings or spirits (shaktargal) in and on liquid (in all kinds of its structural forms-atoms, molecules, drops, waves and running and standing waters) and their immanent and pervading presences in and on liquids, in a full measure (i.e. the spirits of water having their abodes and expanded pervasiveness in waters and liquids, like the spirits living in material forms of solid masses of gross earthly matter) (Stz. 421). நீரினில் சத்தர்கள் நிறை வகை உறை வகை வகுத்து.

- p) We know how the Mother of Sri Aurobindo Ashram once in her younger days overwhelmed the spirits of the waters of sea when they disturbed the ship in which she was travelling by creating huge waves of rough sea.

“Vast Grace-light has self-determined in a full measure the manifold natures in liquid and their many formulations. (Stz. 429) நீர் இயல் பல பல நிறைத்து.

“Vast Grace-Light has self-determined heat in fire and the storage and expenditure of heat energies in an intelligible manner (Stz. 431). தீயினில் சூட்டியல் சேர்தர செலவியல் ஆயுற வகுத்து.

“Vast Grace-Light has self-determined in an intelligent manner “the flower of heat” as a repository or store-house of the qualities and powers of heat for their due manifestation (even as a flower on blossoming would manifest its richness, and fullness of beauty, fragrance, shining colours and liveliness), (Stz. 435). தீயிடை பூ எலாம் திகழ் உறு திறமெல்லாம்.

“Vast Grace-light has self-determined light in heat and its many forms in an intelligible manner. (Stz, 437). தீயிடை ஒளியே திகழற அமைத்து அதில் ஆய்பல.

- q) Light goes always with heat, like the heat-giving light of sun or Electro-magnetic waves of light and heat. Light and heat are the inseparable energies of fire, electricity and nuclear processes of fusion and fission.

“Vast Grace-Light has self-determined in an intelligible manner a (nuclear) seed-state of heat, a formless and invisible or hidden state of heat (as the radiation of heat in electro-magnetic waves and in the rays of sun light) and a visible and manifest state of heat (as in the burning fuels, oils and gases) “Vast Grace-Light has self-determined in an intelligible manner a (nuclear) seed-state of heat, a formless and invisible or hidden state of heat (as the radiation of heat in electro-magnetic waves and in the rays of sun light) and a visible and manifest state of heat (as in the burning fuels, oils and gases) (Stz. 439) தீயிடை அருநிலை, திருநிலை, கருநிலை ஆயுற அமைத்து.

- r) The nuclear state of heat signifies the plasma state of heat and light as in the fission of atoms into the nuclei and electrons or the nuclear heat and light as in fission and fusion of nuclear particles. Though science does not regard heat as a distinct element but considers it as energy or energy-particle, Indian Yoga systems identify it also with thermal and inflammable substances but regard heat-energy as the basic inherent element in them. karu nilai, Aru nilai and Thiru nilai of the thermal state correspond respectively to heat in the intra-nuclear, extra-nuclear and molecular atoms.

“Vast Grace-Light has self-determined in an intelligible manner the three states of heart as in the above said three states of heart) and their many formulations (stz. 441). தீயிடை மூவியல் அமைத்து.

- s) Fire has the said three natures. The three natures of fire may be also explained differently. Fire is born, grows and extinguishes. It also causes birth, growth and extinguishes. It also causes which are tangibly seen and expressed in physical life. The three forms of inflammable substance are the solid masses like wood, liquids like oils and petrol, and gases like hydrogen. Further, the three natures of fire may be more properly explained as the three senses it evokes namely the sense of sight, which is its own and the senses of touch and sound which belong properly speaking to gas and ether respectively.

“Vast Grace-Light has self-determined in an intelligible manner the heat of fire as the middle and the mid-middle state (among the five elements) (Stz. 443) தீயிடை நடுநிலை திகழ்நடு நடுநிலை ஆயுற அமைத்து.

- t) The middle state of heat tends towards or leans upon the next lower range of the elements, i.e. the liquid; and the mid-middle states of heat tends towards and ascends into the next higher range, i.e. into the gas. See the earlier stanza 415 and notes thereon.

“Vast Grace-Light has self-determined, in an intelligible manner, the manifestation of great powers of action to arise in the heat of fire. தீயிடைப் பெருந்திறல் சித்திகள் பல பல ஆயுற அமைத்து (Stz. 445).

- u) Heat in its highest order of truth is the force of tapas, the conscious force, It is the drive of will in life fulfilling in actions, particularly as observed in the great actions of life. Again the intensity of heat has its great play and interaction in the physical matter as observed notably in the many kinds of physical energies produced therefrom, including the release of immense energy from the nuclear state of matter.

“Vast Grace-Light has self-determined in an intelligible manner the manifestation of miraculous and conscious powers of actions to arise in the heat of fire siddhis of Cit or Cittu” (Stz. 447) தீயிடை சித்துகள் ஆயுற அமைத்து,

- v) Miraculous powers of action such as transmutation of the baser elements into nobler elements like gold and silver by the power of radiation of heat in one’s body or in one’s hands, and the control and the mastery over birth and extinction of fire by one’s will and command, have been observed in the life of yogis. Swami Ramalingam performed such miracles. Heat whatever its intensity and character and kind obeys the conscious will of such yogis. So it becomes a conscious power performing miraculous actions.

“Vast Grace-Light has self-determined, in an intelligible manner the concentration of gods or beings or spirits and their energies (Shaktargal and Shaktigal) in the heat of fire (Stz. 451).

தீயிடை சத்திகள் செறிதரு சத்தர்கள்  
ஆய்பல வகுத்த அருட்பெருஞ் ஜோதி.

- w) The beings or gods or spirits that subsist in thermal substances and in the wave-particles of heat and light display their powers through the shaktis or energies that obey them for execution. The spirits are much associated with the mass of substances that serve as their abode and base for their pervadingly diffused or infiltrated existence; and this point has been more clearly stated with reference to the spirits in liquid.

நீரினில் சத்தர்கள் நிறை வகை உறை வகை  
ஆர்தரப் புரிந்த அருட்பெருஞ் ஜோதி.

The “concentration of godly spirits in fire” seems to suggest the concentrated mass or compactness of burning substances that they permeate. As we have already stated, heat in its highest order of spiritual truth is the force of Tapas, the force of concentration. Godly beings and spirits in fire contribute towards concentration of energies or bring about the concentration of their energies (Shaktigal). Possibly the grouping and combination of nuclear forces and energies in matter are brought about by their play. Mass and energy (represented by Shaktargal and Shaktigal) in matter bring about, by their play, the display of physical light of which heat is one form. Einstein’s famous formula of relativity as expressed in the relationship of mass, energy and the constant of velocity of light ( $E=mc^2$ ) seems to be echoed by the display of light and heat as the physical expressions of the constant divinity through the interaction of the concentrated mass and energy of substance, (powers of the shining gods and their energies) in the realm of physical matter. Matter too has light or luminosity within it. The foregoing stanzas have clearly stated that even solid masses and liquids contain light in them. Gods and Goddesses are considered to be shining and luminous. God of *Agni*, the Fire, is well known for His Light and Heat of Tapas and conscious will. Apart from the play of will by lesser Gods, even the spirits like those in lightnings seem to have a will of their own in behaving peculiarly and strangely in bringing about their terrestrial effects on men, plants and material objects like buildings. In *Tiruvadi Perumai*” (stz. 32), it is stated that properties of matter are supported by mass, and the mass become changed by play of forces or energies in it. Thus mass-energy relationship is given. Mass can be converted into energy. With the change of mass properties of matter too become varied.

மண் முதலாம் தத்துவத்தின் தன்மை பலகோடி  
வயங்கு சத்திக் கூட்டத்தில் வந்தன ஓர் அனந்தம்  
பண்ணுறும் அத்தன்மையுளே திண்மை ஒரு கோடி  
பலித்த சத்திக் கூட்டத்தில் பணித்தன ஓர் அனந்தம்  
எண்ணுறும் இத்திண்மைகளும் இவற்றினது விகற்பம்  
எல்லாமும் தனித்தனி நின்றிலங்க நிலை புரிந்தே

“Vast Grace-Light has self-determined in an intelligible manner the many living organisms and beings in heat of fire, and also the many objects and substances therein or arising from it (Stz. 451).

தீயிடை உயிர் பல திகருறு பொருள் பல.

- x) Even physically living minute organisms live in fire and its heat and in the hot solid and liquid substances, and in the warm or hot physical bodies. These are living creatures in evolution. Unlike the non-evolving typical beings or spirits of fixed character who or which are restricted to material objects, waters, fire or wind and the lower heavens, the evolutionary beings of the earth such as plant, animal and man with the soul element in them grow and progress in consciousness, and as the evolved men come to embrace all fields and heavens of experience, though the evolution from plant to manhood is a slow movement over many births. Man is the highest evolutionary being. The latter part of the stanza seems to refer to the many kinds of object and things that are brought out by the interaction of fire on solids, liquids and gases.

“Vast Grace-Light has self-determined in an intelligible manner many states in the heat of fire and their many formulations of works of energy and their effects. (Stz., 453).

தீயிடை நிலைபல திகழ் செயல் பல பயன் ஆய் பல.

“Vast Grace-Light has self-determined in an intelligible manner the perfect state of heat that can be reached by it (in evolution) and the many natural qualities that are (now or already) within it. (Stz, 455).

தீயினில் பக்குவம் சேர் குணம் இயல் குணம் ஆய் பல.

- y) The perfect state of heat signifies that state of heat and light energies and the corresponding states of thermal substances which shall be reached at the end of divine evolution in terrestrial nature so that the perfect state or states can accommodate and express fully all the other *tatvas* or principles of existence, namely, the physical, vital, mental, psychic and spiritual, in their various modes of working and purities. “Soundless fire” (ஒலியித அனல்) is possibly the perfect state of heat, envisaged also as a constituent of a deathless physical body. Soundless fire or heat may be the heat that is motionless and yet radiates and pervades without any apparent vibration. See also earlier notes.

“Vast Grace-Light has self-determined in an intelligible way the melting power of heat, along with other general and special powers. (Stz, 457).

தீயிடை உருக்கியல் சிறப்பியல் பொதுவியல் ஆயுற வகுத்த.

- z) “General Power” signifies the general burning and heating and illumining powers of fire and those of the heat and light of electricity and lightnings. “Special Power” signifies heat at ultra-high temperatures as in sun and stars when atoms break into nuclei and electrons, the nuclei further breaking into nuclear particles releasing and radiating immense energies of heat and light “Melting power” is limited to the melting of solids by heat. Thus the three powers seem to signify the three states or natures of heat already indicated in the foregoing stanzas 439 and 441.

“Vast Grace-Light has self-determined in an intelligible manner many many states of nature in heat of fire and their many formulations by bringing about concentrations of various order (Stz. 459).

தீயிடை பல பல செறித்து அதில் பலவும் ஆயுற புரிந்த.

“Vast Grace-Light has self-determined the nature of motion i.e. vibration due to expansion and contraction, the nature of breath of life (kalai) and the nature of life or life-energy in gaseous state so as to express dynamisms of power (Stz. 461).

காற்றிடை அசை இயல் கலை இயல் உயிரியல்  
ஆற்றலின் அமைத்த அருட்பெருஞ் ஜோதி.

- aa) The breath of life through the left and right nostrils (ida kalai and pingalai) is a result of the life-energy which is itself involved in the inherent motion or vibration of air. So life and breath may be considered as vibration of gaseous state. According to nuclear physics, electro-magnetic waves of light and sound are considered as essentially related to the vibration of rarefied gaseous state. Radio waves from the outer space are said to be generated in collision of charged particles of incandescent gas.

“Vast Grace-Light has self-determined the “Flower of gaseous state” (i.e. as the storehouse of gaseous qualities and powers) to manifest all its conceivable qualities and powers of dynamism (even as a flower expresses the richness and fulness of its life by its living beauty, fragrance, and shining colours and luminosity from within itself (Stz. 463)

காற்றிடை பூ இயல் கருதுறு திற இயல் ஆற்றலின் வகுத்த.

“Vast Grace-Light has self-determined contact or touch (as a special quality) in gaseous, and its various formulations so as to express dynamisms of power (Stz. 465).

காற்றிடை ஊறு இயல் காட்டுறு பல பல

“Vast Grace-Light has self-determined the innumerable manifest gross states, and subtle seed-states in gaseous existence so as to express dynamisms of power (Stz. 467).

காற்றிலே பெருநிலை கருநிலை அளவில்

- ab) The subtle seed-state of gas indicates the nuclear state of gas with its inner vibrations, whereas the gross state is concerned with the outward and manifest form of gas with its outer motions expansion and contraction and pressures.

“Vast Grace-Light has self-determined the two natures in the physical gaseous state and their various formulations with dynamisms of power (Stz. 469).

காற்றிடை ஈரியல் காட்டி அதிற் பல ஆற்றவும் வகுத்த.

- ac) Ether of space, gas, fire, liquid and solid are said to have respectively one, two, three, four and five natures. This can be more tangibly explained with reference to the characteristic effect of each element on the senses, but subsuming that of the preceding element as we move from ether to solid. Thus, ether has the sense, of sound, gas the senses of sound and touch, fire the senses of sound, touch and sight, liquid the senses of sound, touch, sight and taste and solid the senses of sound, touch, sight, taste and smell. See stanzas 377, 413, 441, 469, 505.

“Vast Grace-Light has self-determined the level or position of the gaseous state in the order of the five elements to be an inter-middle tending towards the outer or lower range (i.e. fire) and a last middle tending towards the inner or higher range (i.e. ether) so as to express dynamisms of power (Stz. 471).

காற்றினில் இடை நடு கடை நடு அகப்புறம் ஆற்றவும் வகுத்த.

- ad) The five order of the elements are ranked thus; earthly solid or gross matter as the bottom or base; liquid as the lower middle; thermal states of fire as the middle and the mid-middle; gaseous states as the inter-middle and the last middle; and finally ether as the top or summit. Thus we have seven order among the five elements. The said seven order, though evidently described as in the vertical plane, shall be also taken to exist in the horizontal level, where the ether is in the inmost, and the earthly gross matter in the outermost and the rest in between them. Generally speaking each contains the others. It is relevant to note that there are two states in heat of fire, as well as in gaseous substances and we know that gas and heat are intimately connected with each other. See Stazs. 379, 415, 443, 471 and 500.

மண்ணிடை அடிநிலை நீரிடை அடி நடுநிலை, தீயிடை நடுநிலை திகழ்நடு நடுநிலை காற்றில் இடை நடு கடை நடு அகப்புறம், வெளியிடை முடிநிலை.

“Vast Grace-Light has self-determined the various qualities, colours and grouping (gana i.e. molecular combinations of atoms) in the gaseous state so as to express dynamisms of power (i.e. to express powers in the Phenomenal outer nature and in the bodies of living beings, or in other words to display the powers of gaseous state in the molecular atoms of gases and other molecular compounds of outer phenomenal nature and in the molecular chains of living cells (Stz. 473).

காற்றினில் குணம் பல கணம் பல வணம் பல ஆற்றலின் அமைத்த.

“Vast Grace-Light has self-determined the innumerable and inexhaustible forces or energies (Shaktigal) in the gaseous state so as to express dynamisms of power (in the outer nature and in living organisms and beings. (Stz. 475).

காற்றிடை சத்திகள் கணக்கில உலப்பில.

“Vast Grace-Light has self-determined innumerable typical beings or spirits in and on gaseous substances (gaseous forms of matter) so as to express dynamisms of power. (Stz. 477)

காற்றிடை சத்தர்கள்.

- ae) These spirits, for example, spirits in clouds, lightnings and gaseous forms fulfil their functions through their executive energies (shaktigal) which they command.

“Vast Grace-Light has self-determined various physical living beings and creatures (men, animals, bacteria, virus and plants), various physical motions and various energies and breath of life and various luminosities of knowledge (kalai i.e. vital breath and energy and mental light and knowledge) to subsist in the gaseous state so as to express dynamisms of power (Stz. 479).

காற்றிடை உயிர்பல சுதிபல கலைபல ஆற்றலின் வகுத்த.

- af) Physical motions in material nature, physical living beings and creatures, and growth of life and the mental light and knowledge are made to depend upon the gaseous state. Kalai or Kala means breath of life and also luminosity as in mental knowledge.

“Vast Grace-Light has self-determined all the instruments or faculties of the four states in the gaseous state so as to express dynamisms of power. (Stz. 481)

காற்றிடை நால் நிலைக் கருவிகள் அனைத்தையும் ஆற்றுற வகுத்த.

- ag) There are four states of individual being. According to Upadesha of the Swami, they are the inmost soul (antar-atma) inner being (*jeeva*), inner-outer being (mental-vital), and the outer bodily being, The instruments or faculties needed for the four states of being are developed by the principle and substance of gas, in its various ranges or grades, from grossness to the subtleties and rarefactions proper to the said states. Even within the realm of mind, we have four faculties viz., buddhi, manas, ahankara and citta reason, thought, ego-will and stored impressions.

“Vast Grace-Light has self-determined the sensations and consciousness (of life) and the feelings and thoughts (of mind) in the gaseous state so as to express dynamisms of power (Stz. 483).

காற்றிடை உணரியல் கருது இயல் ஆதிய ஆற்றுற வகுத்த.

- ah) The vibration in gaseous matter or rather in its nuclei supports physical life impulse and breath of life on the earth which in turn give rise to sensations and the energies in the feelings and thoughts and consciousness of mind.

“Vast Grace-Light has self-determined all the functions of work in (and through) gaseous state and all their conceivable results and effects so as to express dynamisms of power. (Stz. 485).

காற்றிடை செயல் எலாம் கருதிய பயன் எலாம்.

- ai) The driving force of will in works is supported by life-power and the breath of life which ensues from the gaseous state.

“Vast Grace-Light has self-determined the perfect state of gaseous substance and the many results arising therefrom so as to express dynamisms of power (Stz. 487).

காற்றினில் பக்குவ கதி எலாம் விளைவித்து  
ஆற்றலின் வகுத்த அருட் பெருஞ் ஜோதி.

- aj) The perfect gaseous state attainable in evolution is indicated here. It will manifest or will be plastic enough to manifest all kinds of power, physical, vital, mental and spiritual. The non-burning gas (வேகாக்கால்) mentioned in Upadesha and Arut Pa poems seems to be the perfect gas as it remains cool and non-burning though at the same time carrying intense energies of heat and light. It is considered to be one of the constituents of a deathless physical body. Because of it, the transformed body feels itself cool and refreshing, without burning heat, and the breath also becomes cool (Joti Agaval stzs. 1457 and 1463).

“Vast Grace-Light has self-determined the principle of time in gaseous state and the many conceivable periods of time so as to express dynamisms of power (Stz. 489).

- ak) Gaseous state gives rise to motion and vibration, impulse of life and with it the birth, growth and extinction of life, and the time associated with these manifestations. “Non-burning Gas” being a perfect and divinised gas would give mastery over time resulting in a deathless physical body. Ether is associated or identified with space and gas with time. Both in their subtle states interact and create the inseparable space-time continuum of the four-dimensional physical universe. Space-times in their highest spiritual source are verily the inseparable play of Siva-Shakti, the Being and consciousness-Force of the Being.

“Vast Grace-Light has self-determined many natures in the gaseous substance and many other formulations thereof so as to express dynamisms of power (Stz. 491).

காற்றியல் பல பல கணித்து அதிற் பிறவும்  
ஆற்றவும் வகுத்த.

- al) It is worthy to observe that all the foregoing stanzas dealing with the self-determinations of gaseous state invariably mention them as meant to express

dynamisms of power (ஆற்றவும் அமைத்த ஆற்றா அமைத்த). So gaseous state is to be associated with power and the expression of dynamic power which have their highest source in the Supreme Divine Shakti, the consciousness-Force of the Divine Being. Similarly all the following stanzas dealing with the self-determination of ether or ethereal space invariably mention them as bearing grace (அளிதர, அளியுற) i.e. the direct grace of the Divine-Being, because space is essentially an extension of the Divine Being. So too all the self-determinations of heat of fire are said to be so made in a manner intelligible to us (ஆயுற) because heat of force of concentration creates the consciousness to understand the nature of things. Liquid states are described to be self-determined by the vast Light of Grace so as to express measure of fulness, or richness and beauty of harmony which are the characteristics of the divine Ananda, because water and liquid are derived from it. All the solid gross states are self-determined so as to express cohesive closeness or binding compactness (அண்ணுற) suggesting an integrality of the divine existence as the supramental forms of substance along with bliss, force and consciousness and being. In the most material form of earth is involved the integral formulation of the Supramental Divinity. Ours is the golden earth containing the Golden plane of Supermind embedded in it (Stz. 365).

புவி நிலைச் சுத்தமாம் பொற்பதி அளவி  
அவையுற வகுத்த அருட்பெருஞ் ஜோதி.

“Vast Grace-Light has self-determined the extension of phenomenal or physical ethereal space and its uniting and embracing contact with each and everything so as to express grace. (Stz. 493)

வெளியிடைப் பகுதியின் விரிவியல் அணைவியல்,  
அளியுற அமைத்த அருட்பெருஞ் ஜோதி.

- am) The special quality of the Divine Being is its all-pervasive extension. This character is fixed even in the physical ethereal space of existence. It included an uniting embracing contact with elements and principles. There are other spaces too. We have already seen in stzs. 337 and 339 that there are four broadly distinguished spaces of the One Space the supramental, overmental, subliminal and the physical, the last three being derived from the first, the Supramental. Now in the stzs. 493 to 511, more details of the physical space are given, though with a touch of its connection with other spaces. The physical space is meant to express grace of the Divine Being, as grace leads to expansion of all parts of one’s being bringing freedom of the soul in each.

“Vast Grace-Light has self-determined “the flower of ethereal state” and its wonderful powers so as to express grace. (Stz. 495).

வெளியிடைப் பூ எலாம் வியப்புறு திறன் எலாம்  
அளியுற அமைத்த

- an) “Flower of ethereal State” represents the stored qualities and powers of ethereal space. What we call space is the extension of the very substance of ether. So

ether is verily the physical space. “Flower of ether” is the state of ether just about to manifest readily its qualities and powers which are already contained in it but are now as it were revealed progressively (in evolutionary states), even as the blossoming of flower brings out its richness of beauty, fragrance, shining colours and luminosity in a spontaneous and natural way. Therefore, ether may be considered to contain the essence of the other elements, though in a subtle form.

“Vast Grace-Light has self-determined sound (etherial sound) in ether of space and its filling of the whole pervasive space so as to manifest grace (Stz. 497).

வெளியினில் ஒலிநிறை வியனிலை அனைத்தும்  
அளியுற அமைத்த அருட்பெருஞ்ஜோதி.

- ao) Etherial sound is closer in kind to the electro-magnetic radio waves radiating in space, but it has a more direct relation with sound of the words of mind (or sound of thoughts) which occur in our brain-matter or rather impinge or descend upon it. The sense perception of physical sound is essentially evoked by ether.

“Vast Grace-Light has self-determined a seed-state, a formless state and a manifest state (கருநிலை, அருநிலை, விரிநிலை) in the ether of space so as to express grace. (Stz. 499)

வெளியிடை, கருநிலை, விரிநிலை, அருநிலை,  
அளிகொள வகுத்த அருட்பெருஞ்ஜோதி.

- ap) As mentioned already in the second chapter, the “manifest state of ether” is the outer visible form of space, the dome like sky or the curvature of outer space (விரிநிலை). Swami Ramalingam mentions it under “*Bhuta Tatva*” as “*Kundalakara Akasa Swarupa*”, but space is formless or form-dissolving in its “essential nature” and this aspect he describes As “*Nirakara sneha anutva parama atyati laghutva sukshma sadhana anusyuta karana karmatva akasa swabhava*”. The nuclear substance or “Seed-state” of ether (கருநிலை) is the permanent causal substance or substratum for all physical substances and hence has the super-ultra lightness as a quality (*nirantara adhikarana parama atyati akasa rupa*). The manifest state of ether seems to be brought about by the neutrinos that may be one kind or form of etherial substance. The seed-state may be one or identical with graviton, the substance that is associated with the gravitational field of force which influences and affects all substances of whatever kind and nature. Possibly the seed-state formless or form-dissolving state and manifest state of ether may correspond to the essential existence essential nature and form of etherial substance - *rupa, swabhava* and *swarupa* of *akasa*. We may remember that the Swami mentions a similar set of three states in the case of heat of fire (stz. 439). In fact, *rupa, swarupa* and *swabhava* states are applicable to each of the five elements (see “*bhuta tatvas*” under the Swami’s text of “*Tatva Lokas*” and their permuted combinations).

“Vast Grace-Light has self-determined physical etherial space as the top or summit (among the rank and order of the five elements) so as to express grace (stz. 501).

வெளியிடை முடிநிலை விளங்குற வகுத்தே  
அளி பெற விளக்கும் அருட்பெருஞ்ஜோதி.

- aq) The solid mass of earthly matter is the bottom base and the sky of etherial space is the heaven or the summit. See also the notes under stz. 471.

“Vast Grace-Light has self-determined the wonderful typl beings or spirits (Shaktargal) and their female energies (shaktigal) in the etherial space so as to express grace. (Stz .503)

வெளியினில் சத்திகள் வியப்புறு சத்தர்கள்  
அளியுற வகுத்த அருட்பெருஞ்ஜோதி.

“Vast Grace-Light has self-determined the one principle or nature in the physical etherial space which is the principle of extension or pervasion in which all the manifoldly various (things, forces and beings) are formed so as to manifest grace. (Stz. 505.)

வெளியிடை ஒன்றே விரித்து அதில் பற்பல  
அளிதர வகுத்த அருட்பெருஞ்ஜோதி.

- ar) The one principle referred to is that of all pervasive extension of physical existence as etherial space which is essentially derived from the infinity of the divine spiritual being or existence (sivam) through the mental, vital and subtle physical pervasions of space. Again, in the firmly founded physical space am formulated the planes or sub-planes of the subtle-physical, vital and the mental principles, which are suggested in the next stanza. The stanza also suggests unity and oneness of all spaces; many things are formed or take shape in the physical space surrounding the earth and in the outer space of the physical universe, for example, the gaseous nebulae and stars and the falling meteorites and cosmic particles of the outer space, and the rain bearing cloud of the earthly sky and the rain drops. Similarly many forces exist in the vast etherial space. Many beings or spirits like those mentioned in stz. 503 arise in the space sky. The stanza also suggests unity and oneness of all spaces.

“Vast Grace-Light has self-determined the many extensions in the physical etherial space and the many formulations (of things, beings and forces) in them so as to express grace. (stz. 507).

வெளியிடைப் பலவே விரித்து அதிற் பற்பல  
அளிதர அமைத்த அருட்பெருஞ் ஜோதி.

- as) Soul, mind, life and the subtle-physical have their own skies or spaces; but they have their formulated extensions of planes in the physical space also. Thus we have a spiritual physical space, a mental physical space, a vital

physical space and a subtle-physical space in our own physical space proper. In each such spatial extension is formed the many forces, beings and things but all are linked up in the physical space of ether. These are also the many kinds of space in the physical etherial space, as said in the Upadesha.

“Vast Grace-Light has self-determined in the etherial space a life ignorant of soul-nature (i.e. living beings and creatures of earthly evolution), a life of seed-nature (i.e. plant life with its submerged soul element) and a life of conscious nature (i.e. developed human beings with their inmost soul emerging out for active play in the evolutionary life on earth) so as to express grace. (Stz. 509).

வெளியிடை, உயிரியல், வித்தியல், சித்தியல்,  
அளிபெற அமைத்த அருட்பெருஞ்ஜோதி.

“Vast Grace-Light has self-determined the full or total extension of the physical space of ether and all other extensions and formations in it so as to manifest grace. (stz. 511).

வெளியின் அனைத்தையும், விரித்து அதில் பிறகும்  
அளியுற அமைத்த அருட்பெருஞ்ஜோதி.

Thus so far the nature and powers and potentialities of solid or gross elements of matter, liquids, thermal states and gaseous states and the physical ether of space have been delineated in the foregoing stanzas from 367 to 511. Now in the following stanzas are given the inter-relation between them.

“Vast Grace Light has self-determined without gap or break (in continuity) the gaseous state in the physical etherial space; and the thermal state in the gaseous and the liquid state in the thermal; and solid or gross earthly state in the liquid so as to make them manifest and multiply into many kinds of matter and substances (Stz. 545 & 547).

வானிடைக் காற்றும் காற்றிடை நெருப்பும்  
ஆனற வகுத்த அருட்பெருஞ்ஜோதி.  
நெருப்பிடை நீரும் நீரிடைப் புவியும்  
அருப்பிட வகுத்த அருட்பெருஞ்ஜோதி.

- at) The above two stanzas indicate that ether is the cause of “*bhuta srishti*” (*bhuta karana anu*), the origin of the simple physical five elements. Each is derived from the preceding one. It is a case of progressive descent by involution from the subtle state of physical ether into the less subtle or gross form of physicality of matter. Bhautika srishti implies combination of the atoms of the simple and original five elements to produce molecular compounds of matter, and in the case of the physical life, the molecular chain of living cells of the physical body. This is indicated in the succeeding stanzas, which are of an evolutionary nature. *Bhuta srishti* is more fundamental and stable than *bhautika srishti* that implies many changes in material structure and in the organic forms.

“Vast Grace-Light has self-determined heat of fire to arise in and from liquid, and breath of life (i.e. a form and power of gaseous state) in and from the heat of fire (stz. 549).

நீர் மேல் நெருப்பும் நெருப்பின் மேல் உயிர்ப்பும்  
ஆர்வுற வகுத்த அருட்பெருஞ்ஜோதி.

“Vast Grace-Light has self-determined the earthly solid or gross mass of substance to arise in and from liquid (or water), and the projection of plateaus and mountains (or the outer crust of earth and its plateaus and mountains) in and from the earthly solid mass; both the liquid and crust of solid earth arising from the heat of fire (within the bowels of the earth). Stz. 551.

புனல் மேல் புவியும் புவி மேல் புடைப்பும்  
அனல் மேல் வகுத்த அருட் பெருஞ் ஜோதி.

- au) Stanzas 549 and 551 above refer to the evolution of the hot gaseous ball of earth in the distant aeonic past, to become by successive cooling stages, into molten liquid, then forming eventually the solid outer crust and mass of earth and its projections of mountains. Heat of fire within the bowels of earth was the cause for throwing out the molten lava into a liquid form, which subsequently cooled and condensed into solid masses. But it was also the cause for growth of mountains on the earth. The hot gases in their free state and those that gushed forth from the depths of earth, particularly hydrogen and oxygen combined to form water. Then again, in 549, heat is said to be contained in liquid and waters; and from heat the breath of life (a function of gaseous state) arises. Thus evolution of earth supporting physical life is traced out in the above two stanzas. That heat or fire is contained or born in waters may possibly signify the inflammable nature of hydrogen gas and the nature of life-giving oxygen in the presence of which combustion of all material substances takes place in nature. Even as the two gases combine to form water there is the birth of fire or heat with a sound of explosion. Of course, inflammable and volatile liquids like oils and petrol evidently contain the element of fire in them. In the Vedic literature Fire is said to be hidden in earth, and is born in the waters and rises up to reach into the heaven of Truth which is its true Home (the Supermind).

## 8. Sri Aurobindo on Atoms and Atomic Particles and Etheric Space

Sri Aurobindo has expressed himself on the discoveries of modern science and in particular on nuclear physics, apart from the revelations he had by his own direct vision and experience of the atomic and sub-atomic micro world of the wave-particles of matter and their relation with the supra-physical substances in the vital, mental and supramental realms of existence. The extracts reproduced herein below are taken from his “Life Divine” written and revised in 1940 and from his epic poem “Savitri” completed by about 1950.

1. “When Science discovers that matter resolves itself into forms of Energy, it has hold of a universal and fundamental truth; and when philosophy discovers that matter only exists as substantial appearance to the consciousness and that the one reality is spirit or pure conscious Being, it has hold of a greater and completer, a still more fundamental truth. But still the question remains why Energy should take the form of Matter. ....” (Life Divine, Tenth edn. p. 234).
2. “ ..... as the All - Existent converts all His self-aspectings into various energy of His creative Force of consciousness, cosmic Mind turns these, its multiple view-points of universal existence, into stand points of universal Life; it turns them in Matter into forms of atomic being instinct with the life that forms them and governed by the mind and will that actuate the formation. At the same time, the atomic existences which it thus forms must by the very law of their being tend to associate themselves, to aggregate; and each of these aggregates also, instinct with the hidden life that forms and the hidden mind and will that actuate them, bears with it a fiction of a separated individual existence .....” – (Life Divine, Tenth edn. p. 238)
3. “Thus not any eternal and original law of eternal and original Matter, but the nature of the action of cosmic Mind is the cause of atomic existence. Matter is a creation, and for its creation the infinitesimal, an extreme fragmentation of the Infinite, was needed as the starting point or basis. Ether may and does exist as an intangible, almost spiritual support of Matter, but as a phenomenon it does not seem, to or present knowledge at least, to be materially detectable. Subdivide the visible aggregate or the formal atom into essential atoms, break it up into the most infinitesimal dust of being, we shall still, because of the nature of the Mind and Life that formed them, arrive at some utmost atomic existence, unstable perhaps but always reconstituting itself in the eternal flux of force, phenomenally, and not at a mere unatomic extension incapable of contents, Unatomic extension of substance, extension which is not an aggregation, coexistence otherwise than by distribution in space are realities of pure existence, pure substance, they are a knowledge of Supermind .... They are the reality underlying Matter, but not the phenomenon which we call Matter. Mind, Life, Matter itself can be one with that pure existence and conscious extension in their static reality, but not operate by that one-ness in their dynamic action, self-perception and self-formation. – (Life Divine, Tenth edn. p. 238.)

Notes:

Sri Aurobindo seems to refer by “formal atom and essential atom” to the atom as known to science and the nucleus of atom respectively. In subsequent passages he refers to electrons by the term “electric infinitesimals”.

4. “There must be and there are grades between inconscient substance (i.e. phenomenal matter) and utterly self-conscious self-extension, as between the principle of Matter and the principle of spirit ..... these gradations of substance, in one important aspect of their formulation in series, can be seen to correspond to the ascending series of Matter, Life, Mind, Supermind and that other higher divine triplicity of Sachchidananda. In other words, we find that substance in its ascension bases itself upon each of these principles and makes itself successively a characteristic vehicle for the dominating cosmic self-expression of each in their ascending series” (words within brackets are our own). – (Life Divine, Tenth edn. p. 255)
5. “A consciousness-Force, everywhere inherent in Existence, acting even when concealed, is the creator of the worlds, the occult secret of Nature. But in our material world and in our own being, consciousness has a double aspect; there is a force of Knowledge, there is a force of Ignorance.”- - (Life Divine, Tenth edn. P. 295)
6. “Actually to our Science this infinite or indeterminate Existence reveals itself as an Energy, known not by itself but by its works, which throws up in its motion waves of energism and in them a multitude of infinitesimals; these, grouping themselves to form larger infinitesimals, become a basis for all the creations of the Energy, even those farthest away from the material basis, for the emergence of a world of organised Matter, for the emergence of Life, for the emergence of Consciousness, for all the still unexplained activities of evolutionary Nature.  
 ..... We know now that different groupings and a varying number of electric infinitesimals can produce or serve as the constituent occasion ..... for the appearance of larger atomic infinitesimals of different natures, qualities, powers; ..... can come to constitute these different atoms. .... We know also that certain combinations of certain invisible atomic infinitesimals produce or occasion new and visible determinations quite different in nature, quality and power from the constituent infinitesimals; but we fail to discover, for instance, how a fixed formula for the combination of oxygen and hydrogen comes to determine the appearance of water which is evidently something more than a combination of gases ..... a material manifestation of a quite new character. We see that a seed develops into a tree ... .. but we do not discover ..... how the life and form of the tree come to be implied in the substance or energy of the seed .. .... We know that genes and chromosomes are the cause of hereditary transmissions, not only of physical but of psychological variations; but we do not discover how psychological characteristics can be contained and transmitted in this inconscient material vehicle. We do not see or know, but it is expounded to us as a cogent account of Nature-process, that a play of electrons, of atoms and their resultant molecules, of cells, glands, chemical secretions and physiological processes manages by their activity on the nerves and brain of a Shakespeare or a Plato to produce or could be perhaps the dynamic occasion for the production of a Hamlet or a Symposium or a Republic; ..... These formulate of Science may be pragmatically correct

and infallible, they may govern the practical how of Nature's processes, but they do not disclose the intrinsic how or why .....their rationale is fundamentally unintelligible." – (Life Divine, Tenth edn. P. 298).

7. "There is more to perplex us; for we see the original indeterminate Energy throwing out general determinates of itself, - we might equally in their relation to the variety of their products call them generic indeterminates, - with their appropriate states of substance and determined forms of that substance: the latter are numerous, sometimes innumerable variations on the substance-energy which is their base: but none of these variations seems to be predetermined by anything in the nature of the general indeterminate. An electric Energy produces positive, negative, neutral forms of itself, form that are at once waves and particles; a gaseous state of energy-substance produces a considerable number of different gases; a solid state of energy-substance, from which results the earth principle develops into different forms of earth and rock of many kinds and numerous minerals and metals; a life principle produces its vegetable kingdom teeming with a countless foison of quite different plants, trees, flowers; a principle of animal life produces an enormous variety of genus, species, individual variations: so it proceeds into human life and mind and its mind-types towards the still unwritten end or perhaps the yet occult sequel of that unfinished evolutionary chapter. Throughout there is the constant rule of a general sameness in the original determinate and, subject to this substantial sameness of basic substance and nature, a profuse variation in the generic and individual determinates; an identical law obtains of sameness or similarity in the genus or species with numerous variations often meticulously minute in the individual." – (Life Divine, Tenth. edn. P. 299)
8. "This opens the way for other explanations which make Consciousness the creator of this world out of an apparent original Inconscience. A Mind, a Will seems to have imagined and organised the universe, but it has veiled itself behind its creation; its first erection has been this screen of an inconscient Energy and a material form of substance.... All these things we see around us are then the thoughts of an extra cosmic Divinity, a Being with an omnipotent and omniscient Mind and Will, who is responsible for the mathematical law of the physical universe, for its artistry of beauty, for its strange play of sameness and variations, of concordances and discords, of combining and intermingling opposites, for the drama of consciousness struggling to exist and seeking to affirm itself in an inconscient universal order." – (Life Divine, Tenth edn. p. 302.)
9. "All the unexplained processes of Nature would find their meaning and their place if this hypothesis (i.e. the above said hidden consciousness in the inconscient material Nature) proved to be tenable. Energy seems to create substance, but, in reality, as existence is inherent in Consciousness-Force, so also substance would be inherent in Energy, – the Energy a manifestation of the Force, substance a manifestation of the secret Existence. But as it is a spiritual substance, it would not be apprehended by the material sense until it is given by Energy the forms of Matter seizable by that sense. One begins to understand also how arrangement of design, quantity and number can be a base for the manifestation of quality and property; for design, quantity and number are powers of existence-substance, quality and property are powers of the consciousness and its force that reside in the existence; they can then be

made manifest and operative by a rhythm and process of substance. The growth of the tree out of the seed would be accounted for, like all other similar phenomena, by the indwelling presence of what we have called the Real-Idea; the Infinite's self-perception of the significant form, the living body of its power of existence that has to emerge from its own self-compression in energy-substance, would be carried internally in the form of the seed, carried in the occult consciousness involved in that form, and would naturally evolve out of it. There would be no difficulty either in understanding on this principle how infinitesimals of a material character like the gene and chromosome can carry in them psychological elements to be transmitted to the physical form that has to emerge from the human seed," (Life Divine, Tenth edn. p. 304).

10. I am the heir of the forces of the earth .....
- .....
- What God imperfect left, I will complete .....
- .....
- He was the first creator, I am the last  
I have found the atoms from which he built the worlds

The first tremendous cosmic energy  
Missioned shall leap to slay my enemy kin,  
Expunge a nation or abolish a race,  
Death's silence leave where there was laughter and joy

Or the fissured invisible shall spend God's force  
To extend my comforts and expand my wealth  
To speed my car which now the lightnings drive  
And turn the engines of my miracles .....

.....

I have used the mystery of the cosmic waves  
To see far distance and to hear far words.  
I have conquered space and knitted close all earth  
Soon I shall know the secrets of the Mind;

(Savitri-Book 7 canto. 4)

11. At the outset of this enigmatic world  
.....
- In a miracle of inconscient secrecy .....
- .....
- In this whirl and sprawl through infinite vacancy  
The Spirit became Matter and lay in the whirl,  
A body sleeping without sense or soul .....
- .....

Being was an inert substance driven by Force  
At first was only an etheric Space;  
Its huge vibrations circled round and round  
Housing some unconceived initiative.

Upheld by a supreme original Breath

Expansion and contraction's mystic act<sup>2</sup>  
Created touch and friction in the void,  
Into abstract emptiness brought clash and clasp

Parent of an expanding universe  
In a matrix of disintegrating force,  
By spending it conserved an endless sum.  
On the hearth of Space it Kindled a Viewless Fire

That, scattering worlds as one might scatter seeds,  
Whirled out the luminous order of the stars.  
An ocean of electric Energy  
Formlessly formed in strange wave-particles

Constructing by their dance this solid scheme,  
Its mightness in the atom shut to rest  
Masses were forged or feigned and visible shapes,  
Light flung the photons swift revealing spark

And showed, in the minuteness of its flash<sup>3</sup>  
Imaged, this cosmos of apparent things<sup>4</sup>  
Thus has been made this real impossible world,  
An obvious miracle or convincing show.

(Savitri - Book 2 canto 5)

- 
1. This line suggests the curvature of etherial space. cf. Swami Ramalingam's reference to "*Kundalakara akasa swarupa sakti*",
  2. This line describes the nature of the primal gaseous state of matter.
  - 3&4. These lines suggest the "moon light" or luminosity as of moon light within the apparent forms and images of the material object as hinted by Swami Ramalingam in stanza 38 of his Poem "*Thiruvadi Perumai*" which also speaks of the design and quality of matter. Sri Aurobindo has explained in a foregoing passage (see item 9) how arrangement of design, quantity and number can be a base for the manifestation of quality and property of matter; for design, quantity and number are powers of existence - substances; quality and property are powers of the consciousness and its force that reside in the existence; they can then be made manifest and operative by a rhythm and process of substance. Stanzas 23, 24, 27 and 32 of the Swami's said poem speak of the quantity and number of a mathematical law governing the atoms and about the light, form and breath of life and the qualities manifested by atoms.
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## 9. On the Centres or Chakras of the Body and the Nervous System and on Causal heat and Plasma heat

(SEE NOTES IN CHAPTER 10)

We give below the translation of the “*Pindanubhava Lakshana*” subject in the book of Upadesha, the oral teachings of the Swami as recorded by his disciples. On the last portion of this topic (paras H & I) we have given elaborate explanations elsewhere in our book “Arut Perum Jothi and Deathless Body” and it is concerned with the overhead spiritual centres and gradations of planes leading to Supermind (*Suddha Siva Sthana*). Notes are given now here and there and at the end of the passage on some of the important points arising for consideration. In particular the notes explaining words marked with numbers under each para from A to G have been given in the next chapter – Chapter 10 part 2 – as they are connected with the nervous system and form a single subject matter. However, the words so numbered under para E have been explained immediately below the same.

- A) “There is a square receptacle (literally sac or bag) two and half inches above the sex organ of man. In it seminal fluid which is watery is collected up to the sixteenth year of age. This receptacle is called “*manasa thatagam*”, the pool of mind. Seminal fluid that secretes after the sixteenth year is collected in the centre of the frozen or concentrated watery semen of the earlier period. This latter secretion so stored has a golden color. It is called “lotus flower”. In the centre of that flower is a fine vapour (ஆவி), which is a hundred times finer or more rarefied (i.e. thinner and light weighted) than air, The God presiding over it is called Brahma (the god of creation). He is said to have a period of active manifestation (*sakala kala*) when there arises the said (golden) vapour and a period of involved or hidden state of existence (*Kevala kala*) when the vapour remains in a potential or inert state (i.e. involved and not apparently or overtly active). If there is mating by sex at the time of the birth or existence of the said vapour, there will be conception and it is called creation.”

Notes:

The Swami correlates his actual experience of the yogic or supra-physical system with the psychological counterpart as well as with the inner parts of physical nervous system and the body, and he also correlates these with the visions of symbols arising the practice of yoga and also with gods and goddesses of the traditional religions as seen in vision. The experience is total and whole, at once psychological and yogic as well as physiological. The said marked correlations (see numbers) are given at the end of the chapter as they are not directly connected with the subject matter of this book, but the reader may read the relevant notes or correlations and the concerned pan side by side.

- a) Giving a very physical and material basis of interpretation which is proper in the context, we may observe that the fine vapour here spoken of may possibly be similar to or identical with the lightest and simplest gaseous element namely the atom of hydrogen which is the basic building material of the

physical universe forming 90 per cent of its content, and because of the nuclear fusion of which, the stars and the sun shine bright as for ever, and radiate their energies and substances of light and heat to the distant planets and the earth. The atoms of hydrogen or rather their nuclei the protons invariably enter into all material atoms and molecular structures. Hydrogen has also its important role in the cells of the body and it helps the breathing process in the cells. Possibly the gaseous state of hydrogen is seen as a golden coloured vapour formed in the seminal vesicle, when seen in the psycho-physical vision of a living mental being like man. By the fusion of atoms of hydrogen, in various ways, the universe has been formed and shaped.

- b) *Avi* (ஆவி), in Tamil means vapour, life, spirit, soul and emanation of soul. Here in the above context, it is taken to mean vapour in a physical sense, as the vapour of a very fine or rarefied type, as the hydrogen. Though vapour, it is yet a substance and as such it becomes the vehicle or body of a presiding power or god namely Brahma, that is to say, it is the substance of a being called Brahma. Possibly this rarefied vapour is the same as “*amrita vayu*”. The Swami means by “*amrita vayu*” (in another passage of Upadesha quoted and explained in Ch. 3 and 4 referred to) the hydrogen gas itself, which is the creative fundamental base of the material universe.
- B) “A nerve starts from umbilical region and goes or dips down into the core or centre of the said vapour of the seminal vesicle so as to draw it up (i.e. lift it up or absorb by the impulse of the said nerve) as and when the vapour arises or gathers. It is called “*moolagni*” the heat of the physical base of body (i.e. because of the said nerve also conveying the vapourous heat of the lower abdomen to the physical sex centre called *mooladhara*). As it (i.e. the nerve of heat) starts or arises in the umbilical region, Vishnu is said to be in the *naval*. Two and a half inches above the *naval* (*nabhi*) (i.e. above the umbilicus) there is a square receptacle in the inner depth of the upper abdomen. Food taken in is digested within two and half hours and it is converted into a milky watery fluid (possibly the chyle of the small intestines) by the vapour of the region of Rudra (i.e. the vapourous causal heat of the region of heart felt in the abdomen as the digestive heat *udaragni*) and stored in the said receptacle (at the said inner location, two and half inches above the *naval*, possibly the receptaculum chyli). It is called “*Ksheerabdi*”, literally the milky ocean. As the receptacle of the milky fluid is in touch with or pressed by the inner part of the stomach which is of the form of the leaf of a banyan tree, there is formed in it or over the milky fluid a thin film having a similar form. It is called the “leaf of banyan tree” (ஆலிலை i.e. the form which the fluid takes). In or over that film is formed a nerve with a circular top or head (possibly a ganglion of nerve or knot of nerve from which nerve fibres innervate the receptacle and float or dip over the film). It is called Sesha the serpent (with its raised hood). In that coiled knot of nerve called sesha (*kundali vatta sesha*) is formed a greenish force or shakti (i.e. a greenish part or greenish substance-energy) like the green rust of impurity or verdigris formed in copper vessels. It is called Vishnu (the god of protection and maintenance and implying also his main shakti named Lakshmi) and in the front, back and middle of the greenish nervous part are found its causal substances (*karana sattu*) of golden, yellow

and red colours (cf: VIBGYOR the seven colours of sun light, green appears in the spectrum before yellow, orange i.e. golden orange and red) and the three are called Sri Devi, Bhu Devi and Neela Devi, the three goddesses or female energies or shaktis of Vishnu. As there is a shakti in the middle (i.e. the said nervous life-force of the green nervous part in the navel region) Vishnu is said to possess goddess Lakshmi in his heart.”

Notes:

It is seen that the formations of nerves, nervous substance, colours and energies are sought to be correlated here with the gods and goddesses of the traditional Puranic religions. The physical nerves are connected with the subtle-physical and the vital, according to yoga literature, and through the vital life with the mind also.

- c) “ There is a bifurcated nerve formed in the circular or coiled nerve (*kundali vatta nadi*) at the point of the greenish shakti or force (i.e. at the above said greenish nervous plexus formed and connected with the sinuous spinal cord) of which one branch goes downward and the other upward. When the digested food essence of the milky fluid goes up by the impulse of the upward nerve it appears greenish and when it goes down by the impulse of the downward nerve, it appears yellowish. The upward current of substance or essence (possibly the lymph from the intestines moving up into the thoracic duct) gives life to the being; and the downward current, which is devoid of essence (possibly the fluid of lymph from the lower limbs) is without life. As the upward current of essence gives life or growth of life, it represents (Vishnu’s) functions of maintenance or protections (of life). Further, it is also represented as the movement of Vishnu upward into His Heaven called Vaikunta. The downward current (which is devoid of essence and life) is represented as Vishnu lying in the milky ocean (possibly the receptaculum chyli and its extended part mentioned as another receptacle in the succeeding para). The downward nerve that goes down meets the above said nerve “of the navel thereby giving heat to Brahma (the creator)”.
- d) “ Further there is another receptacle which is on the right side of the (above said) square receptacle (i.e. another receptacle of milky fluid above the navel); it is filled with heat which causes to draw the essence of the digested substance leaving the residual as waste matter on the left side. It stores up the assimilated essence of food in the milky ocean (i.e. in the first said receptacle of the milky fluid). It is called *Vadavagni* (the fire or heat of destruction when the heat becomes excessive). It keeps the milky white fluid in a state of equilibrium, without any destructive excesses so that the dissolution (*pralaya*) or destruction (of body) is avoided. If this heat of the abdomen (*udaragni*) becomes deficient and there-by the milky fluid loses its characteristic nature, disease results.” (If it becomes excessive, it dries, up the milky fluid of the receptaculum chyli and death results, when it is called *Vadavagni*).
- e) “Two and half inches above the place of the said receptacle of milky fluid (which is itself two and half inches above the navel as said before) there is a receptacle in the heart region; and it is of the form of a blossomed flower of

plantain tree. It is white. It is called kailasa (literally the snowcapped white mountain in the Himalayas representing the Heaven of Siva who is Rudra). In this receptacle there is a vapour (ஆவி) which is verily fire or heat (*agni*) itself, and it is a highly refined and rarefied vapour, ten thousand crores times finer than that of the first above said vapour of the seminal receptacle or vesicle (i.e. extreme fineness in regard to the nature of its substance and energy of motion and hence extremely light-weighted and possibly without mass). This is called *Karanagni*, the causal Heat. This heat is called kala chandra Rudra Moorthy (Rudra, the god or power of destruction and the measurer and devourer of time and he destroys world or worlds to purify, renew and reconstruct).

Notes: On

1. See explanations at the end of the chapter.
2. The traditional yoga systems do not distinguish the nature of heat at Mooladhara the physical centre at the spinal base from that in the heart centre. Here by an atomic insight the Swami distinguishes them (i.e. *Moolagni* and *Karanagni*) as also the natures of vapour at both centres. As compared with the vapour at Mooladhara, (or rather in the seminal vesicle under the control of the Swadishtana Yogic centre) which is one hundredth part of air in fineness of substance and energy of motion or heat (possibly corresponding to the vapour and heat of hydrogen atom or of its nucleus called the proton) the vapour of the heart centre is one ten thousandth of a billionth part of air (i.e. one hundredth of a billionth part of the first said vapour) in fineness of substance and therefore carrying super-ultra heat-energy (possibly corresponding to the substance and energy of the massless and energetic wave-particles of light, X-Rays and gamma rays, commonly called as photons, or corresponding, perhaps to the still finer and massless but all permeating wave-particles called neutrinos).
3. *Karanagni*, the causal heat, is here associated with Rudra, the destroyer. The causal heat, which also gives heat to Brahma for creation is here spoken of as the all-destroying fire of Rudra. Possibly the same causal Heat or the high intensity of energy which is released in fusion of nuclear protons of hydrogen which is a constructive or creative process is also behind the intense heat of radiation produced in fission of the nuclides of elements which is of a destructive nature; in the former, there is the building up of matter and in the latter its destruction, though both the extreme intensities are harmful to man, unless controlled and balanced by yoga processes. It is said that at the extremely ultra-high temperatures in the depth of stars, reaching to the order of six thousand million degrees, all the neutrons, protons and electrons within the star wholly becomes what is called a "Neutron star" giving off maximum radiation of energy at the fieriest intensities so as to make it collapse eventually perhaps even in a single day. This is so visualised by modern astronomers. It gives an idea of the role of destruction played by Rudra through intensity of the final conflagration at the end of aeonic ages. See elaborate notes at the end of the passage.

- f) Near this receptacle on its left side is another receptacle like the form of blossomed lotus. This is of green color. A nerve connects this and the above said white receptacle. Through this nerve it is made possible to keep the causal Heat (*Karanagni*) in a state of equilibrium without going into excess or deficiency. Again, there is a nerve, which connects the said receptacle (i.e. the white receptacle of causal heat) with that of milky fluid down below (i.e. the receptacle of Ksheerabdi in the upper abdomen). Through this, heat is given to it (Ksheerabdi, the said receptacle of milky fluid) and kept in balance. That is why, Vishnu is said to have taken birth from Rudra. Through this nerve the impurities of the milky fluid of Vishnu and of the seminal fluid of Brahma are removed or destroyed and so Rudra is spoken of as the destroyer and the purifier (*Samhara karta*).
- g) “In this receptacle of causal heat (*karanagni*) is a coiled nerve called “*Kundali Vatta Narambu or Nadi*”, and it has three branches. These are called the nerves of Soma, Surya, and Agni (Moon, Sun and Fire referring to the well-known three main nervous channels namely *Ida, Pingala and Sushumna* which are also associated respectively with the breathing in the left nostril, right nostril, and in the central spinal system) which run from the top of head to the spinal base (Brahmarandhra to Moola) as the left, right and the central (or middle) nerves in a scissor - like criss - cross manner and permeate throughout the body allowing the current of nervous life-energy to flow by the operation of the upward and downward (or inward and outward) currents of air-breath (Prana and apana) Further, from the base or source of the said coiled nerve (of the heart region) called “*Kundali Vatta Narambu or Nadi*” - two nerves branch out, one on the right, a five-forked or five-pronged nerve and the other on the left a six-forked one. The right one is called Ganapathi (symbolised by the elephant-faced God) and the left one Subramanya (symbolised by the god with peacock as his vehicle). Beneath or at the base of the five-forked nerve is a prominent or main nerve (குலை எடுப்பான நரம்பு i.e. a nerve trunk of fibres) which is directed downward and is of blue color (or bluish black Krishna Varna). This nerve vibrates or pulsates continuously. By its impulse the receptacle of heat in the heart region is supported or upheld and so it is called Ganapathi. On the left and right of the five-forked nerve are the principles or forces of knowledge or reason (buddhi) and the fulfilling power or will (siddhi). Beneath or at the base of the left-sided six-pronged nerve is another nerve (i.e. a nerve trunk of fibres) of various colours. This is called Mayuram the peacock. By the pulsation of this nerve, seventy two thousand nerves (possibly all the main nerves of the nervous system) are supported and kept in control or stabilised without allowing them to go into excessive or deficient functionings. Hence it is called Senapati, the commander. Further, the right and left nerves (Ganapathy and Subramanya) are not only said to be brothers but also aspects of Rudra. While the former has sixty-two matras, the latter forty only per unit of time (matras possibly signifying here the frequencies of vibration).
- h) “Two and half inches above the heart centre is the centre of throat where god Maheswara presides; two and half inches above it is the uvula centre where god Sadasiva presides; two and half inches above it is the centre at the middle of brows (Ajna centre) in the forehead where Bindu (the soul) governs; two

and half inches above it is the Nada centre (i.e. the first overhead centre of Sahasrara or the centre of self corresponding to the “spiritual Higher Mind” of Sri Aurobindo); two and half inches above it is Parabindu centre (i.e. an overhead centre corresponding to the “spiritual illumined Mind” and which may be called rather the lower Parabindu centre); two and half inches above it is Paranada centres (i.e. an overhead centre corresponding to the “spiritual Intuitive Mind” and which may be called rather the lower Paranada centre); two and half inches above it are (the further successive overhead centres of) Dikranta, Adikranta, Dwadasanta, etc. (i.e. centres for lower or selective overmind, global over mind and the summit overmind which is the twelfth centre. In the farther beyond (ateeta), are the centres of suddha siva (the supramental poses or sessions). For the centres from Maheshwara centre up to Bindu centre (i.e., soul centre at the ajna) there are similar features or details as to location or place (of operation), nerves, function, colours etc. as were given for the other lower centres. For the centres between Nada and Dwadasanta (i.e. from Spiritual Higher Mind upto summit overmind which is the field of “Parabindu and Paranada proper” as explained elsewhere by the Swami), we have different skies or spaces of experience (*akasa*, *bheda*). Beyond it is the super-causal (the supermind *Ati Karana*) which is experienced by the spirit.”

- i) “Further, a pillar rises up from Brahma-sthana (Mooladhara) upto suddha siva sthana (the overhead centre of Supermind). Upto the heart centre it assumes the character or nature of gaseous state through nerves or nervous impulses (*vayu nadi* here representing also the life-power), and beyond it that of the nature of Heat (*Agni*, the conscious force of will whose heat is also reflected as a wave or vibration of intense physical heat, as mentioned above, in the form of the fine vapour of the heart region). At the base, the pillar is stout and becomes finer and finer (as it goes up) like *anu* within *anu* (i.e. becoming finer like the sub-atomic particles within an atom or literally as the electron within electron - “*anu* within *anu*”) so that it becomes imperceptible to the senses; and it becomes infinitely vast so that it cannot be sensed even by *jeeva* (the being bound in Ignorance); but it can be seen by the soul when identified with it. This is called ‘Sivakara Poorana Sthambha’ the formulated perfect and whole pillar of Siva.
- j) “If the above said receptacle of heat in the heart region becomes enlarged by excessive function, then extraordinarily intense wave of heat permeates (in the body) and absorbs into itself the fluid essence of “Ksheerabdi”, the milky fluid of the receptacle down below (possibly the lymph of the receptaculum chyli), when death will ensue as a result. The causes for such excessive enlargement of the said receptacle are food and mating by sex indulgence (i.e. by an excess in these habits). If there is a settled balance (in the quantitative and qualitative intake of food and in sex habits). death will not result”. - Book of Upadesha.

Notes:

The above para in its last part seems to relate to conditions of health in persons who have begun to do yoga, but have not yet attained any high spiritual realization which would lead to transformation of body.

We would like to elaborate on the nature of the heat of the extremely fine vapour at the heart region earlier mentioned. It should necessarily be not merely of a physical nature, but also associated with the vital life and the psychological nature and even with spiritual heat of Tapas, However, even considering it, from the point of a purely physical phenomenon, and contrasting it with the heat of the vapour (*Moolagni*) at the spinal base, we may deduce that it should be a highly intense and rarefied form of heat such as that of the “Plasma state” of matter, which is a fourth state beyond the solid, liquid and gaseous states but here possibly controlled and suitably modified or transformed by the heat of the vital life and the mind. The Plasma State is found in the sun and has been reproduced in some of the man-made experiments. In this state, atoms of elements, even of the simplest and lightest gaseous element, hydrogen, are broken into their components, the electrons and the nuclei, the latter containing neutrons and protons as in heavy elements, or a proton and neutron as in heavy hydrogen or a proton alone as in the ordinary simple hydrogen. At ultra high temperatures, far above the heat of the Plasma State, even the nuclei are broken down into neutrons and protons releasing immense energy of heat during the fission. Such temperatures are found in the interior core of stars and the sun. The nucleons (i.e. neutrons and protons) may also be further transformed into electrons and positrons (i.e. positive electrons) and the massless all-permeating neutrinos and anti-neutrinos. The electrons and positrons would collide and annihilate themselves even as to their smallest mass but radiate at the same time the massless photons of energy in the form of light waves, and as the more powerful X-rays and gamma rays. But in the interior of the stars and the sun there is also the reverse process of fusion in which the nucleons of hydrogen fuse to form more complex gaseous elements like helium and again in that process there is an immense release and radiation of energies in the form of heat and light which reach us on the earth. Thus by a cycle of the processes of fission and fusion, emission and absorption of atomic particles, a perpetual radiation of light and heat from the sun and the stars is made possible. In both fusion and fission of nuclei of elements, photons and neutrinos shoot out from the interior of the stellar and solar bodies. Though both travel at the velocity of light, the neutrinos can permeate and penetrate even through dense matter in no time as if it were vacuum, and fill all the spaces, earth and planets in and through. Even our physical bodies are permeated by the ubiquitous neutrinos, though they do not produce any reaction in us. More additional informations on neutrino according to the latest discoveries of nuclear physics are given in chapter 6.

Now coming to the Swami’s text (see the penultimate para i), a physical interpretation based on physical science arises because the Swami distinguishes the fineness of the vapour at the heart centre in a dimension applicable to the micro-world of atom, such as applicable to the sub-atomic massless wave-particles of photons and neutrinos. Its fineness which is associated with the invisible column or pillar mentioned at the end of the passage is said to be atomic or rather as fine as sub-atomic particle within atom (அணுவக்கணுவாய் *anu* within *anu*). However, as the subject matter is related to the heat generated in yoga for which nerves of the body act as the carrier and receptacle of heat and vapour, it is proper to infer that the heat-vapour of the heart centre should be connected not only with the massless high energy-substances of photons and neutrinos, but also with the corresponding life energy-substances, and mind energy-substances. Speaking particularly with reference to the physical neutrinos that permeate our physical bodies without any reaction, we may

infer that there shall be in existence energy-substances of what may be called life-neutrinos and mind-neutrinos which would absorb the physical neutrinos or keep them in control and balance so that their effect and impact at the physical level are not felt directly.

Again another point arises for consideration. Generally in the Indian traditional system of yoga and philosophy, heat is reckoned as the third or the middle in the order of the five elements namely earth, liquid, heat, gas and ether. It occurs before the gaseous state of vapour. But the heat spoken of here at the heart centre is of a different order. In fact, at the end of the text, the Swami mentions that the nervous energies from the spinal base upto the heart centre exist in the form of gaseous states (*vayu nadi*) and above it (i.e. beginning from the heart centre) they occur as form of Heat (*Agni*). This *Agni* or Heat does not seem to be the same as that of the known order of the five elements, because it arises after the gaseous state, that is to say, there is another state of intensity of heat which is equivalent to the “plasma state” of heat or something above it at super-ultra high temperatures as in the stellar interior but suitably transformed and controlled by the life and mind and spirit in our embodied system.

Sri Aurobindo too speaks of three kinds of physical fire or heat namely (1) the ordinary visible fire (i.e. heat and light) (2) the fire in electricity and lightning and (3) the solar fire. Evidently, the solar fire or heat refers to the “plasma state” of heat in the interior of sun and stars or more properly to the heat at which the fusion and fission of nuclear atoms take place in them. It is the state of heat in which nucleons fuse to form nuclear atoms of elements at first of a simple structure, and then of the more and more complex elements subsequently. Thus, this process of transformation of one element into another seems to underly the transmuting or transforming power of Swami Ramalingam by which he could transform baser metals into gold. He himself performed such transformation of matter. He changed liquid mercury into its solid state, and the mercurous solid compound into a liquid state by keeping it in the palm of his hand for a short while. Similarly, by keeping in his hands for a short time of few seconds, he changed baser metals into gold. This is called “Hema Siddhi”, power of transforming metals into gold. This power, according to Swami, is invariably possessed by one who has attained transformation of body into a deathless physical body. Of course, the transformation of physical body into its deathless state is not merely a physical process as is given out in the above examples. It involves the simultaneous operation of all principles and powers- physical, vital, mental, supra-mental and spiritual, each of which having its characteristic substance and energy for changing the physical body into its luminous deathless state.

The grades of physical fire or heat mentioned by Sri Aurobindo seem to fit in with the four grades of heat referred to by the Swami in his ‘*Joti Agaval*’ poem. Like the wave-particle of nuclear physics, heat may be considered as wave - substance or energy substance. The divine Vast Grace Light has become the stable or firmly stabilised heat (or fire) of the earth (i.e. earthly gross heat of fire அனல் நிலை அனலாய் அது அனலின் நிலை அனலாய் and it leads to a more intense form of heat அனல் உறு அனலாய், அது அனலின் உறு அனலாய் which in turn brings about the middle state of heat (அனல் நடு அனலாய் அது அனலின் நடு அனலாய்). This middle state contains within it another state which is the inmost heat (அனலினுள் அனலாய்

அது அனலின் உள் அனலாய்) possibly referring to the heat of the divinely transformed physical life and body. The Swami further observes that the first spoken ordinary heat of fire has been manifested by the Vast Grace-Light by limiting measuring itself into or as a finite thing (நெருப்பது நிலை அளவி). See 'Jothi Agaval' stz. 361, 362. Thus, a very physical interpretation can be given to these stanzas, apart from the supra-physical and spiritual significances that they also convey.

Of course, the Swami likewise speaks about the other elements, ether, gas, water and earth or earthly solid matter, hinting four states in each and that the first gross but firmly established state in each has been manifested as a finite or a measured finite of the divine Vast Grace - Light itself. (See 'Joti Agaval' stzs. 12-1-170 to 183). Now from the above, it is evident that each element is linked up or correlated with the other and it contains all the others, because of the common substratum of vast Grace-Light which is supramental Substance and Energy. Modern physicists like Markov are also driven to the conclusion, though in a material sense, that each element contains all the others, and each elementary particle is composite of all others. Therefore, like the four states of heat, there are similar corresponding four levels of substance-energy in each of the five elements. Thus when Swami Ramalingam speaks of the heat associated with the rarefied vapour and heat of the heart centre, he possibly refers to the middle or even the inmost state of heat and its corresponding level or state of gas or vapour.

Further these states of matter, from a gross level to the finest in each of the five elements, are not merely confined to the physical phenomena but also extended into the biological and psychological and spiritual levels of existence, because all go to make an integral whole existence. It is in this representative sense that the Swami speaks of the seed-state of the five physical elements (ஐங்கரு Ayeng Karu) as the unit of an integral existence in his poem "*Tiruvadi Perumai*" (12-37) quoted in the fifth chapter and from such an unit he traces the evolution of physical matter in and through life and mind and describes the whole process as a rhythmic play of manifestation of the Divine Being. Even as different elements, stable and unstable, can be spoken of as different states of the simplest atom of the element namely hydrogen, and the massive atomic components of neutrons, protons and mesons as different states of the minutest sub-atomic particles of electrons (including the positively charged counterparts called positrons) which in turn are convertible into the more fundamental states of massless and formless photons and neutrinos or more exclusively into neutrinos and their negative counter-parts called anti-neutrinos, so too in an ultimate analysis, the physical matter itself may be regarded as one end-state of substance-energy of the ultimate Divine Substance-Energy with the life and mind acting as the mediary intervening states. In fact, pointing as it were to an intermediate state, the notable astronomer Zeldovich has put forward a hypothesis according to which the words are said to be born in collision of super-gigantic energy particles wandering about in the boundless expanses of the universe, that is to say, words of the mind, or mind-born words are also energy-substance of a very high order.

Again, we may consider from another view-point, the Swami's power of transmutation of metals into gold which is evidently associated with the finest type of heat of the heart centre. The Swami, by his attainment of deathless body, had become free not only from the dangers of the five elements, but also more specifically from those of the radio-active cosmic particles and rays called "Gagana Kala and Kadir"

(Stz.12-4-2 and 12-44-50). In fact, it is evident that he had mastery over the five elements and particularly his body shared the power of the divine Light of Arut Perum Joti, and in identity with it, his eyes could beneficially enjoy the goodness of the power of physical light of high intensities which are natural to the interior of stars and the sun (என் இரு கண்களுக்கும் கதிர்நலம் Joti Agaval stz.). We may say in other words that his eyes shone with and radiated the good light of the sun and the stars, though too powerful to be absorbed or received in its unmodified power, by the ordinary people around him. He even closed one of his eyes by a bandage for some days lest both the eyes when open should harm those disciples who were attending on him by physical nearness.

Swami Ramalingam had mastery over the five physical elements. Rain did not wet him nor his clothes. Fire did not touch him nor burn him nor his clothes; not even a mark of the fire was left on his clothes when once burning charcoal fell on his body. His physical body including the bones became plastic and supple. He affirmed that his body could penetrate through or become penetrable by the five elements of nature, by the radio-active cosmic rays of the outer space and even by instruments of weapon without any harm (தடுக்கப்படுதலில்லாத தனிவடிவம்) and without any obstruction. He walked through the walls and through thorny bushes without obstruction as if walking on a plain ground. He left no footprints on the ground. His body had become filled with the divine Light of Grace and did not cast its shadow on the ground. His body had become golden, ever youthful, ever pure, diseaseless, thirstless, hungerless, sleepless, deathless and ever decayless and indestructible, cool, ever-blissful and ever-growing and ever-renewing in its deathless substances. Many of the people around him saw his shadowless body.

We learn from nuclear science that the cosmic particles and rays of cosmic radiation consist mainly of alpha particles (of helium nuclei) and beta particles (of electrons and positrons) and X-rays and gamma rays of high velocities; and they strike upon the earth from all sides of the space above and around, as they shoot up from the distant stars and sun at tremendous velocities almost at the speed of light. These entering into the atmosphere of the earth bring about changes or transmutation of substances particularly in nitrogen, carbon and oxygen. About 90% of cosmic primary particles are constituted by free protons of hydrogen, 9% of alpha particles of the inert helium and 1% by other heavy particles of elements. At the sea-level, most of them break into secondary cosmic particles constructed by 70% of mu-mesons of intermediary mass but with high velocities and intensities of energy. 29% of electrons, the most elementary particles of the least mass so far known (apart from the invisible formless and massless photons of X-rays and gamma rays, and neutrinos and the anti-neutrinos all of which come without change directly from the stellar and solar bodies and 1% of the heavier particles.

It is evident from the foregoing that the Swami's body had become a controlled field of not merely the vital, mental and supramental forces, but also of the physical forces of the highest intensities as are characterised by the high-powered atomic particles of cosmic radiation, because he specifically put forth the claim that he was free from the dangers of cosmic particles and rays which could penetrate through his body without harm. It is quite likely that he used forces of cosmic radiation by and through his body for transmutation of baser metals into gold or that

his body inherently possessed a controlled radio-activity so as to transform them from one element into another.

### பிண்டானுபவ லக்ஷணம் (உபதேசம்)

மனித தேகத்தில் கோசத்திற்கு இரண்டரை அங்குலத்திற்கு மேல் நாற்சதுரமான ஒரு பையுண்டு. அதில் 16 வயதளவும் உண்டாகும் இந்திரியம் ஜலமாகச் சேருகின்றது. அதைத்தான் மானசதடாகமென்று சொல்லுகின்றது. 16க்கு மேல் சேரும் இந்திரியம் உறைந்த அந்த ஜலத்திற்கு மத்தியில் சேருகின்றது. அப்படியாகச் சேர்ந்து கொண்டு வரும் இந்திரியம் பொன்வண்ணமாக இருக்கும். அது தாமரைப்பூவென்று சொல்லப்படும். அதன் மத்தியில் ஒரு ஆவி சாதாரண காற்றுக்கு நூற்றிலொரு பங்காக வெகு நேர்மையாக இருக்கும். அதன் வண்ணம் பொன் மயமாக இருக்கும். அதற்கு அதிஷ்டான தெய்வம் பிரமனென்று சொல்லப்படும். அந்த ஆவி உண்டாகுங்காலம் அவருக்குச் சகல காலம் என்றும் அடங்கும் காலம் கேவல காலம் என்றும் சொல்லப்படும். அந்த ஆவி உண்டாகுங்காலத்தில் செயற்கையானால் கருத்தரிக்கும். அது சிருட்டியென்று சொல்லப்படும்.

அதில் ஆவி உண்டாகத் தொப்புளிலிருந்து ஒரு நாடி தோன்றி அதன் மத்தியில் முகந்து கொண்டிருக்கிறது. அதன் மூலமாய் அக்கினியிருக்கின்றது. அது மூலாக்கினி என்று சொல்லப்படும். அது தொப்புளிலிருந்து உண்டாவதில் விஷ்ணு தொப்புளிலிருப்பதாகச் சொல்லப்படுகின்றது. அதன் மேல் இரண்டரை அங்குலத்தில் உந்திக்கு நேராக உட்பாகத்தில் சதுரமாய் ஒரு பையுண்டு. புசித்த அன்னத்தை ஐந்து நாழிகையில் பால் போன்ற ஜலமாய் ருத்திர பாகத்தில் உள்ள ஆவி பிரித்து அந்தப் பையில் சேர்க்கின்றது. அதை கூரீராப்தி என்று சொல்லுகிறது. அந்தப் பையிலிருக்கும் பால் போன்ற ஜலத்தின் மேல் ஆலிலை வடிவையுடைய வயிற்றின் உட்பாகம் படிவதினால் அதே வண்ணமாக ஓராடை கட்டியிருக்கும். அதை ஆலிலை என்று சொல்கின்றது. அந்த ஆடையின் மேல் (ஒரு) நரம்பு வட்டமாய்த் தலை தூக்கி இருக்கின்றது. அதைச் சேஷனென்று சொல்லுகின்றது. அந்தக் குண்டலி வட்ட சேஷனெனும் நாடி மத்தியில் செம்பினது களிம்பு போன்ற பச்சை மேனியாய் ஒரு சக்தியுண்டு. அதை விஷ்ணுவென்றும், அச்சத்தியில் முன் பின் நடு என்னும் இடத்தில் அதன் காரணச் சத்து பொன் வண்ணமாயும் அரித்திரா வண்ணமாயும் குங்கும வண்ணமாயும் மூன்று உள்ளன. அவற்றைச் சீதேவி, பூதேவி, நீளாதேவி எனச் சொல்லுகின்றது. மத்தியில் ஒரு சத்தி இருப்பதில் விஷ்ணு மார்பில் லக்ஷ்மியை வைத்தார் என்பது.

குண்டலி வட்டமான நாடி மத்தியிலுள்ள பச்சை வண்ணமான சத்தியிலிருந்து ஒரு நாடி உண்டாய் இரண்டு தலையாய் விரிந்து ஒரு தலை மேலும் ஒரு தலை கீழும் செல்லுகின்றது. இந்த நாடிகளின் மூலமாய் அந்தச் சத்து மேலே செல்லும் போது பசுமை வண்ணமாகவும் கீழ்ச் செல்லும் போது பீத வண்ணமாகவும் செல்லுகின்றது. மேலே செல்லுவதினால் ஜீவர்களுக்கு ஜீவிப்பும் அதன் சாரம் கெட்டுக் கீழே செல்வதினால் ஜீவிப்பின்மையும் உண்டாகின்றது. மேலே செல்வதில் ஜீவிப்புண்டாக்குவதால் காத்தல் தொழிலை உணர்த்துகின்றது. மேலே செல்வதை விஷ்ணு வைகுந்தம் போகின்றாரென்னும் கீழே செல்லுகின்ற போது கூரீராப்தியில் இருக்கிறாரென்றும் சொல்லுகின்றது. கீழே செல்லும் நாடி முன் சொன்ன தொப்புள் நாடியுடன் கலப்புண்டாய் பிரமனுக்குஷ்ணத்தைத் தருகின்றது.

அன்றியும் இந்தச் சதுரமான பையின் வலப் பாகத்தில் ஒரு பையுண்டு. அந்தப் பையில் அக்கினி நிரம்பிக் காரணமாயிருக்கின்றது. அது புசித்த வஸ்த்துக்களின் சத்தைக் கிரகித்துக் கொண்டு அசத்தை மலமாக இடது பாகத்தில் சேர்த்து விடுகின்றது. கிரகித்த சத்தை முன் சொன்ன கூரீராப்திப் பையில் சேர்க்கின்றது. இதை வடமாக்கினி என்று சொல்லுகிறது. மேலும் இந்த வெள்ளை ஜலத்தை அக்கிரமமின்றிச் சமப்படுத்திப் பிரளயம் வாராது காத்துக் கொண்டிருக்கிறது. இந்த உதராக்கினி குறைவுபட்டு கூரீராப்தியின் ஜலத்தின் தரங்கெடுமானால் நோயுண்டு.

இந்தப் பையாகிய ஸ்தானத்திற்கு மேல் இரண்டரை அங்குலத்தில் இருதயத்தில் மலர்ந்த வாழைப்பூ போல ஒரு பையுண்டு. அது வெண்மையாயிருக்கும். இதைக் கைலாயமென்று சொல்லுகின்றது. இந்தப் பையுள் முன் சொன்ன காற்றில் பதினாயிரங் கோடி பங்கில் ஒரு பங்காக வெகு நேர்மையாய் அக்கினி மயமாய் ஒரு ஆவியிருக்கும் இதற்குக் காரணாக்கினியென்று பெயர். இவ்வக்கினியைக் கால சந்திர ருத்திர மூர்த்தி என்பர். இப்பையின் அருகில் இடப்புறத்தில் மலர்ந்த தாமரைப் பூப் போல் ஒரு பையுண்டு. அந்தப் பை பசுமை வண்ணமாயிருக்கும். அதற்கும் முன் சொன்ன வெண்மைப் பைக்கும் ஒரு நாடியுண்டு. அதன் மூலமாய்க் காரணாக்கினி அதிகப்படுத்தாமலும் குறைவு படுத்தாமலும் சமப்படுத்தி வைக்கும். இந்த மலர்ந்த பைக்கும் கீழிருக்கும் கூரீராப்தி பைக்கும் ஒரு நாடியுண்டு. அதன் மூலமாய் அதற்கு உஷ்ணங் கொடுத்து நிலையில் வைக்கும் இதனால் ருத்திரனிடத்தில் விஷ்ணு இடமாகிய ஜலத்திலும் பிரமனிடமாகிய இந்திரியத்திலும் உள்ள குற்றங்களைக் கண்டிப்பதால் ருத்திரனைச் சம்ஹார கர்த்தா என்று சொல்வது.

இந்த அக்னிப் பையில் குண்டலி வட்ட நரம்பு ஒன்று உண்டு. அதில் மூன்றாகப் பிரியும் கிளையுண்டு. அது மூல முதல் பிரமரந்திரம் வரையில் இடம் வலம் நடுவென்று கத்தரிமாறலாய்ப் பிராண அபானனுக்கு இடங்கொடுத்து ஊடுருவி நிற்கும். இந்த நரம்புகளுக்குச் சோம சூரியாக்கினி என்று பெயர்.

இஃதன்றி இக்குண்டலி வட்ட நரம்பினடியில் நின்று இரண்டு நரம்பு வலத்தில் அஞ்சு கவருடைய தலையாயும் இடத்தில் ஆறு தலையுடைய கவராயும் நிற்கின்றன. வலத்திலுள்ளது கணபதி என்றும் இடத்திலுள்ளது சுப்ரமணியர் என்றும் பெயர் சொல்லுவது. மேற்படி ஐந்து கவருடைய நரம்பிற்கு அடியில் தலையெடுப்பான நரம்பு கீழ் நோக்கி கிருஷ்ணவர்ணமாயிருக்கும். இந்த நரம்பு இடைவிடாது அசைந்து கொண்டிருக்கும். இந்த அசைவில் அக்கினிப் பைக்கு ஆதாரம் உண்டாவதால் இதற்குக் கணபதி என்று பெயர். மேற்படி ஐந்து கவருடைய நாடிக்கு இடம் வலம் இரண்டிலும் சித்தி தத்துவம் புத்தி தத்துவம் உண்டு. இடத்திலுள்ள ஆறு கவருடைய நாடிக்குக் கீழே அனந்த வண்ணமான நாடி ஒன்றுண்டு. இதற்கு மயூரம் என்று பெயர். இந்த நாடியின் அசைவில் எழுபத்தீராயிரம் (72,000) நாடியும் அக்கிரமமின்றி நிலைபெறுகின்றபடியால் இதற்குச் சேனிபதியென்று பெயர். மேலும் வலது புறத்து நாடிக்கு அறுபத்திரண்டு மாத்திரையும் இடது புறத்து நாடிக்கு நாற்பது மாத்திரையும் அளவு வித்தியாசமிருப்பதால் இவர்களைச் சோதரர்களாகச் சொல்லுவதுமின்றி மேற்படி ருத்திராம்சமாகவே சொல்லுகின்றது.

இருதயத்திற்கு மேல் இரண்டரை அங்குல இடமான கண்டத்தில் மகேசுவரனும், அதற்கு மேல் இரண்டரை அங்குல (இடமான) அண்ணாக்கில் சதாசிவனும், அதற்கு மேல் இரண்டரை அங்குல உயரத்தில் புருவ மத்தியில் விந்துவும், அதற்கு மேல் இரண்டரை அங்குலத்தில் நாதமும், அதற்கு மேல் இரண்டரை பரவிந்துவும், அதற்குமேல் இரண்டரை அங்குலத்தில் பரநாதமும், அதற்கு மேல் இரண்டரை அங்குலத்தில் திக்கிராந்தம், அதிகிராந்தம், துவாதசாந்தம் முதலானவைகளும் அதீதத்தில் சுத்த சிவமுமுள. மகேசுவரஸ்தானம் முதல் விந்து ஸ்தானம் வரையிலும் முன் போல் இடம், நாடி, தொழில், வண்ணம் முதலியவுமுள்ளன. நாதஸ்தானந் தொட்டு துவாத சாந்தம் வரையில் அனுபவ வெளியாகிய ஆகாச பேதமாயிருக்கும். அதற்கு மேல் அதிகாரண மாத்திரமாய் ஆன்மானுபவத்தில் விளங்கும்.

மேலும் பிரமஸ்தானந் தொடங்கிச் சுத்த சிவஸ்தானம் வரையில் ஒரு ஸ்தம்பம், இருதயம் வரையில் வாயுநாடி வண்ணமாயும் அதற்கு மேல் அக்கினி வண்ணமாயும் இருக்கும். இது அடியிற்பருத்து வரவர நேர்மையாய், இந்திரிய கரணங்களுக்குப் புலப்படாமல் அணுவுக்கணுவாய், ஜீவனுக்கும் புலப்படாமல் அகண்டமாய், ஆன்மக் காட்சியில் அருகித் தோன்றுவதாய், இரண்டற நிற்கும். இதற்குச் சிவாகார பூரண ஸ்தம்பம் என்று பெயர்.

முன் சொன்ன இருதயாக்கினிப்பை அக்கிரமமாய் விரிந்து, விசேஷ அக்கினி ஜ்வாலை விசிரிம்பித்துக் கீழிருக்கும் கூடூராப்திப் பையிலிருக்கும் ஜலத்தைச் சுருட்டிக் கொள்ள, ஜுவனுக்கு மரண காலம் நேரிடும். மேல்படி பை விரிவதற்கு ஆதாரம் அருந்தல் பொருந்தல். இவை சமமானால் மிருத்தியு வராது.

(உபதேசப் பகுதி - ப 264 - 267)

## நினைப்பு மறைப்பு

இந்த ஜீவன் அக்கினியின் சூரிய பாகத்திலுண்டாகும் காற்றினில் அசைக்கப்படும் போது நினைப்பும், அக்கினியின் சந்திர பாகத்திலுண்டாகும் காற்றினில் அசைக்கப்படும் போது மறைப்பும் உண்டாகின்றது. இதுதான் நினைப்பு மறைப்பு உண்டாவதற்குக் காரணம்.

(உபதேசப் பகுதி - ப 289)

## நினைப்பு மறைப்பு (மேலும் விளக்கியது)

நினைப்பு மறைப்பு உண்டாவதற்குக் காரணம்: சந்திரன் அக்கினியோடு கூடி சூரிய பாகத்திலுண்டாகும் காற்றினில் அசைக்கப்படும் போது, உண்டாகும் நினைப்பு; சூரியன் அக்கினியோடு கூடி சந்திர பாகத்தில் உண்டாகும் காற்றினில் அசைக்கப்படும் போது உண்டாகின்றது மறைப்பு. நினைப்பு மறைப்பு என்பதற்குப் பொருள்; நினைப்பென்பது யாது? ஜனனம், மனஅசைவு; ஒன்றை நினைத்தல் சகலகாலம். மேற்படி தத்துவம் வேறொன்றில் பற்றல், தத்துவத்தின் அசைவாகிய ஆவி மேலேறுதல் மேற்படி ஆவியேறின இடத்தில் நில்லாது ஆக்கிரமித்தல், மறைப்பதென்பது யாது? மரணம், தூக்கம், மனம் ஒன்றைப் பற்றி உடனே மறைதல் கேவல கிலம், தத்துவத்தின் கூர்மை கீழ்ச் செல்லுதல், பிரக்ஞை இல்லாதிருத்தல், மேற்படி ஆவி ஆக்கிரமித்தல், மனம் ஆபாசப்பட்டுச் சூனியமாதல், மேற்குறித்த

நினைப்பு மறைப்பற்று நிரதிசயானந்தமாய் அருள் வடிவாவதே சுத்த சன்மார்க்க சாதனம்.

குறிப்பு: சூரிய பாகத்திலுண்டாகும் காற்று என்பது பிராண வாயு. சந்திர பாகத்திலுண்டாகும் காற்று என்பது அபாண வாயு.

### சூரியன் சந்திரன் அக்கினி

..... சந்திரன் காரிய காரண உருவன். சகலன் சூரியன், கேவலன் சந்திரன், அனுபவத்தில் இடம் வலம் போல மாறும். (அதாவது திரிசிய அனுபவத்திலுள்ள இடம் வலமாகவும் வலம் இடமாகவும் அனுபவந் தோன்றும்). பிரமத்துவம் சூரியனிடத்திலும் விஷ்ணுத்துவம் சந்திரனிடத்திலும் உள்ளன. அக்கினிக்குக்கலை 64. இப்போது எட்டுக் கலையோடு காரண உருவனாய் மற்றைக்கலைகளை உள்ளடக்கி நீருறு தீப்போல் எங்குமுடையவன்.

(உபதேசப் பகுதி - ப 253)

### பக்குவரும் சூரிய கலையும்

சாதரண ஜீவர்கள் சந்திர கலையில் இறப்பதும் பிறப்பதும் இயற்கை. பக்குவர்கள் சூரிய கலையில் பிறப்பதும் இறப்பதும் இயற்கை. சூரியகலை அனுபவம் கிடைப்பது கஷ்டம். தினம் சூரிய கலையில் செல்லும்படி மனதை அந்தக் கண்களில் செலுத்த வேண்டும்.

(உபதேசம் - ப 296)

### சந்திர சூரியன் அக்கினி

சந்திரன் மகிமை வரலாறு: ரூபாருபி, காரிய காரணன், சோபா மாத்திரன், சுடாத தன்மை ..... அர்த்த வடிவன் .... பச்சை வெண்மை கலந்த மேனி, மன அறிவு ..... மன ஒளி.

சூரியன் வரலாறு: ரூபி, காரியன் ஒளி மாத்திரன், சுட்டுஞ் சுடாத தன்மை..... வட்ட வடிவன்..... பஞ்ச வர்ணம்..... ஜீவ அறிவு..... ஜீவ ஒளி.

அக்கினியின் வரலாறு: அரூபி, காரணன், பிரகாச மாத்திரன், சுடுத்தன்மை,..... பூர்ண வடிவன், எங்கும் வியாபகி, சுவர்ணம், ஆன்ம அறிவு..... ஆன்ம ஒளி.

(உபதேசம் - ப 254)

### காயத்ரி

காயத்ரி: கா-ய-த்ரி. க ஜல தத்துவமாகிய ஸ்தூல தேகம், பிரம ஸ்வரூபம். ய வாயு தத்துவமாகிய சூக்ஷ்ம தேகம், விஷ்ணு ஸ்வரூபம், ஆ அக்னி தத்துவமாகிய காரண தேகம், ருத்ர ஸ்வரூபம். த்ரி மூன்று. அதாவது மேற்குறித்த மூன்று தேகங்களின் ஸ்வரூப ரூப சபாவ குணங்களை ஐயம் திரிபு மயக்கமின்றிக் கடந்தால் ஜனன மரண சிகரம் நீங்கி நித்தியர் ஆவோம்.

(உபதேசம் - ப 287)

தீபத்தில் ஒளி, சோபை, பிரகாசம் என்னும் மூன்றில் பிரகாசம் காரண அக்கினி; சோபை காரிய காரண அக்கினி; ஒளி காரிய அக்கினி.

(உபதேசம் - ப 318)

### மூன்று அவஸ்தை

அவஸ்தை மூன்று: ஜாக்கிரம், சொப்பனம், சுழுத்தி. இவற்றில் உள்ளம் பித்த உஷ்ணத்தோடு கூடி லலாட ஸ்தானத்தில் நிற்பது ஜாக்கிரம். சொப்பனமாவது உள்ளம் வாத நாடியோடி கூடிக் கண்ட ஸ்தானத்தில் இருப்பது. சுழுத்தியாவது உள்ளம் சிலேத்தும் நாடியோடு கூடி மார்பு ஸ்தானத்தில் நிற்பது.

(உபதேசம் - ப 293)

குறிப்பு: உள்ளம் என்பது ஜீவன் எனக் கொள்க.

### பிண்ட லக்ஷணம்

தலை அண்டம்; மிர்பு முதலானவை பிண்டம். அண்டத்தில் பிண்டம் புருவமத்தி. அண்டத்தில் அண்டம் பிரமரந்திரம். இதில் (அண்டத்தில் அதாவது மார்புக்கு மேல்), சோம சூரியாக்கினி பிரம விஷ்ணுக்கள் இருக்குமிடம்; நேத்திரம் புருவமத்தி, அண்ணா பிரமரந்திரம். இதில் பிரகாசமாயும் அறிவாயும் பிராண வாயுவாயும் இருக்கின்றது. பிண்டத்தில் பிண்டம் இருப்புக்குங் கீழ் பாத பரியந்தம். பிண்டத்தில் அண்டம் பீசம். பிண்டம் வயிறு.

மேற்படி பிண்ட ஸ்தானத்தில் கர்த்தாக்கள் இருக்குமிடம் கோசம், தொப்புள், மார்பு, இவர்கள் வண்ணம், நாடி, உஷ்ணம், காற்று, குறி முதலிய பேதங்களாம். ஆதலால் பிரம விஷ்ணு ருத்திர பேதங்கள் அனந்தகோடி ..... மேல்படி தேகத்தில் பிரம பேதம் கீழும் மேலும் இருப்பதால்--

நாமடைய வேண்டிய பதஸ்தானங்கள் எவை என்றால் அவை கண்ட முதல் உச்சி வரையில் அடங்கியிருக்கின்றன. மேல் படி பதங்களாவன சொர்க்க பூர்வமாக சதாசிவபதம் ஈறாக உள்ளன. இதற்கு மேல் நாதாதி சுத்தம் ஈறாக உள்ளன. கைலாசாதி பதங்கள் உந்திக்கு மேல் கண்டம் ஈறாக உள்ளன. இது சாதாரண பாகம். நரக இடமாவன உந்தி முதல் குத பரியந்தம். கர்ம ஸ்தானம் குத முதல் பாதம் ஈறாக உள்ளது. இவைகளில் பிரமாதி (அதாவது பிரம்மாவின் அல்லது மயக்கம் தரும்) பிரகாசமுள்ளது. அனுபவிப்பது கண்டத்தில். இந்த தேகத்தில் எமனிருக்கும் இடம் குதமாகிய நரக ஸ்தானத்துக்கு இடது பாகம். மேல்படி தேகத்தில் ஆன்மா தனித்திருக்கும். ஜீவன் மனமுதலிய அந்தக் கரணக் கூட்டத்தின் மத்தியில் இருக்கும்.

(உபதேசம் - ப 262)

இதற்குச் சாக்ஷியாக இப்போதுதான் சன்மார்க்கக் கொடி கட்டிக் கொண்டது. அக்கொடி உண்மை யாதெனில்: நமது நாபி முதல் புருவமத்தி ஈறாக ஒரு நாடி இருக்கின்றது. அந்த நாடி நுனியில் புருவ மத்தியின் உட்புறத்தில் ஓர் சவ்வு தொங்குகின்றது; அதன் அடிப்புறம் வெள்ளை வர்ணம்; மேற்புறம் மஞ்சள் வர்ணம்; அச்சவ்வின் கீழ் ஓர் நரம்பு ஏறவும் இறங்கவும் இருக்கின்றது. இக்கொடி

நம் அனுபவத்தின் கண் விளங்கும். இவ்வடையாளக் குறிப்பாகவே இன்றைய தினம் வெளி முகத்தில் அடையாள வர்ணமான கொடி கட்டியது. இனி எல்லவர்க்கும் நல்ல அனுபவம் அறிவின் கண் தொன்றும்.

-மஹோபதேசம் (உபதேசம் - ப 360)

கீழ்க்கண்டவை ஒன்றுக்கொன்று ஒத்த பொருத்தமும் தொடர்புமுடையன எனக் காண்கிறது. அவற்றைத் தொகுத்து இங்கே காண்பிக்கிறோம்.

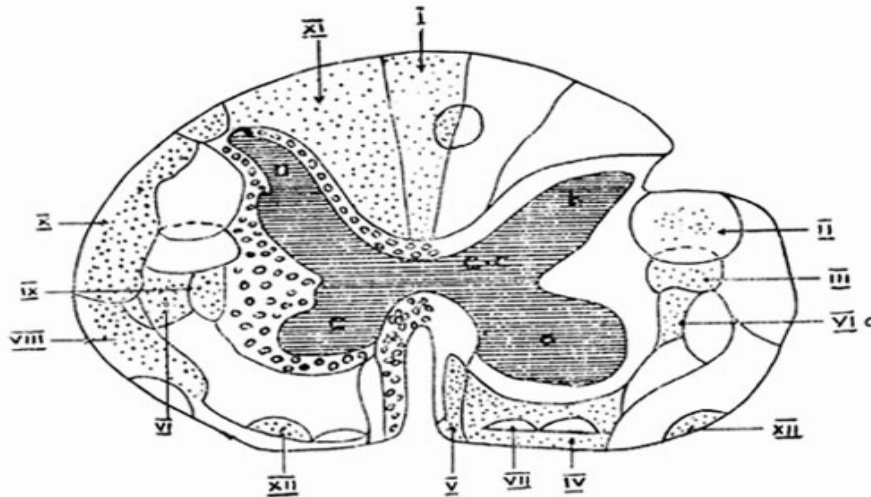
### ஒத்த பொருத்தமும் தொடர்புமுடையவை

1. இடகலை நாடி	சுமுமுனை நாடி	பிங்கலை நாடி
2. சந்திரன் காரிய காரணன் ரூபா ரூபி	அக்கினி காரணன், அரூபி	சூரியன் காரியன், ரூபி
3. இடது	மத்தி	வலது
4. இடதுநாசி மூச்சு	மத்திய மூச்சு (இடது வலது இரண்டிலும் சம மூச்சு)	வலது நாசி மூச்சு
5. சுப்ரமணியர்	ருத்திரன்	கணபதி
அ) கீழ்நிலை ஆதாரங்கள்:		
தொப்புள் (நாபி)	மார்பு (அனாகதம்)	மூலாதாரம் (கோசம்)
ஆ) மேல்நிலை ஆதாரங்கள்:		
கண்டம்	புருவமத்தி (ஆக்ஞை)	உள்நாக்கு
6. விஷ்ணு	ருத்திரன்	பிரம்மா
7. கனவு	சுமுத்தி	நனவு
அ) வாதம்	சிலேத்துமம்	பித்தம்
ஆ) கண்டத்தில் வாதம்	மார்பில் சிலேத்துமம்	லலாடத்தில் பித்த உஷ்ணம்
8. வாத நாடி	சிலேத்தும நாடி	பித்த நாடி
9. அபான வியு	சமான வியு	பிராணன் அல்லது பிராண வியு

அ) ரேசகம்	கும்பகம்	பூரகம்
10. மரணம் கேவலம்	சமப்படுத்தல் சுத்தம்	ஜனனம் சகலம்
11. மனம் முதலிய கரணிக்கினி	காரணாக்கினி அல்லது ஆன்ம அக்கினி	ஜீவாக்கினி
12. மறைப்பு அல்லது மறப்பு	நினைப்பு மறப்பு அற்ற சம (ஆனந்த உணர்வு நிலை)	நினைப்பு
13. தத்துவத்தின் கூர்மை கீழ்ச் செல்லுதலும் வெளியே செல்லுதலும்	தத்துவத்தின் சமரச சகஜ நிலை	தத்துவத்தின் கூர்மை ஒருமைப் பட்டு மேலேறுதலும் உள்முகமிகச் செல்லுதலும்
14. தூக்கமும் மயக்கமும்	ஆனந்த நடுநிலை	பிரக்ஞை உணர்வு
15. சந்திர கலை 12	அக்கினிக் கலை 64	சூரிய கலை 16
16. ஆறு கவருடைய இடது நாடி (சுப்ரமணியர்)	குண்டலிவட்ட நாடி	ஐந்து கவருடைய வலது நாடி
Neck to pelvis Sympathetic Trunk (see also item 5)	Spino – medullar Cerebral Trunk	vagal – sacral para – sympathetic
Sympathetic nervous system	Central nervous system	Para – sympathetic nervous system

## 10. Part I-Sensory and Motor Pathways of the Spinal Cord

### SPINAL CORD



**Fig 1: Configurations of conducting pathways of spinal cord shown as in its cross-section (Courtesy – K. M. Bycov)**

Dots on left indicate ascending sensory pathways from the afferent neurons of the spinal cord and spinal ganglia. Dots on the right indicate the descending motor pathways or the efferent neurons terminating in the spinal cord. The ascending and descending pathways of the spinal cord are connected with the higher divisions of the central nervous system for conducting the sensory and motor impulses. Circles show intersegmental pathways connecting the cells of grey matter with the white matter of the cord. cc-Central canal of the spinal cord; a and b – posterior horns of grey matter; c and d – anterior horns of grey matter.

Ascending sensory pathways in the white matter of the spinal cord: I - posterior (or dorsal) spinal column of funiculus gracilis; XI - posterior spinal column of funiculus cuneatus; I and XI ascending to medulla oblongata. X - Dorsal spino-cerebellar tract in the lateral part of the spinal cord; VIII - Ventral (or anterior) spino-cerebellar tract in the lateral part of spinal cord: X and VIII ascending to the cerebellum. IX - lateral spino-thalamic tract; VI - Ventral spino - thalamic tract; IX and VI ascending to the thalamus of cerebrum; XII - spino-tectal tract i.e. ascending to the tectum of the mid brain.

Descending motor pathways in the white matter of the spinal cord: II - Lateral pyramidal tract; V - Anterior Pyramidal tract; II and V descending from the motor zone of the cerebrum or cerebral cortex. Crossing to the opposite side in the lower medulla oblongata it forms the tract II in the spinal cord called as lateral cortico-spinal tract. Tract V is formed without such crossing and hence called direct pyramidal tract, i.e. the anterior cortico-spinal tract, though its fibres pass also to the opposite side but on the level of the spinal segment. III-Rubro-spinal tract descending from the red nuclei of the mid brain; IV - Vestibulo-spinal tract. VII - Olivo spinal tract descending

from the olive area of the medulla oblongata. Via - Tecto-spinal tract from the tectum of the mid brain.

Correlation with the Swami's Yogic vision of Lotus.

Possible correlation of Swami Ramalingam's vision (or of any yogi's vision) of the lotus-flower (i.e. its pericarp) at the yogic centres with the configuration of the said pathway marked II (lateral pyramidal tract or cortico-spinal tract) in the above figure seems proper. Similar correlation of the Swami's vision of the plantain-flowerlike-form of the receptacle of heat (i.e. the right atrium of heart) with the configuration of the pathways marked IX and VI together (i.e. lateral and ventral spino-thalamic tracts) also seems proper. The latter correlation is not only in respect of the form of the said receptacle but also in its white color and function of heat, as the said configurations IX and VI are formed in the white matter of the spinal cord and the pathways relate to the regulation of the heat and temperature of the body.

The petals of the lotus flower as seen in Yogic vision might be due to the configurations at the fringes of the cord (see X and VIII), and the varying even number of petals at each yogic centre might be due to the play or vibration of the adjacent spinal segments of varying number, below and above the immediate segment, where the yogic centre lies and with which they are connected. This would apply particularly for all the yogic centres below Ajna of the middle forehead.

It is understood that though in the diagram the ascending and descending pathways formed by the afferent and efferent fibres are shown in the white matter, they have their corresponding cells of origin in the grey matter of the spinal cord (including spinal ganglia) in the case of the former, and their corresponding terminals in the said grey matter in the case of the latter.

Configuration marked III (rubro-spinal tract) which is shown with II (lateral cortico-spinal tract), might possibly give rise to the vision of the red lotus (i.e. its pericarp) of the Shakti at the yogic centres (especially below the Ajna) as the said tract III is derived from the red nucleus of the mid brain and it lies almost horizontally on the mid line with the central spinal canal (c.c.). In the yogic vision, the red lotus of the Shakti is seen within the pericarp of the main lotus of the yogic centre and as part of the latter, and here too the smaller tract III is seen overlapping with the larger tract II. The Shakti is seen to abide with her respective ruling power or god in the overlapped zone. In the vision, the symmetrical configurations on either side become centralised as one and seen at the centre. This might be so for II and III.

The sinuous or serpentine coils (said to be three and half coils) of the aroused kundalini (or current of vital and nervous consciousness) seem to correlate roughly with the three sinuous formations of the spinal cord namely, the sinuous grey matter of the cord, the immediately surrounding formation or zone of white matter (see the zones marked with small circles) and then the outer area of the white matter proper (marked with dots). The spinal-medullar cord is known as Kundali Vattam and the spinal nerve that is connected with it as "*Kundali Vatta Nadi*".

Now we give herein below wherever possible the three-fold correlations namely the yogic and psychological the vital and central nervous vital, the gross

physiological in regard to the Swami's vision of the yogic centres in the central axis of the spinal column (with its extension in medulla oblongata), and particularly with reference to Swadishtana in the lower abdomen, Nabhi the navel in the central abdomen, and Anahata in the region of the heart.

## 10. Part-II-Psychological, Vital and Physiological Nervous System as Visioned by Swami Ramalingam

(NOTES ON CHAPTER 9 - PINDANUBHAVA LAKSHANA)

Notes on items numbered in para A (on Swadishtana Centre): see the text of Pindanubhava Lakshana under chapter nine.

1. In the gross physical body the square receptacle (sac or pouch) would signify the seminal vesicle along with the prostate gland. As it is said to be two and half inches above the sex organ of man, the yogic centre referred to is Swadishtana, which lies in the depth at the centre of the lower abdomen. However, the said receptacle is connected with the Hypogastric plexus (of the navel region) through its main nerve of a similar name i.e. Hypogastric nerve. Mooladhara yogic centre lies below Swadishtana in between sex organ and anus but in the depth there-at. But the said Hypogastric plexus and the beginning part of its connective nerve which innervates and controls the seminal receptacle below, lie in the region of Nabhi, the navel. In the succeeding para B, Swami Ramalingam observes that a nerve descending from the navel region dips down into and floats over the vapour content of the seminal vesicle, and so, this *nadi* or nerve would evidently be the same as the hypogastric nerve. The Swami uses the term *nadi* or nambu to mean a nervous plexus or ganglion or a nerve trunk or nerve according to the context and the descriptions connected with it or thereunder. The real Yogic centres, particularly the centres below the Ajna, may be taken as lying in the central axis of the spinal cord (or rather the spino medullar column) and each may be identified with the centre of the respective segment of the spino-medullar cord (spinal cord here viewed to include the medulla oblongata) and thus the presiding psycho-physical power, here named as a god may be taken as ruling and regulating the function in the respective region, of the spino-medullar column, covering also a few adjacent spinal segments above and below. Thus Brahma ruling over the Swadishtana Yogic centre has rule and control over the hypogastric plexus formed from and connected with the centre of the concerned spinal segment which is however not separated from but connected with the other immediately adjacent segments above and below, and in fact through them with the whole central nervous system which is at once psychological and physiological. It is also understood that the nerve fibres enter into or terminate in the walls of blood vessels, arteries, veins and lymphatic vessels and also in the visceral or internal organs and glands.
2. In the above context the seminal vesicle ruled over by the creative power of Brahma is properly called 'Manasa Thatagam', the pool of psycho-physical creation. Brahma is the god of creation or the creative power both in man and woman. The heat of creation is conveyed through a nerve and this heat called Moolagni is said to be carried by the (hypogastric) nerve descending from the navel (or rather from the hypogastric plexus) and floating over the seminal receptacle so as to form or create the golden vapour. In para E it is said that this nerve of creative heat (Moolagni) is connected with the nerve of causal heat (*Karanagni*) of the heart region (i.e. the Yogic centre of heart and its

nervous cardiac plexus) through the intervening nerve of digestive heat (*Udaragni*) of the upper abdomen (i.e. coeliac plexus, two and half inches above Nabhi, the navel). A connective nerve from the coeliac plexus innervates, controls and regulates the Receptaculum Chyli (*Ksheerabdi*). Thus *Moolagni*, *Udaragni* and *Karanagni* are respectively ruled, regulated and balanced by the gods or powers namely Brahma, Vishnu and Rudra.

It is seen that Brahma, Vishnu and Rudra have each its or his respective Yogic centre in the central spinal axis but with the extension of its control on the nervous plexus formed so as to serve its area or province and that the plexus is located outside the spinal cord, a little above such Yogic spinal centre. The Yogic centre and its corresponding nervous plexus would thus vary in respect of their physical locations. Swadishtana which is the lower abdominal yogic centre of Brahma (in or about the region of the seminal visicle) has its extended power of control over the hypogastric plexus which is physically located in the navel region but formed and connected by all the lumbar spinal segments L-1 to L-5, and its main nerve namely the hypogastric nerve controls the regulation of the ejection of seminal fluid from “*Manasa Thatagam*” the seminal vesicle. The said ejection of semen is unlike micturition, a psycho-physical act. So too the navel or the central abdominal yogic centre of Vishnu called Nabhi centre or Manipuraka which is exactly in the depth of the umblicus (Nabhi) has its extended power of control over the coeliac plexus (familarly known as solar plexus) which is physically placed in the upper abdominal region (where Cistern Chyli the *Ksheerabdi* lies) but formed and connected by the thoracic spinal segments, more especially by T-5 -to T-12. The yogic heart centre of Rudra called Anahata (here the physical heart is not meant, but its controlling centre formed in the central spinal axis, in the depth at the lower end of sternum) has its extended power of control over the cardiac plexus which is physically placed in the arch of aorta over the heart, but formed and connected by the upper thoracic and lower cervical segments of the spinal cord, more especially by T-1 to T-4 and C-6 to C-8 so as to serve the innervation of heart and lungs and their regions. The yogic centre of Maheshwara in the throat is called Visuddhi and it is in the central spinal axis in the depth at the upper end of sternum and its power of control extends to the cervical plexus. The yogic centre of Sadasiva is at uvula (*lalana*) in the upper throat in the central spinal axis. The yogic centre of Bindu is centralised in the depth of the middle of the forehead and it is called Ajna and this has its lower base in the mid of the eye-brows.

It is considered as the birth-place of prana, the vital life-energy with its inward and upward current of air. The cranial nerve Vagus controls the breath and it emerges from the upper medulla oblangata (i.e. the lower Ajna) which has a centre for respiration. The yogic centre of Ajna proper may be taken as in the thalamic region above the mid brain but in communication with the higher divisions of the cerebral brain on the one hand and with the spinal cord through the brain-stem (mid-brain, pons, cerebellum and medula oblangata) on the other until its sway and directive impulses (afferent and efferent) reach every part of the body including the internal and external organs and glands and finally terminating in the sacral or pelvic region of Mooladhara where the downward and outward current of air (*apana*) rules and has its play. Ajna is

the bee-hive of all functions and activities, mental, vital and physiological, and is the nexus of the cerebro-spinal system, though Ajna is generally said to be located in the inner depth of the mid point between the eyebrows. Its real centre of field lies above, in the depth, of the middle forehead (i.e. in the thalamic region, containing thalamus, basal ganglia and internal capsule). In the mid of the eye-brows the white lotus of the Ajna (i.e. its white pericarp) with two white petals is seen in yogic vision. However Ajna may be taken to extend medially from the medulla oblongata (after the level of decussation by formation of pyramids) to the cerebral cortex, but its real centre of operation lying in between i.e. in the thalamic region.

Thus we have six centres according to the yogic centres given in the Swami's passage (see para H) when reckoned from Swadishtana to the Bindu centre of Ajna which is dealt with in more details at the end of the chapter. Mooladhara which here seems omitted to be enumerated – though mentioned elsewhere, in his Upadesha (under “Subramanyam and Arul Neri” where Mooladhara is included but uvula centre omitted) may be taken as coming also under the rule of Brahma and this yogic centre has its control over the pelvic or sacral plexus, formed by the sacral spinal segments S-1 to S-5 and the coccygeal. In some texts of yoga literature, Mooladhara is said to be governed by god Ganapathy. This also seems proper as Swami Ramalingam associates Ganapathy with the para sympathetic nervous system with its upper end in the medulla oblongata (source of vagus nerve) and lower end in the sacral segments of the spinal cord.

3. The reference to the lotus flower is an Yogic experience that takes place in the central axis of the spinal column at the yogic centre of the respective spinal segment, as already referred to above. The vision lotus of flower in its blossomed form (i.e. the vision of its pericarp and petals) arises due to the (nervous) vibrations in the depth of each yogic centre from Mooladhara, the spinal base, onwards. The lotus is seen with differing number of petals – four in the Mooladhara, six in Swadishtana (lower abdomen), ten in the navel or Nabhi (umbilical centre), twelve in the heart centre of Anahata (in the depth at the lower end of sternum), sixteen in the throat centre Visuddhi (in the depth at the upper end of sternum) and two in the Ajna in the inner depth at the middle of eye-brows. In the Sahasrara at the top of head the petals become innumerable and is said to be of the order of 1000 or 1008 petals (approximately to the permuted result of 33 vertebrae or 31 spinal segments).

Here in para A of the Swami's passage, the number of petals is not given. It relates to the Swadishtana centre. However a physiological formation appearing like a more or less round pericarp of lotus can be seen (see the above diagram) in the white matter of the spinal cord on both sides symmetrically (see the marked configuration II therein). The configuration marked as II represents the descending pathway of the pyramidal tract through the length of the spinal cord, with its connective efferent fibres from the motor zone of the cerebrum, which is the highest part of the brain. It is called the lateral cortico spinal tract. As the yogic experience of the lotus i.e. of its pericarp occurs centrally in the spinal column, it is understandable that the symmetrical configurations on both sides of the cord is possibly seen centrally

as one configuration, when the yogic consciousness awakens at a particular yogic centre or ascends or descends through the central spinal axis. The differing even number of petals seen at each yogic centre may possibly be due to the other configurations at the fringes of the white matter (for e.g. see marked areas X, VII, IX, VI, IV, XII etc.) of the spinal cord which may be grouped as the various ascending tracts on both sides of white matter formed by the afferent fibres. Thus the inner configuration of the descending tract (marked II) might give the psycho-physiological vision of the pericarp of the lotus flower whereas a number of the outer configurations of the ascending tracts (especially those marked X, VIII) that of the petals of the flower which would vary in number at the respective important segment of the spinal cord where a yogic centre lie. More properly, the varying even number of petals seen might be also due to the vibration or radiation of tracts X and VIII, in the adjacent spinal segments, above and below, which are connected with the segment at the yogic centre. Or the vision of petals might be due to the vibration of the outer trunk of nerve fibres of lateral cortico spinal tract (marked II) which progressively diminishes in size till it becomes thin at the sacral end. Thus we get three orders of experience at the Swadishtana centre (1) the physiological in the form of square receptacle of seminal fluid, (2) the psycho-physical as the form of the round lotus-like bud (or pericarp) with its petals at the yogic centre of the concerned spinal segment and (3) the purely psycho- spiritual or psycho-yogic as the form and creative force of god Brahma, who is associated with the creative heat of a rarefied vapour meant for a physical creation of man. At each yogic centre we would get similar but characteristic triple order of experiences.

4. Notes on item 4 have already been given under the text of para A.

Notes on items numbered in para B, C and D (on Nabhi Centre):

1. Hypogastric nerve, which starts from the hypogastric plexus (i.e. pre sacral plexus) in the navel region, goes down to connect with the seminal vesicle, the said plexus and the vesicle being under the rule of Brahma, the god of creation, whose substance or vapour of heat is golden in color. He rules the lower lumbar and sacral regions.
2. Vishnu, the god of vital power of maintenance balancing the fire of hunger and thirst (*Vadavagni*, *Udaragni*) without excess and deficiency, rules and presides at the Nabhi or navel yogic centre. He is the god of waters of nutrition such as the blood, lymph and fluids and he is green in color. The substance energy of this power is said to be green (possibly light green) which may be taken as the characteristic color radiated by vibrations of the relevant spinal segment of the nabhi or navel yogic centre, along with its nerves and plexus. In the books on neuro-anatomy, the photograph of spinal cord shows even physically the green color of spinal nerves in the spinal segments of this region and of the region of heart i.e. between T-1 and L-1 or L-2. The Nabhi centre is concerned with the control and regulation of the receptaculum chyli (*ksheerabdi*) formed in the lower part of the thoracic duct, which is the main lymphatic vessel. *Ksheerabdi* is situated in the upper abdominal region.

3, 9 and 10:

Ksheerabdi may be taken as the receptaculum chyli which is a reservoir or receptacle of the lymph drained from the stomach and intestines and from the lumbar-sacral region and the lower limbs. However it forms the lower part of the thoracic duct which is the main lymphatic vessel for the upward flow of the lymph and for its final emptying into the superior vena cava of the heart through a subsidiary vein formed at the junction of the left internal jugular and subclavian veins. Though the receptacle is said to be square, the film formed over the milky lymph is of the form of leaf of the banyan. According to medical science the Cistern Chyli (Ksheerabdi) varies considerably in its mode of formation, its size and its placement. Variations of the thoracic duct are fairly common. "Islands" may occur in the course of the duct and sometimes two fairly large ducts will parallel each other for a distance. The Swami observes that there is another receptacle on the right side of Ksheerabdi. This is possibly another extension of the cistern chyli (i.e. receptaculum chyli) on the right side where intestinal lymphatic trunk, carrying the rich fatty lymph from the intestines, and the lumbar lymphatic trunk carrying less rich tissue-lymph join. The Swami has further said that the right receptacle is a container of heat of the digestive system and draws up the essence of food (i.e. particularly the fatty lymph of the intestines, the fat being considered by the Swami as very important) leaving the residual waste for elimination on the left side. Thus it balances the heat of digestion (*udaragni*) without excess or deficiency. Possibly this balancing of heat is because of the joining of the fatty rich intestinal lymph and the less rich lumbar lymph from the tissues. Ksheerabdi and its right receptacle are said to lie in the inner depth, two and half inches above the umbilicus (*nabhi*). So, they are placed in the upper abdominal region i.e. near the coeliac plexus of nerves, though their control and regulation is by the yogic centre of *nabhi*, the navel with its presiding power Vishnu. Thus the province of Vishnu may be roughly taken as the abdominal region between the coeliac and hypogastric plexuses, but with its yogic and central nervous regulation being located at the *nabhi*.

4 and 5:

The nerve said to be formed with a round head over the film of lymph of the ksheerabdi would signify the form of a plexus (with its net work of nerves) formed two and half inches above the navel. This is characteristically described as the roundly spread hood or head of a conscious coiled serpent (*kundali vatta seshā nadi* or simply *kundali vatta nadi*). So it is to be considered as essentially connected with or representing the sinuous or serpentine form of the spinal cord (see in the above figure the three sinuous formations of the spinal cord in respect of its grey matter, the surrounding belt of the intersegmental connecting nerves and the farther belt of white matter. The three sinuous belts may possibly correspond roughly with the three and half coils of the *kundali* serpent spoken of in the yoga literature). Here as the nerve is said to be the formation of greenish substance energy of Vishnu with its inner causal substances of yellow, red and golden colours respectively in its posterior, medial and anterior levels, we have to take it as a plexus of three sets of nervous fibres which serve to innervate the cistern chyli. This plexus is

evidently the coeliac plexus, formed above the navel centre. If it is a mere peripheral or connecting nerve, it may be simply described as a *nadi*, but not as kundali vatta *nadi* - a term which suggests its connections with the spinal cord. The three sets of fibres are seen in their respective colours of yellow, red and golden, possibly because of the respective vibrations of (1) the direct or primary afferent fibres (from spinal ganglion) (2) pre and post ganglionic efferent sympathetic fibres and (3) pre and post ganglionic efferent parasympathetic vagal fibres contained in the said plexus of green color, in its posterior, medial and anterior levels. The said three sets of fibres have their causal cells or nuclear cell substances in the grey matter of the spino-medullar cord where also possibly their respective nuclei are seen in the said order of light colours because of their different frequencies of vibration though all of which resulting in the formation of the light greenish substance energy of Vishnu particularly at the navel centre of spinal axis. Possibly the light bluish tinge of their respective white matter also got mixed up to produce the said green color. Green is obtained by mixing blue and yellow or the golden. Further, the spinal nerves emerging in the abdominal segments of the spinal cord appear greenish. It is understandable that the substance-energy of the nutrient cells in the grey matter of the spino-medullar cord (which is essentially indicated by the term “Kundali Vattam”) would appear in different colours in different zones or segments of the cord and also produce or emit combination colours by the different living energies of nervous impulses due to mental, vital (including nervous vital) and physical impetuses or excitements. Therefore it is evident that there should be a play of different light colours in the grey matter of the brain and spino-medullar cord. The grey color itself may be treated as a combination of all colours including light black. White is seen by adding the three fundamental color lights – red, blue and green lights. Thus red and blue result in the purple; blue and green in the bluish green; red and green in the yellow; red, blue and green in the white. Black is obtained by subtracting from white, the said resultant colours of purple, yellow and bluish-green. We may also give a more grossly physiological explanation for the three causal substances of golden, yellow and red colours of the green plexus of nerve, which are incidentally named Bhu Devi, Sri Devi and Neela Devi. Neela Devi means bluish goddess. Bhu Devi, the goddess of the earth, would signify the golden or rather golden red substance. Sri Devi would look yellowish. Therefore the said three colours may be properly associated thus: Bhu Devi with the golden or golden red, Sri Devi with yellow and Neela Devi with blue, but in the context as bluish red. Now the three colours would largely indicate the three kinds of vessels namely arterial, lymphatic and venous vessels which are innervated and regulated by the connective nerves supplied by the coeliac plexus (in the region of the receptaculum chyli which is the lower part of the great lymphatic vessel namely the thoracic duct). As in the medical science, lymph is considered light yellowish venous blood bluish red in color and arterial blood bright golden red in color we may identify them in the context as the respective contents of the lower lymphatic thoracic duct (in the region of ksheerabdi or receptaculum chyli), azygos vein on the right, and abdominal aorta on the left side.

The cistern chyli (ksheerabdi) is the lower expanded part of the thoracic duct. It is a sac or saccular dilatation in the lymphatic route, which drains the lymph

from the abdomen and lower limbs. It lies in the upper part of the abdomen behind the right side of the abdominal aorta, but usually in front of the two upper right lumbar arteries and the right lumbar azygos vein (and hence also behind the inferior vena cava). Thus on its front and back lie the large arteries and veins with their flowing but different colourful contents of causal substances. The total resulting color of green is seen because the comparatively large arteries and vein (in front and back of it) are themselves light green, in their outer appearance. Possibly the lymphatic vessel itself (here the sac) is also light greenish in its outer appearance. Green is the color of vital energy and represents the flow of energy and, the flow of the colourful causal substances - light yellowish lymph, golden reddish arterial blood and bluish red blood of the veins.

We may also point out incidentally that Swami Ramalingam in his *Peru Vinnappam* speaks of several kinds and colours of nerves such as the small, big, white, red, green, etc. (while and yellow also referred to in his *Upadesha* in regard to the nervous tissues or substances in the depth of the Ajna Yogic centre in the forehead), the many kinds of brain such as Omkara and Aankara (possibly the form of brain in the head is after the form of Tamil Letter ஔ and that of spino-medullar cord in the form of vertically inverted letter ஐ), the many kinds of fluids (amrita) such as in the head and at the waist (possibly the cerebro-spinal fluid in the head and in the spinal canal), the many kinds of lymph (sukla) such as in the upper and lower body (i.e. the lymph of the receptaculum chyli in the thoracic duct, and the seminal fluid which is also a kind of lymph) - apart from the several kinds of skin, muscles, bones, blood, etc. each of which being named specifically, and the several kinds of internal and external organs with their locations, functions and effects (mentioned in a general way). The Swami also mentions the five important colours - white, red, green, golden and deep blue - which have permuted themselves to form 25 shades of combination-colours and enter as the ingredient of the cells of the body. The different and characteristic colours of the bodily cells are seen by the Swami in his vision, possibly due to their characteristic vibrations (especially in regards to the nerves) or because of the color becoming constituent part of the respective cells. He has also seen the living sperm and the ovum (the male-child-fertilising ovum and the female-child-fertilising ovum) in their natural living conditions in the human body and in their combination in fertilisation (see *Peru Vinnappam* and *Upadesha*).

However, as we are here concerned with the nerves, his reference to white nerves may signify the white matter of the brain and spinal cord as formed by the white nervous fibres of axons. The red nerves may include the red nuclei of the mid-brain. Green is seen as the color of spinal nerves emerging from the spinal cord in the thoracic and lumbar regions, and a shade of golden red in those of the sacral region. As the white axons have their nuclear cells in the grey matter of the brain and the spino-medullar cord, they may appear in different colours in the different zones or segments, according as the different frequencies of their vibrations give rise to shades of light colours such as light golden, light yellow, light green, red, blue and other hues, or according as the color of the nuclei of nerve centres in the brain to and from which they ascend and descend (for e.g. the red or pinkish red nuclei of the mid brain has its

descending tract in the spino-medullar cord, called Rubra-spinal tract. See the above figure and the region marked III). The Swami, in para G of the text in Ch. 9 refers to the bluish (possibly light blue) nerve trunk of Ganapathy (i.e. of the para-sympathetic trunk) and the many-hued nerve trunk of Subramaniam (i.e. of the sympathetic trunk). He has also elsewhere referred to the yellow nervous substance in the depth of the Ajna.

6, 7 and 8:

It is said that a bifurcated or two-branched nerve is formed from the said Kundali Vatta *Nadi* (i.e. from the coeliac plexus), one branch going upward and the other downward. This evidently refers to one of the coeliac ganglia which are paired ganglia lying in the lateral parts of the coeliac plexus and it serves as the junction for the upward and downward going splanchnic nerves. Therefore, the bifurcated nerve apparently refers to a coeliac ganglion into which thoracic splanchnic nerve joins from above and from which lumbar splanchnic nerve starts and goes downward. Splanchnic nerves are formed in the thoracic, lumbar and sacral regions on both sides of the sympathetic trunk; here they are formed from the sympathetic coeliac ganglia. We may note that the splanchnic nerve (or visceral nerves) and their net work accompany the main blood and lymphatic vessels. They innervate the vessels and the visceral organs on the way. Therefore it seems that the Swami in his vision sees that because of their innervation of the receptaculum chyli (the lower part of the lymphatic thoracic duct), the lymph is seen to move upward in the duct and the moving substance appears greenish, indicating the life-giving or nourishing substance of the intestinal fatty lymph and that the lymph seen coming from below (i.e. from the lower lumbar region and the lower limbs) is devoid of or less rich in its substance and appears yellowish. Lymph is a light yellow fluid like plasma and it is drained from the tissues, but lymph from the intestinal area is a white milky fluid perhaps light bluish white. In the thoracic duct the mixed substances might give a light greenish appearance. Yellow and blue when added gives green.

The downward - going splanchnic nerve of the lumbar region (see item 7) is said to join the hypogastric plexus of the lower abdomen and from the latter the hypogastric nerve carrying the heat of creation (*Moolagni* of Brahma) proceeds downward to innervate the seminal vesicle.

9 and 10:

We have already explained these under the notes above on the conjoint items 3, 9 and 10. We have to only add that the extended receptacle on the right side of the receptaculum chyli (*Ksheerabdi*) is a container of digestive gastric or abdominal heat of Vishnu (*Udaragni*) and the *Ksheerabdi* itself is said to be connected above with the receptacle of causal heat in the region of heart (*Karanagni*) - possibly the physical counterpart or the heart of blood is meant - through a connecting nerve which is evidently the thoracic splanchnic nerve innervating the heart. Likewise *Ksheerabdi* is connected below with the seminal receptacle or vesicle through the lower lumbar splanchnic nerve, its extension being called the hypogastric nerve farther down, as it passes through

the hypogastric plexus. The hypogastric nerve is said to be the carrier or vessel of the creative heat (*Moolagni*) of Brahma.

Notes on items numbered in paras E and F: I of E; 4 and 5 of F:

Two and half inches above the *Ksheerabdi* of the upper abdomen is a receptacle in the region of the heart. It looks like a blossomed plantain-flower (i.e. the inner white flower-bud appearing bulged at one end and conically tapering at the other end). It is white in color and full of the causal heat of its most rarefied vapour (*Karanagni*). Possibly its form and color would correspond with the configuration of the afferent nerve fibres in the white matter of spinal cord which serve as the tract of impulses ascending through the spinal cord and the brain stem to the thalamic part of the cerebrum which is concerned with the sensation of heat and regulation of temperature of the body. This tract is called the spino-thalamic tract and the configuration of its trunk of white afferent fibres would look more or less like the plantain flower. See the configurations numbered IX and VI (ninth and sixth) in the above diagram of the cross-section of spinal cord. They are the lateral and ventral spino-thalamic tracts. Either VI or both VI and IX together appear like a plantain flower on either side of the white matter. The nuclear cells of these afferent fibres lie on the opposite side in the posterior (or dorsal) horn of grey matter of the cord. From there the fibres cross medially near the central spinal canal to the opposite side of white matter. The above explanation is by way of correlation as to form, color and function (i.e. heat), in the spinal nervous system.

Now at the gross physical level, there is another parallel correlation. The said receptacle of causal heat would correspond with the right heart or more particularly with the right atrium or auricle which in its outer formation looks more like a plantain flower. In the next para F, the Swami observes that to its left there is another receptacle or sac (bag) of green color (the color possibly referring to the endothelial or outer membrane of the heart) which looks almost like a lotus flower i.e. like its round pericarp. The heart excepting the right atrium would almost appear round like the pericarp of lotus. Though the Swami does not specifically mention the two receptacles as the right and left heart of blood, the context seems to suggest them as the physiological parts of the heart apart from a similar psychological vision of configurations in the central spinal nervous system - the configurations II, or III appearing like lotus bud and that of IX and VI together appearing like a plantain flower (see diagram)

The appearance of white color of right atrium or auricle might be due to the comparatively thin endothelial and muscular layers of its sac, and the green color of the rest of the heart due to the thicker walls of its sac. The causal heat (*Karanagni*) of the right receptacle or atrium would be evidently related to the automatic motive force of impulse of the neuro-muscular tissue called sino-atrial node of the right atrium. This node is often spoken of as the pace-maker of the heart. It works by itself-that is, without any extraneous stimulation (even if removed from the body), but its rate and intensity of heat in the living human body is slowed or accelerated respectively by the vagus (para-sympathetic) and the sympathetic nerves which innervate it (the said node) through the cardiac plexus. The para-sympathetic and sympathetic nerves, (*Ganapathy* and *Subramaniam*) have different rates of vibration. The Swami refers to their differential vibrations as 62 and 40 matras respectively (see para G) in their

normal conditions of working. Extraneous stimulation given to them possibly makes them react in the opposite way. The Swami further mentions that there is a connecting nerve between this right receptacle and the left and it regulates the balancing of the causal heat without excess or deficiency. This evidently refers to the atrio-ventricular nodes and the “bundle of His” (with its left and right branches) which innervate the septum of the left and right ventricles and the left auricle so as to carry the impulse of the sino-atrial node of the right auricle to these parts. In effect this results in the pumping of the chambers of the heart and the circulation of blood. The Swami’s reference to the two divisions of heart (the right atrium and the rest of the heart) is simple and meaningful as it seems based on the working of the said neuro-muscular nodes. Possibly it is due to the rarefied vapour of heat inherently present in the sino-atrial node (or generated by its vibrations) that the right atrium or receptacle looks white in color. Psychologically and spiritually the heat of the flame of soul is sensed in the inmost depths of the yogic heart centre. This is the real causal heat which is translated at a lesser depth as the warmth of emotions of love and feelings of kindness and at the nervous vital level as the heat of the afferent fibres of spino-thalamic tract and at the gross physical level as the heat of the automatic impulse of the sino-atrial node; and by this impulse the heat is sought to be distributed through the circulatory system of blood and lymph through the heart and its blood and lymphatic vessels involving also at the same time the respiratory circulation and movements of the lungs which started at the time of birth the entry of soul in the formed living body of the child, possibly through the soft membranous and pulsating part on the head (fontanelle). The ancient Yogi Tiru Moolar refers to the entry of soul with the Prana into the head (Tirumantram 2764, 576, 645).

We may point that the heart muscles contain profusely mitochondria which are the constituent parts of cells playing vital role in cellular metabolism. Mitochondria conducts the aerobic respiratory process of the cell, providing energy transformations in the nutritive, substances brought to the cell and this is done through enzymes of the cell by liberating hydrogen and passing it along the respiratory chain of the cell and coupling it with electron transport before it mixes with oxygen finally to form water. Thus hydrogen and its electron play active part in cellular respiration and metabolism. It is considered by the medical science that the sino-atrial node of muscular tissue is automatically excited into rhythmic vibration possibly because of the play of H ions and not because of the nerve fibres, which is based on the fact that the heart beats of the foetus begin even where there are no nerves or their fibres in the heart as yet.

This causal (physical) heat is said to be kept in balance by the two receptacles of the heart (of blood) i.e. through the cardiac plexus of Rudra which supplies nerves to the sino atrial and ventricular nodes, and the digestive heat similarly being kept in balance by the two receptacles of lymph (Ksheerabdi) and its right extension in the upper abdomen) i.e., through the coeliac plexus of Vishnu which innervates them; and the creative or procreative or reproductive heat being balanced by the receptacle of semen in the lower abdomen or pelvic region i.e. through the hypogastric plexus and the pelvic or sacral plexuses of Brahma. (See paras D and E).

Notes on item 6 of para F:

The connecting nerve that serves to link the receptacle of heart containing the causal heat of rarefied vapour (i.e. the right atrium) with the receptaculum chyli below

(i.e. the Ksheerabdi of the upper abdomen) by innervating them both so as to regulate the movement of lymph of the Ksheerabdi. (part of thoracic duct) finally into the former the right atrium, is evidently the splanchnic nerve that runs through the thoracic and lumbar regions. It has its connections with the cardiac plexus above in the thoracic region of heart and with the coeliac plexus below in the lumbar region of the Ksheerabdi. This has also been explained under notes on paras B, C and D.

Notes on Para G: Items 1 to 4; 5 to 7; 8 and 9:

Kundali Vatta *Nadi* which is said to be formed in the receptacle of causal heat (i.e. in the right atrium of heart) with its three branches may be taken as the cardiac plexus which distributes to the sino-atrial node three fibres namely (1) direct or primary afferent fibre (from the spinal ganglion) (2) Post ganglionic sympathetic efferent fibre (from a sympathetic ganglion) and (3) the post-ganglionic parasympathetic efferent fibre of the vagus nerve (from its parasympathetic ganglion). As said before the Swami uses the term *nadi* or nambu to mean nervous plexus or ganglion or nerve trunk or a nerve fibre or nervous cell and issue according to the context and description. But the use of the term “Kundali Vatta *Nadi*” clearly suggests its connection with the spino-medullar cord.

The Swami further observes that two more additional branches which are more basic are found in the said Kundali Vatta *Nadi* i.e. in the cardiac plexus, one on the left which is six-formed or six-divisioned and the other on the right which is five forked or five divisioned. The Swami here traces the sources of the said two post-ganglionic efferent fibres of the sympathetic and para-sympathetic systems to their respective proganglionic fibres which also intermingle in the said cardiac plexus. However the Swami, in so doing, links up the preganglionic vagal fibre with the whole para-sympathetic system which ramifies and innervates the body (particularly the smooth muscles and internal organs) through its five-fold divisions (i.e. the four cranial nerves numbered and named as the oculo-motor (III) the facial (VII), the Glosso-pharyngeal (IX), the vagus (X), and the sacral nerves of the spinal cord). Similarly he visualises the whole sympathetic system with its six-fold trunk by and through the said pre-ganglionic sympathetic fibre. The six division of the sympathetic trunk may be indicated by the ganglia formed in the six regions namely throat, chest, upper, middle and lower abdominal regions and the pelvic. The vagal and sacral nerves of the parasympathetic serve these zones correspondingly, and the former (i.e. the vagus) innervates and regulates all the smooth muscles, visceral or internal organs and glands and the main blood vessels and lymphatic vessels (1) in the respiratory tract of the lungs, (2) circulatory tract of the heart, (3) the digestive tract of the Oesophagus, stomach, pancreas, liver, etc, and (4) the assimilative intestinal tract with its connections to the receptaculum chyli, while the latter (i.e. the sacral) serves (5) the eliminative and ejaculatory tracts of seminal vesicle, bladder and rectum. The vagus, along with the facial and glosso-pharyngeal nerves (cranial nerves) originate from the medulla oblongata, whereas the oculo-motor nerve from the mid-brain.

According to the Swami, the right-sided five-forked nerve is called Ganapathy and this may be identified as the para-sympathetic trunk. The Swami observes that it is formed on both sides, right and left and it is constantly vibrating, because of which the causal heat of the heart (the right atrium with its sino-atrial node) is maintained. Again this nerve trunk is said to have an underlying nerve as its base, a blue (possibly

light blue) coloured nerve which goes downward. Evidently, this blue (Krishna Varna) nerve represents the afferent trunk of fibres of the para-sympathetic, particularly the Vagus, which accompany its efferent fibres throughout, from the medulla oblongata down to the sacral end where its afferent and efferent fibres join with those of the para-sympathetic sacral nerves of the spinal cord. The para-sympathetic trunk (Ganapathy) is said to be formed on both sides, right and left, with its functional principles or knowledge and action (buddhi and siddhi), i.e. here in the sense of sensory and motor fibres or afferent and efferent fibres. The Swami further adds that the rate of vibrations of Ganapathy is 62 matras per unit of time and it is greater than that of the sympathetic trunk (Subramanyam) which is 40 matras only. This conforms broadly and generally to the discovery of medical science in regard to their differential vibrations. Both the trunks, Ganapathy and Subramanyam are said to be co-ordinating systems and they are considered as brotherly gods born of Rudra of the yogic centre of heart. Thus it is evident from the Swami's observations that the spino-medullar nervous system, and through it the whole of the central nervous system, can be easily felt and identified by having an entry or access into the depth of the Yogic heart centre which has an immediate physiological control over the cardiac plexus and through it also the regulation of the respiration and blood-circulation.

Though the para-sympathetic (Ganapathy) trunk is clearly stated by the Swami to be on both sides, it is taken by him for all practical or functional purposes as a right-sided trunk (or to put a modern term, right to left or anti-clockwise nervous system). Similarly the sympathetic (Subramanyam) trunk is taken by him as a left sided trunk (i.e. left to right or clockwise nervous system) though it also has its trunk on both sides which is implied in the context, though not specifically mentioned. Ganapathy and Subramanyam may be considered as anti-clockwise and clockwise, and are usually associated respectively with sun and moon. Now coming to the sympathetic (Subramanyam) trunk, the Swami observes that this too has an underlying nerve at its base which is of many varied colours. This evidently refers to the afferent trunk of fibres of the sympathetic system, i.e. the visceral afferent fibres which are formed by cells in the lateral grey horns of the spinal cord and found accompanying the efferent sympathetic fibres. This underlying nerve, or nervous vehicle so as to say, is called Mayuram, the peacock, possibly because of its varied colours. This nerve by its function keeps in order 72,000 nerves i.e. without allowing them to become excessive or deficient in their workings and hence it is called Senapathy, the Commander, Possibly the 72,000 nerves refer to the important nerves of the whole nervous system. It is found by medical science that the impulse of excitation in the sympathetic fibres extends and spreads into the whole of that system and hence through such vibration it influences reflexly or directly the Para-sympathetic as well as the central nervous system of the spino-medullar cord and the brain. The sympathetic and para-sympathetic are considered to have co-ordinated functions even according to Medical science, and the Swami considers Ganapathy and Subramanyam as brothers, born of Rudra who represents the Central nervous system.

Notes on para G (contd.): See items 2, 3 and 4:

Now coming back to the first part of Para G, we have already seen that the three divisions of nerves passing through the cardiac plexus, namely the direct afferent, the post ganglionic sympathetic and the post ganglionic para-sympathetic are respectively represented at their sources (1) by the direct afferent fibres of the

spino-medullar cord (its direct efferent fibres being also included) which by its functional name is called *Agni* (the central Fire or Heat) of the central spinal column (2) by the efferent fibres emerging out from the spinal cord to form the sympathetic trunk (including its afferent fibres from the lateral horns of the cord) which by its functional name is called here as Chandra the Moon and (3) by the efferent fibres like the Vagus emerging out from the medulla oblongata (including its afferent fibres) and those from the sacral segment of the cord forming together the para-sympathetic trunk which by its functional name is known as Surya, the Sun. The said three are also respectively known as Sushumna, Ida and Pingala in the general Yoga literature. Sushumna is at the centre. The Ida, and the Pingala are on its left and right sides respectively.

We have already seen that the sympathetic and parasympathetic trunks, though each existing on both sides, are taken functionally as the left handed or left sided (Ida or Moon) and the right handed or (Pingala or Sun) respectively.

This is made clear in another passage of the Swami's Upadesha where it is said that the positive and negative workings of consciousness such as conscious remembrance by thought and its forgetfulness (similarly creation and destruction, birth and death, concentration and distraction etc) arise to the being (*jeeva*) when moved by the respective *vayu* or current of air (or vibration of vapour) from the right-sided sun (Pingala) and from the left sided moon (Ida) respectively. Therefore, the flow of current of *Vayu* is from right to left and from left to right respectively. The Swami makes it clear that the positive workings of consciousness are effected by the sun becoming active or dominant when at the same time the moon remains conjoint with *Agni* (Sushumna). The negative workings or consciousness are effected by the moon becoming active or dominant when at the same time the sun remains conjoint with *agni*. In effect this means that Ida or Pingala (moon or sun) cannot function unless in conjunction with Sushumna (*agni*) which is the central nervous system through the spinal cord. *Agni* is the central heat of the spinal cord. In another passage the Swami explains remembrance and forgetfulness thus: The being (*jeeva*) remembers things, when moved by the current of *vayu* from the sun side of *Agni*, and forgets when moved by the current of *vayu* from the moon side of *Agni*. However in several passages in Upadesha the Swami has stated the experience of the true sides of sun and moon which are just a reversal of the commonly accepted and considered right side for sun and left side for moon. "What are commonly considered or seen as the right side for sun (the male the Siva) and left side for moon (the female, the Shakti) are wrong and change the sides in the true inner experience i.e. the true side of the moon is on the right side while that of the sun on the left." To avoid confusion about the sides, we have adopted in this book the usual and commonly accepted right side for the sun and left side for the moon. Thus Ganapathy becomes associated with or identical with Surya the sun, and Subramanyam with Chandra the moon. Sun is again associated or identified with Brahma; the moon with Vishnu and *Agni* with Rudra (see Upadesha). Thus creation, birth, consciousness remembrance, concentration, inward and upward current of life-force and air movement (prana) etc. are associated with the solar or right-handed (i.e. right to left or anti-clockwise) nervous force. Destruction, death, unconsciousness and sleep, forgetfulness, distraction, downward and outward current of life-force and air movement (apana) etc. are associated with the lunar or left handed (i.e. left to right or clockwise) nervous force. Both co-ordinate and keep up the over all balance of forces within the human

system, psychologically as above said and physiologically as in the circulation of blood, respiration, digestion, assimilation, elimination and reproduction. This balancing of nervous forces is effected, through and in conjunction with *Agni* represented by the central spinal-medullar column. The basis of this balancing is the inner causal heat of life at the yogic heart centre translated as the inner currents of life through the inner prana and apana and outwardly as the outer inhalation and exhalation. The inner and outer prana is represented at Ajna centre, in the mid of the forehead, and the inner and outer apana at the Mooladhara in the pelvic region. The two are the upper and lower poles with a potential difference of force that prevails in every part of the body to keep the balance between life and death, inspiration and expiration, arterial and venous circulations, assimilation and elimination, health and disease, consciousness and forgetfulness, and so on. When the balancing is effectively disturbed death results. God of death is said to abide on the left side of *anus* in the pelvic zone (see Upadesha on pindalakshanam). When one's consciousness or conscious existence is centrally poised in the central axis of the spino-medullar column or rather the cerebro-spinal column or at the sahasrara, the top of the head, both the said dual aspects or currents can be balanced continuously and in all respects-in the physical, vital and mental levels of one's existence. That is the blissful spiritual or Yogic life, when one is said to be equipoised and comes to live and breathe centrally in Shushumna, the central spinal column represented by *Agni*. (see the Swami's Upadesha on "Consciousness and forgetfulness", *Surya Nadi* or *Surya kalai*, pinda lakshana, *surya chandra* and *Agni*, Gayatri triple avasthas, etc.) There is a host of correspondences that are associated with *Agni*, *Surya* and *Chandra* representing the central, parasympathetic and the sympathetic nervous systems. A list is given at the end.

Tirumoolar also expresses in his Tirumantram the co-ordinating truths of moon, sun and *agni* (Ida, Pingala and Sushumna respectively) more briefly thus. "When moon and *agni* join, the rays of the sun become active or dominant; when sun and *agni* join, the rays of the moon become active or dominant. Tirumoolar explains further that when the three namely, moon, sun and *agni* join, the star (Taraka here representing one's soul or rather the spark of soul which is deep within the heart centre namely anahata or within the ajna centre) rises or reveals itself. Indeed the subdued or hindered star remains to become everything, the all-existence" - TM 864. The star (Taraka) is one's own *swarupa* or one's true being. It is the firm source and foundation of one's existence. All beings, have come into existence from the lotus flower of the star"-TM 860. Thus Tirumoolar refers to the flame of soul hidden in the depths of one's adhara or existence as the star. In TM 862, he even points out that "the star reveals and manifests itself and gathers ever more rays of its light (five times five rays of light) and develops in its intensity of light when *agni*, the hidden fire in the mooladhara, is kindled to arise and gets nourished and strengthened by the rays of sun and subdued and slowed down by the rays of the moon. Thus *agni*, sun and moon join in yoga when senses are withdrawn - TM 862, 876, 855 and 856. The sixty four kalas or rays of *agni* (central fire of Sushumna, the central nervous system including spinal cord) the burning and energetic sixteen rays of sun (here the description possibly indicating the sympathetic nervous system) and the subduing or softening and slowing twelve rays of moon (here the description possibly indicating the parasympathetic nervous system) and the four rays of the bound and hindered star (the soul as a spark of light) make up together the ninety six kalas or rays of the imprisoned or bound human existence (adhara) - TM. 855, 856. Bindu or semen gets

ejaculated when the sun's rays get softened or decreased and the subduing moon prevails i.e. ejaculation takes place with the stimulation of the parasympathetic nerves of the sex TM 879 and 877.

The Swami has observed in the opening part of para G, that the three nerves or nervous trunks present a crisscross pattern in a scissor-like manner from the spinal base (Moola) to the top of head (Brahmarandhra). This evidently refers to the crossing of the most of the nerve fibres (afferent and efferent) to the opposite side and this crossing takes place in the medulla oblongata. In the case of some afferent or efferent fibres, the crossing takes place at the level of the spinal segment where they enter into or terminate. Due to this effect of crossing or decussation, the sensation and impulse, in one or more parts on one side of the body can be controlled and regulated by the corresponding process of nerves in the other side i.e. opposite side of the head. For example, the sensation and impulse in the right big toe of the leg or in the right testicle would be reflected in the left nostril or its breath. That is to say by changing or bringing the breathing to one side of the nose, a lower limb or a lower part on the other side of the body would be controlled and regulated. The nervous process is immediately linked up with the breath. The above said three nerve trunks or sources are, as we have already seen, (1) the direct afferent and efferent nerves of the spino-medullar cord (2) the sympathetic afferent and efferent nerves and (3) the parasympathetic afferent and efferent nerves.

List of correspondences in the Yogic, Physiological and vital (including nervous vital), and mental systems.

Left	Centre	Right
1. Left sided nervous system (clockwise)	Central nervous system	Right sided nervous system (anti clockwise)
2. Ida	Sushmna	Pingala
2a. Female principle	Neutral or harmony of both	Male principle
3. Sympathetic nervous system	Central nervous system	Para sympathetic nervous system
3a. Six-fold nerve (Subramanya)	Kundali Vattam (spinal)	Five fold nerve (Ganapathy)
4. Chandra, the moon	Agni, the fire or heat	Surya, the sun.
5. Chandra kalas- 12	Agni kalas – 64	Surya kalas – 16
6. Subramanya	Rudra	Ganapathy

6a. Vishnu	Rudra	Brahma
7. Left sided Breath (breathing through left nostril)	Central breathing  (with equal breath in both nostril)	Right sided breath (Breathing through right nostril)
Psychological, vital and physical powers and effects of items 1 to 7		
8. Apana the  outward and current of air	Samana the equalising  power of breath or current of air	Prana, the inward and upward current of air
9. Ion of carbon	Hydrogen ion	Oxygen ion
9a. Veinous blood	Lymph	Arterial blood
9b. Cold	Neutral or balancing	Hot
9c. <i>Visha vayu</i>	<i>Amrita vayu</i>	<i>Ushna vayu</i>
9d. North pole of magnet	Mid part of magnet	South pole of magnet
9e. Proton	Neutron	Electron
9f. Outer electron	Neutrino	Nuclear electron
9g. Earth	Ether (sky)	Air (or gas)
10. Forgetfulness and obscurity of remembrance	Equal poise without forgetfulness or effort	Remembrance and concentration of thought
11. Death	Equal harmony	Birth
12. <i>Kevala</i>	<i>Suddha</i>	<i>Sakala</i>
13. Sleep and confusion	The blissful equipoise	Consciousness and wakefulness
14. <i>Rechaka</i> exhalation	<i>Kumbhaka</i> retention of breath	<i>Pooraka</i> inhalation
15. <i>Tatvas</i> or principles of	Harmony of <i>tatvas</i>	<i>Tatvas</i> in their inward and

existence in their outward and downward movements and their dissipation		upward
16. Vata <i>nadi</i> or Nerve	Sleshma or Kaphanadi or nerve	Pitta <i>nadi</i> or nerve
16a. Nervous impulse disposed to create gaseous formulations and exchange in the body (including respiratory circulation)	Nervous impulse disposed to create fluidity or secretion giving coolness	Nervous impulse disposed to create heat of the body and digestive and bile secretions
16b. Swapna dreaming	Susupti, sleeping state	Jagrata, waking state
16c. Throat region for vata <i>nadi</i>	Heart region for sleshma <i>nadi</i>	Forehead region for pitta <i>nadi</i>
Ruling Powers or Gods and their Yogic centres, lower and higher		
17. Chandra, the moon	<i>Agni</i> , the central heat or fire	Surya, the sun
17a. <i>Karya Karana</i> , and <i>Ruparupi</i> and causal effectual	<i>Karanan</i> , and arupi the formless and casual	<i>Karyan</i> and <i>Rupi</i> : the form and effectual
17b. Vishnu	Rudra	Brahma
17c. Subramanyam	Rudra	Ganapathy
In the lower levels:		
17d. Nabhi, the naval	Anahata, the heart	Mooladhara the sex centre, and swadishtana
17e. Digestive and assimilative heat ( <i>Udaragni</i> & <i>vadavagni</i> )	Causal heat ( <i>karana Agni</i> )	Creative heat ( <i>Srishti Agni</i> or <i>Moolagni</i> )

In the higher level:

17f. Visuddhi the throat	Ajna, the inner mid of forehead but also in contact with top head	Uvula, the upper throat (in the mouth)
17g. Subtle body (Sukshmadeha)	Causal body ( <i>Karanadeha</i> )	Physical body (Stuladeha)
18.Mind	Soul	Body (nervous and physical)

Note:

- a) In the above list, the items under 9, have been given by us, as they seem to make appropriate correlations in the background of the modern sciences and of the Swami's observations on *Amrita vayu* (hydrogen), *Ushna vayu* (oxygen), *Visha vayu* (carbon-di-oxide) and *Bhuta Vayu* (nitrogen) and on the seven kinds of atoms and atomic particles such as electron (*Bhuta karya anu*), etc. (see Upadesha on Srishti Jnaya p 254-255).
- b) Any excess or deficiency in any one or more of the three dispositions under 16(a) leads to the three broad classifications of illness, namely vata, sleshma and pitta doshas.
- c) Ida, the current of left-handed (or left to right or clockwise) yogic nervous force is associated with chandra the cooling moon and as the female principle or rather as the female side or left side of a person irrespective of his or her sex. Similarly we associate the sympathetic nervous system with the female principle, especially because the uterus of woman is most abundantly innervated or supplied with the sympathetic nerves and far less by the para-sympathetic though most of the other organs including sex organs of either man or woman have a dual supply of the sympathetic and para-sympathetic nerves. Para-sympathetic nervous system is associated with Pingala and the sun and with the male principle or the male side or right side of a person irrespective of his or her sex. According to current medical views the para-sympathetic is considered to cause ejaculation of semen. However, we may add that ejaculation occurs on some occasions when the breath is dominant on the right side and on other occasions when it is dominant on the left side and according to Swami Ramalingam and Tirumoolar the right or left breath gives rise to the birth of male or female child respectively. Therefore, in the former the para-sympathetic may dominate in ejaculation and the sympathetic in the latter. According to medical science genetic sex of a foetus is determined exclusively by the sperm and is quite independent of ovum, because the sperm some times contains male determining genes and sometimes the female determining genes.
- d) The clockwise nervous force of the left-sided Ida and the anti clockwise nervous force of the right sided pingala as the respective currents moving from left to right, and from right to left are *valid* and justified by the Swami's foregoing explanation of the flow or current of *vayu* (gaseous vital energy or

nervous vital force) from the moon-side (left) to the right where sun conjoins with *Agni* (the sushumna, central nervous system including the spinal cord) giving rise to negative states such as unconsciousness, forgetfulness of thought, sleep distraction, destruction death etc. and the corresponding flow or current of *vayu* from the sun side (right) to the left, when moon conjoins with *Agni*, giving, rise to positive states such as consciousness, mental thought and remembrance concentration, creation, birth etc. Moon, Sun and *Agni* also refer to the left, right and central breath respectively. The essence of *tatva* (*vayu*) is said to rise upward due to the sun and goes downward due to the moon.

Notes on para H:

For the yogic centres above the heart namely visuddhi in the throat, “ulna” (or Uvula in the upper throat) and Ajna in the mid head, the Swami has not given details as to their location, function, nerve connections and formations and colours but only generally remarks that these relevant details are similarly to those for the lower centres including the heart. Therefore it is to be understood that the Swami has not exhausted all the details of the Central nervous system i.e. the cerebrospinal system with the higher divisions and functions of the brain, though he knew of it in its fulness and lived in its impulse and currents of knowledge and action. Then, there are the overhead Yogic centres which are purely spiritual but have their influences through the top of the head (Ajna to be considered to extend to the top head) into the mind, vital life and the central nervous system and the physiological cells and organs of the body. Because of the totality of his vision, from the spiritual down to the physical, it becomes a true vision of the truth of the spirit, mind, life and body in their respective inherent natures as well as in their integrality and harmony. In his case, the spiritual extended to the realm of Truth-consciousness, the Super-mind; and its supreme Light, consciousness Force and Bliss transformed his mind, life and body into their divine equivalents and the physical body too became transformed into its deathless state. The Swami’s spiritual consciousness also extended beyond the supermind into the worlds of Satcitananda.

Swami’s reference to the Ajna In his “Mahopadesha”:

However, in his “Mahopadesha”, the Swami has given some hints about the Ajna centre, in so far as it is concerned with the nerves connected with it. We give his observations here-under and make the possible correlations with the still imperfect findings of the medical science in regard to the anatomical and physiological structure, nature and functions of the nervous system, which are restricted to only about 5% of the total number of nerves. Explanations given within the brackets are our own.

“There is a nerve (i.e. a trunk of nerve fibres) ascending from Nabhi, the umbilical centre, up to Ajna, the mid centre in the forehead. At the tip or end of this nerve is a soft nervous tissue (செவ்வ, Javvu) which is formed in the depth of the Ajna centre and it is hanging. The bottom part of it is white and the surface part yellow (possibly the white axons of the ascending afferent nerves of spino-thalamic tract seen at the point of their termination in the grey matter or yellowish grey matter of the medial thalamic nuclei. Just at the base of the said nervous tissue (possibly the medial thalamus), a nerve, branches upward

and down-ward (possibly the upward nerve being the fresh relay of nerve fibres shooting off into the cerebral cortex above as the thalamo-cortical fibres) and the downward nerve being the said nerve fibres of the spino-thalamic tract descending into the spinal cord below). One can realise the vision of the creeper-like nerve. As a symbol of this, I unfurl the flag which is yellow at the top and white at the bottom, so that all may realise brother-hood of man (based on the affinity of one's soul to another)".

The Swami meant to point out by the symbol of flag, the light of soul which is behind the white screen represented by the interior, while nervous tissue at the Ajna, after crossing over the other colours signified rather as color screens in the order of black, blue, green, red and yellow or golden yellow, the last of which representing intelligence or purified mind and possibly also represented here by the exterior yellow nervous tissue at the Ajna.

We give here-in-below the reasons and explanations for fixing the Yogic Ajna centre in the thalamic region. The thalamic is immediately linked up with the internal capsule wherein the ascending and descending tracts of fibres (afferent and efferent) from and to the spinal cord as well as from and to the cerebral cortex, converge and enter, though their respective functional tracts are kept distinct and separate. Thus in the internal capsule we find the cortico-spinal tract of fibres (or the efferent pyramidal tract), thalamo-cortical afferent fibres, cortico-rubral and cortico-fugal efferent fibres which are all connected with cerebral cortex. Besides, the spino-thalamic tract of fibres are received in the thalamus directly. Most of the ascending and descending tracts of fibres from and to the spinal cord reach thalamus (and its connected internal capsule) through the medial lemnisci and the pyramidal pathways of the brain-stem respectively. Thalamus serves as a great sensory relay station. Ascending sensory fibres pass through medial lemnisci and terminate in the thalamus and further projection or relay of the nerve fibres to the cortical sensory areas takes place here in the form of thalamo-cortical fibres which pass through the internal capsule. Because of this and its connection with the internal capsule, the state, of alertness or concentrated wakeful consciousness is obtained or can be maintained in the Yogic centre of the Ajna. Thalamus is connected also with the basal ganglia (caudate nucleus, putamen and pallidum) in its upper and lateral sides, with the internal capsule lying in between. Below, it is connected with the red nucleus and substantia nigra. The red nucleus possibly gives rise to the vision of red lotus (or its pericarp) or shakti because of the configuration of the descending fibres of the rubro-spinal tract which overlaps that of the cortico-spinal (pyramidal) tract. The latter possibly gives rise to a vision of the main lotus (or its pericarp) of the god of Yogic centre at the respective spinal segment (see the configurations marked III and II respectively in the diagram of the spinal cross section).

Substantia nigra which is deeply pigmented may possibly give rise to the yogic inner vision of successive order of seven colours, from without inwards, in the middle of forehead ajna namely black, blue, green, red, golden, white and the mixed or the multi-coloured. One sees a particular color in the said order according to his evolutionary inner growth or he might see them all successively. The vision of color or successive colours extends to or upon outer objects also. The glowing color vision can be seen in the forehead even if the eyes are closed. Behind the screens of seven colours, as they are so called by Swami Ramalingam, is seen the light of soul. The

substantia nigra is sometimes also referred to as the black substance in the medical science. The black is the obscuring power of Maya (material nature). Black color is also obtained by the method of subtraction, subtracting yellow, violet and bluish-green (a shade of combination color) from the white which contains the seven colours (VIBGYOR) or rather eight colours including blue-green combination of colours or color lights of blue green and red but after subtracting from the white light the said yellow, violet and blue-green, would give black color. Golden color seems to be neutral or is complementary to white.

Just as different colours or color lights can be produced by the methods of additive color mixture or subtractive color mixture, it has been found in 1959 by Edwin Land that multi-colours or multi-coloured lights arise by mixing white and the orange-red (a shade of color) so as to have different proportions of the mixture at each point of the screen or of visual image of a picture. But according to Swami Ramalingam, the seventh screen or color that hides the soul is a multi-coloured screen. This is evidently formed by the mixture of white and the golden in different proportions at the various points of the inner visioned screen within man. The golden and the white are the fifth and sixth screens respectively hiding the light of soul. The multi-coloured seventh screen is the last. The golden color is closer to the shade of orange-red.

Substantia nigra is a semi-lunar layer of grey matter which contains a number of deeply pigmented nerve cells. It extends through the whole length of the mid brain. Its function still remains obscure. Much less is known about the functional significance of the pigment which according to medical science occurs in greater amount in primates but reaching the maximum in man. It increases with age possibly with the growth of intellect and concentration. Substantia nigra contains a compact dorsal part containing many pigmented cells, the latter extending into the sub-thalamic region. Substantia nigra has its profuse connections with cerebral cortex, basal nuclei, hypothalamus, red nucleus and the spinal cord.

The thalamus (its medical part particularly) appears as a hanging nervous tissue or nuclear mass of cells. Because of the location and function of thalamus and its inter connections with internal capsule, red nucleus and substantia nigra and the geniculate bodies (for auditory and visionary functions), we may take the thalamic region as the immediate field of the Yogic Ajna centre. Ajna is considered as the centre of inner vision, thought and will. Thalamus being situated just above the mid brain is in a location which is almost central both from the horizontal and vertical mid lines of the brain. It may be also said to be a junction between the passage through anterior fontanelle on the vertical section and that through the posterior fontanelle on the horizontal section (i.e. in the back of the head). The anterior fontanelle is felt or seen pulsating especially as a soft spot on the top of the head of an infant. The two openings of fontanelles, each covered only by thin membrane without ossification by bones at the time of birth, might be the passage of entry for the soul along with the prana or breath to enter into the child at the time of its birth, one being horizontal inward passage at the back of the head corresponding to the Ajna centre, and the other a descending vertical passage through the top of the head corresponding to the Sahasrara. The ancient supramental Yogi Tirumoolar affirmed the entry of soul and its prana and apana through the head (TM 2764, 576, 645). As narrated above thalamus lies more or less at the meeting point of the said two passages.

Afferent sensory fibres which converge in the medial lemnisci as they ascend through the brain stem (medulla oblongata, pons, cerebellum and mid brain), give off many collaterals to the adjacent neurones of the reticular system. This sensory influx to the reticular system is of great importance in maintaining an alert consciousness of the subject. Finally the medial lemnisci passes through the subthalamic region to end in the thalamus. From the thalamus another neurone-relay projects to the sensory cortex of the cerebrum. We may consider in the above background that the cerebral cortex is a distributive off-shoot of thalamic system with its basal ganglia and the internal capsule, because in Yoga, Ajna is considered as the last and sixth centre in the physiological or bodily system and Sahasrara as an overhead centre above the body. Therefore Ajna is considered as the seat of soul (or only a practical or effective centre of soul in case soul is considered to be in the depth of the heart, Anahata). In both the centres, Anahata and Ajna, the inmost depth or concentration of consciousness can be felt, though at the Ajna, there is also the sense of the upward concentration. Though centrally located in the thalamic region, Ajna has to be considered as extended above to the top of the head i.e. the cerebrum on the one hand, and to the medulla oblongata down below on the other. Its extension or rather the extended field of control on the medulla oblongata is through the mid brain of the brain stem and that essentially through the medial lemnisci and the adjacently lying (cortico-spinal) pyramidal pathways and the rubro-spinal tracts and reticular formations of the brain stem.

It is found in medical science of physiology and neuro-anatomy that spinal fibres form the direct pyramidal tract, without crossing to the opposite side at the level of decussation in the medulla oblongata. As a rule, the said fibres do not extend beyond the lower cervical or mid-thoracic region i.e. beyond the region of heart in the depth of which the soul abides and makes it its station, in the usual evolutionary course of its existence. If in the evolution the soul could not make Ajna as its seat and dynamic centre of play, it would choose the inmost depth of the heart for the same purpose. As if to help it in this process, the formation of the direct pyramidal fibres of the spinal cord from the cerebral cortex to the mid thoracic region of the heart seems to serve such a purpose. Its connection with the thalamic region of the Ajna centre is implied. The said tract is found only in the primates and men and not in the lower animals. It is subject to large variations such as its entire absence or rarely on the contrary the inclusion of all the cortico-spinal fibres. But usually it is composed of about 15 to 30% of all the cortico-spinal fibres, the rest being formed as the lateral cortico-spinal tract. Taking cortico-spinal fibres (both the lateral and anterior) of the spinal cord into consideration, one may easily find their nexus with the cerebral cortex and hence their tract or tracts themselves represent the cerebro-spinal nervous system.

We have already mentioned as a possibility that the configurations of the cortico-spinal tract and rubro-spinal tract may respectively give rise to the inner vision of the lotus (i.e. its pericarp) of each chakra or Yogic centre (below the Ajna) where its power or god rules, and the inner vision of the red lotus (i.e. its pericarp) of the shakti or goddess as arising cells of origin in the red nucleus of the mid brain where from fresh relay of its ascending white fibres to the cerebral cortex (i.e. cortico-rubral white fibres) pass through the internal capsule which is a white mass of nervous substance.

We shall explain in greater detail the correlation of these tracts with the vision of lotuses and petals.

Red nucleus (nucleus ruber) is an *oval* shaped mass of nerve cells with a pinkish color situated in the mid brain closely to substantia Nigra with which it is connected by fibres. The color is due to an iron-containing pigment in many of its cells. The red nucleus have numerous afferent and efferent connections with the cerebral cortex and the brain stem and with the nuclei of sub-thalamic, hypothalamic and thalamic regions. It has its direct efferent descending fibres terminating in the spinal cord and this tract is called rubro-spinal tract. It (red nucleus) also forms a rubro-reticular tract which terminates in the reticular grey matter in the brain stem and from here reticulo-spinal fibres transmit the impulses to the spinal cord. The rubro spinal tract decussates immediately as it descends from the upper mid brain, and passes through the reticular formations of the pons and medulla oblongata to reach the spinal cord. Both the rubro-spinal and reticulo-spinal fibres are closely connected. Rubro-spinal, lateral cortico-spinal, lateral reticulo-spinal and tegmento-spinal fibres terminate in the same lateral region of the spinal white matter and correspondingly in almost the same laminae of the grey matter, though their tracts are distinctly made. In their cross section, rubro-spinal and lateral reticulo spinal tracts of fibres appear to lie horizontally almost on the mid line with the central spinal canal. The configuration of rubro-spinal tract may possibly give rise to the Yogic inner vision of the pinkish red lotus (i.e. its pericarp) of the Shakti or goddess in all the Yogic centre (chakras) below the Ajna and this lotus is within or overlapping with the main lotus of the god of each chakra (i.e. its pericarp) which is possibly formed in vision by the configuration of the lateral cortico-spinal tract at the respective segment of the spinal cord corresponding to the Yogic centre. One may note the overlapping configuration of the said two tracts (see the marked zones II and III in the above diagram in Ch. 10 part I). The lotus of the respective god appears in a different color at each Yogic centre whereas that of the shakti appears as red only except in the Ajna where the lotuses of both the shakti and the god appear white. The shakti's lotus is also within the pericarp of the main lotus of the Ajna chakra which has two white petals. In some tantric texts of Yoga, shakti is mentioned to be within or seated within the pericarp of the main lotus, without assigning a separate lotus, for her at the level of the Ajna (see V 32 of shat chakra *Nirupana* - "Serpent Power"). In as much as the spinal terminals of the rubro-spinal and the lateral cortico-spinal tracts end in almost the same lateral area of white matter and correspondingly in almost the same laminae of grey matter the former tract is considered in medical science even as an indirect cortico-spinal pathway. This is mentioned here only to show their close connections. The other two tracts of fibres namely the lateral reticulo-spinal and the lateral tegmento-spinal along with the spino-thalamic and spino-cerebellar tracts possibly give rise to the vision of petals to the main lotus, as they lie close to the lateral cortico-spinal tract.

However, we do not exclude the possibility of the visionary formation of differing even number of petals arising at the respective segmental level of the cord (corresponding to the respective Yogic centres) due to the radiation of the outer and inner trunks or bundles of nerve fibres (axons) forming the lateral cortico-spinal tract which descends through the segments of the cord, whereas its central trunk or part might give rise to the vision of the pericarp of the lotus. This explanation seems to be justified because, the lateral cortico-spinal tract is not uniformly made throughout the length of the spinal cord..., but it gradually diminishes in size as it descends, ending

about the location of the fourth sacral segment of the cord. Further its fibres are of varying diameter; the longer fibres are said to be in the exterior level and the shorter fibres in the interior. Correspondingly, the number of petals of the lotus or its pericarp gradually decreases as we come down from the throat centre to the sex centre (Mooladhara), progressively decreasing from 16 to 4 (i.e. 16 at the throat, 12 at the heart, 10 at the *naval*, 6 in the lower abdominal centre and 4 at the spinal base - (see stz. 1704 of Tirumantiram). An interesting discovery about the lotus of the Ajna in the mid-forehead, according to the ancient supra-mental Yogi Tirumoolar, is that it too has 16 petals in its fulness, though at the lower level i.e. in the mid of the eye-brows, it is seen to have two petals only- (Ibid Stz. 1704 and 1711). This we have explained at the end of this chapter as it gives a clue to correlation with scientific datas such as the formation of compact mass of three bundles of the cortico-spinal fibres in the lower Ajna (i.e. in the upper medulla oblongata, after the level of decussation or crossing of fibres to the opposite side) and the fragmentation or breaking up into a number of bundles (about 16) in the pons and mid brain. The integral vision of these bundles in the thalamic region of the internal capsule is seen possibly as 16 petals of Ajna at a higher level. Thus the 16 petals seen at this level is not of a different lotus, but of the same Ajna lotus, according to Tirumoolar (See Tirumantram 1711, 2359, 796, 1704, 2662, 2670).

Swami Ramalingam, in one of his early writings (in a letter to a disciple, speaks of the lotus of Anahata, the heart centre, as having 12 petals, of which 8 petals are to be considered as of the Shakti, 2 as of the ruling power or god, and 2 as, meant for their seat. (Vide his letter dated August 1866 book of letters p. 413). Though he does not specify the color of the lotus, it is implied. The important point is that the reckoning of the 8 petals of the Shakti is made within the total 12 petals of the Chakra. So the Shakti is to be considered as within the pericarp of the Chakra, i.e. in the lotus of the divine power or god. “Shatchakra Nirupana” of Purnananda Swami mentions god and goddess (or shakti) of each Chakra and the shakti is invariably mentioned to abide in a red lotus or pinkish red lotus within or inside the main lotus or pericarp of the god, except in the Ajna chakra where the shakti’s lotus is also mentioned to be white and its within the white lotus or pericarp of the Ajna Chakra. (See “Serpent Power” by Arthur Avalon). Here we get a clue for correlation of the vision of the pinkish red lotus (or its pericarp) of the Shakti with that of the configuration of the rubro-spinal tract of efferent fibres, because of the pinkish red nucleus of the mid brain which gives off its fibres downward into the spinal cord without synapse or break of continuity, and the said configuration being seen at the spinal segment of each Yogic centre below the Ajna. The vision of the main lotus of the god each chakra or yogic centre may be correlated with that of the configuration of the lateral cortico-spinal tract (Pyramidal tract). This is seen in different color at each centre below the Ajna possibly because of its differential vibrations of white fibres (axons) at the respective segmental levels of the spinal cord. The different colours of some centres are also explainable because of the combination of color with that of the red coloured lotus (red nucleus).

Now coming to the lotus seen at each Yogic centre or Chakra Sri Aurobindo gives their colours and significances. According to him, the color of the chakra, i.e. the color of the pericarp of the lotus and that of its petals are the same, though the color varies for each centre. Thus the color of the lotus (its pericarp and petals) of the Yogic centre Mooladhara (spinal base) is red; that for Swadishtana (lower abdomen)

deep purple red; for Nabhi (the navel) violet; for Anahata (the heart centre) golden pink; for Visuddhi (throat) grey; for Ajna (in the middle of the forehead) white; and for Sahasrara (at the top of the head) blue with gold light around. But there is variation of color in regard to some centres as seen by Purnananda Swami who also refers to the color of the Shakti and her lotus (see serpent power – by Arthur Avalon). This however gets reconciled if we take into account the combination color by combining the color or petals of chakra and the color of the shakti (or goddess) as seen by the latter. Thus e.g., the vermillion of the petals of the Swadishtana Chakra and the blue color of its Shakti (who is seated on a pinkish red lotus) as seen by the latter would give deep purple red of the lotus as seen by the former. The blue or bluish black of the petals at the Nabhi Chakra and the blue color of its shakti who is seated on a pinkish red lotus) when combined with the red color of its god Rudra would give the violet color of Sri Aurobindo's vision. The vermillion of the petals at the Anahata Chakra and the golden color of Shakti (who is seated on a pinkish red lotus) would give the golden pink of Sri Aurobindo's vision.

Thus, in the above we find an agreement in the vision of color of the chakra or of the lotus for all the centres. Sri Aurobindo however does not specify the color of the shakti or that of her lotus-seat, whereas Purnananda Swami does, as above referred to. The red lotus of the Shakti seen at all centres below the Ajna may be considered as pinkish red that is the color of the Indian red lotus. But this is seen in the Ajna as her white lotus within the main white lotus of the Ajna as explained above. The varying colours of the chakras below the Ajna are possibly due to the different frequencies of vibration in the white axons of the lateral cortico-spinal tract in the respective segmental levels of the spinal cord. The cortico-spinal tract of white fibres is having its cells of origin above in the grey (or yellowish grey) matter of the cerebral cortex and its terminating points in the white matter of the spinal cord at the different segmental levels or Yogic centres. Further the differential vibrations of the respective segmental parts of the said tract below the level of Ajna, and the resulting color variations of chakras are evidently due to their close link with the autonomic nervous system, whereas the same tract, in the level of Ajna, (i.e. above the point of decussation in the medulla oblongata or above the medullar region) fully and directly becomes part of the central nervous system and hence appears white. But in the case of the red or pinkish red lotus of the shakti formed in each chakra, the color does not vary below the Ajna, possibly because unlike other nuclei of nerves, which have only grey-matter as the source, the red nucleus (from which the rubro-spinal tract is formed and considered to give rise to the vision of red lotus) has in addition a pinkish red pigment in many if not all of its cells. However it gives off from its nuclear base the white axons as the fibres of the rubro-spinal tract which in the circumstances might by its radiation appear red in the inner vision of the chakras below Ajna. Correspondingly white fibres called cortico-rubro tract descending from the cerebral cortex and terminating in the red nucleus pass through the internal capsule which is a white band of nervous path and possibly the configuration of this tract, seen at the Ajna appears as a white lotus of the Shakti i.e. its white pericarp.

Further, the yogi after some time of inner concentration at the Ajna, feels an upward ascending consciousness which is the continuous path of nervous current from Mooladhara (spinal base) to the top of the head. At the Ajna, it is said that, all that is seen and realised at the respective chakras below is totally made visible, and the Ajna centre also commands the vision of what lies above it i.e. between the Ajna

and the top of the head (Sahasrara). Therefore, in this background, the Ajna centre, has to be taken as lying centralised in the thalamic region with the internal capsule serving as the pathway of the current of consciousness through the cortico-spinal tract (which possibly gives rise to the vision of main white lotus of the Ajna) and the connected and closely lying cortico-rubral tract and its continuation as the rubro-spinal tract (which are possibly seen in vision respectively as white lotus of the shakti at Ajna and as red lotus below it). Sahasrara at the top of the head (not in its overhead significances) is only an extension or rather a distributive extension of the thalamic nervous system and hence also of the Ajna. In short, the Ajna centre may be considered as the key centre of the whole cerebro spinal system.

Now we shall quote Sri Aurobindo on the chakras or Yogic centres.

“All these centres are in the middle of the body. They are supposed to be attached to the spinal cord, but in fact all these things are in the subtle body, sukshma deha, though one has the feeling of their activities as if in the physical body when the consciousness is awake”. In the process of his yoga, “the centres have each a fixed psychological use and general function which base all their special powers and functionings. The Mooladhara governs the physical (including its consciousness, down to the sub-conscious. The abdominal centre Swadishtana governs the lower vital, i.e. the small vital movements, petty greeds, lusts, desires, sense instincts etc.; the navel centre Manipura or Nabhi padma, the larger desire- movements; the heart centre, hrddpadma or Anahata, the emotional being (the higher emotional being with the psychic soul entity deep behind it); the throat centre visuddhi governs the expressive and externalising mind (commanding expression and externalisation of mind movements and mental forces); Ajna chakra governs the dynamic mind, thought, will, vision and mental formation; the thousand petalled lotus sahasradala (above the head) governs the higher thinking mind and the illumined mind and opens upwards to the intuition and the overmind. The seventh is sometimes identified with the brain, but that is an error, as the brain is only a channel of communication situated between the thousand- petalled and the forehead centre”.

So too Swami Ramalingam and Tirumoolar and others have recognised six centres upto the Ajna in the adhara (embodied existence within the psycho-physiological system) and the seventh, the sahasrara, as above the head in the niradhara (above the physiological hence called the supportless system) and the last leads finally into the supermind, satya Jnana sabha.

As the Ajna centre is said to begin from the middle of the eyebrows and lie a little above it centrally in the depth of the mid forehead, and extend up to the top of the head, we may trace the correlation of the vision of its main white lotus (i.e. its pericarp) and its petals with the configuration of both the cortico spinal tracts of fibres (i.e. both the lateral and anterior fibres) which according to medical science become three compact bundles in the anterior part of the upper medulla oblongata (i.e. after or at the level of decussation or crossing of most of the said fibres to the opposite side) and again break up into a number of bundles in the pons and the mid-brain. They are formed into more or less 16 bundles in the mid-brain in the region of crus cerebri and then they enter the internal capsule to pass on to the cerebral cortex above.

In the upper part of medulla i.e. at the said level of decussation or just above it, we find that all the cortico-spinal fibres enter the medulla oblongata and form the pyramidal mass on each side of the anterior medulla oblongata, we can distinguish three tracts - a major medial tract formed by the mostly crossed lateral cortico-spinal fibres, a minor tract formed by the uncrossed lateral cortico-spinal fibres and another minor tract formed by the uncrossed anterior cortico-spinal fibres. The last two might give rise to the vision of a white petal on each side of the pericarp of the Ajna lotus, where as the said pericarp is formed by the central or medial part of the tract. Thus as these tracts are of radiating white axons (nerve fibres), the configurations of their cross-sections will give rise to the vision of a white lotus with two white petals in the lower Ajna (i.e. in the upper part of the medulla oblongata).

Now the breaking of the said pyramidal cortico-spinal tracts into a number of bundles -possibly into seventeen bundles with a central one serving as the pericarp and the rest as its sixteen petals - takes place in the pons and the mid brain. Therefore the white lotus of the same Ajna seen in the middle of the fore bead, a little above the middle of the eye-brows, i.e. as seen in the mid brain or in the thalamic region, has sixteen petals; This sense is clearly readable from the Tirumantram of the ancient well-known supramental Yogi of the south, namely Tirumoolar. He observes in stanzas in TM 1711, 2359 and 796 of his Tirumantram that above the beautiful lotus of the Ajna which has two petals (TM 1704) is seen its own sixteen petals (TM 1711) and that the sixteen petals are said to arise due to the sixteen kinds of *vayu* (i.e. rarefied vaporous energies of prana) and by their integration link the Ajna centre with the powerful super-mind above (TM 796) and make it a centre of the pure wisdom and Bliss of the supreme Truth-consciousness (TM 1711 and 2359).

நாலும் இருமூன்றும் ஈரைந்தும் ஈராறும்  
கோலிமேல் நின்ற குறிகள் பதினாறும்  
மூலம் கண்டு ஆங்கே முடிந்து முதல் இரண்டும்  
காலம் கண்டானடி காணலுமாமே.

மந் 1704

குறிப்பு: ஆறு ஆதாரங்களில் முறையே நான்கு, ஆறு, பத்து, பன்னிரண்டு, பதினாறு, இரண்டு இதழ்களைக் காண்பீர். முடியும் ஆதாரமாகிய புருவ மத்தியில் மூலம் ஆகிய ஆன்ம உயிரைக் கண்டு பின் அதில் காலங்கள் படைத்த ஈஸ்வரனைக் காண்பீர்.

ஆய மலரின் அணிமலர் மேல் அது  
வாய இதழும் பதினாறும் அங்குள  
தூய அறிவு சிவானந்தமாகிப் போய்  
மேய அறிவாய் விளைந்தது தானே

மந் 1711

ஆய மலரின் அணிமலர் தன்மேலே  
பாய இதழ்கள் பதினாறும் அங்குள  
தூய அறிவு சிவானந்த மாகியே  
போய அறிவாய்ப் புணர்ந்திருந்தானே

மந் 2359

ஆயும் பொருளும் அணி மலர் மேல் அது  
வாயு விதமும் பதினாறுள வலி  
போய மனத்தைப் பொருதுகின்ற ஆதாரம்  
ஆயவு நாளும் முகூர்த்தமும் ஆமே

மந் 796

குறிப்பு: வலி போய மனம் - ஞானப் பெருவெளியின் தெய்வீக விஞ்ஞான மய மனம்.

ஆக்ஞா சக்கரத் தாமரைக்கு மேலே அதன் 16 இதழ்கள் காணப்படுவது சொல்லப்பட்டுள்ளது. இந்த 16 இதழ்களை ஒருசேரக் கண்டவர்கள் தூய அறிவு அல்லது சூபர்மைன்டு என்கிற சத்தியஞானப் பெருவெளியில் சிவானந்தப் பேரெளியுடன் கலப்பார்கள்.

சந்திர பூமிக்குடன் புருவத்திடைக்  
கந்த மலரில் இரண்டிதழ்க் கன்னியும்  
பந்த மிலாத பளிங்கின் உருவினன்  
பந்தம் அறுத்த பரங்குரு பற்றே

மந் 2662

வந்த மரகத மாணிக்க ரேகை போற்  
சந்திரும் மாமொழிச் சற்குரு சன்மார்க்கம்  
இந்த இரேகை இலாடத்தின் மூலத்தே  
சுந்தர சோதியுட் சோதியுமாமே

மந் 2670

குறிப்பு: இலாடத்தின் மூலத்தே - நெற்றிக்குள் உள்ள மூலமாகிய அந்தராத்மா அல்லது உயிர். அது பேரழகிய அருட்பெருஞ்சோதியின் அல்லது சிவானந்த சோதியின் இரேகை ஒளியாகும்.

Thus the sixteen petalled Ajna lotus (if we may so call it), as distinguished from the two-petalled Ajna lotus seen in the mid of the eye-brows, is seen above in the mid-forehead and Tirumoolar affirms that the 16 petals are of the same Ajna lotus. We arrive at the conclusion that this is seen in the mid-brain and thalamic region, in the genu of the internal capsule which is above the mid brain.

In dealing with the 16 centres or planes of experience in his “Joti Agaval poem”, Swami Ramalingam, begins with the sixth (i.e. Ajna) and mentions it as having two points or sub-centres for realization, one in the middle of the head and the other in the top of the head.

மூவிரு நிலையின் முடிநடு முடிமேல்  
ஓவற விளங்கும் ஒருமை மெய்ப் பொருளே

Therefore Ajna centre may be considered to have a range from the middle head to the top of the head, as already explained. The others are the overhead centres

or planes of experience from the seventh to the sixteenth of which the thirteenth leads into the supermind, and the sixteenth forms the summit of the supermind as opening into the infinite and eternal world of Bliss or Ananda loka. In the context of our subject we are here concerned with the Ajna centre which is definitely spoken of as having a range with lower and higher levels in the heads, (“Joti Agaval” line 883).

Now we also find corroborating evidence from the works of Swami Ramalingam, especially in his text of “*Tatva lokas*”. He mentions the progressive integration of five, eight, ten, twelve and sixteen bindus or points of light which are said to be dynamic or radiating luminous centres; of vibration - (Pancha, ashta, dasa, dwadasa and shodasa nata bindu madhya Yoga) - and they are seen in the Ajna centre. Possibly these refer to the bundles of fibres of the said cortico-spinal tracts passing through the pons and mid-brain into the internal capsule. Bindu according to Swami Ramalingam is the Ajna centre and also means point of light, - here luminous and dynamically radiating point of light (nata bindu madhya Yoga). These bindus or luminous points or formations of light are spoken of also as kalas generally or even as the digits of moon. Thus arise the references in the Yoga literature as dwadasa and shodasa kalas generally, or as the shodasi chandra kala - as the twelve and sixteen kalas in general or as the sixteenth kala of the moon.

Apart from the vision of the sixteen petalled lotus in the higher range of Ajna, the integration of all the sixteen points of light or radiating circles of light lead to the higher experience of the supermind. Some might realise the integration of the Nata Bindu (dynamic bindu) in fives, some in eights or tens, some others in twelves. The rare yogi realises the sixteen together. This would give an integration of all the purified powers of mind vital life and the body so as to lead to the supreme Truth-conscious Light of Supermind. It is evident from the Tantra Yoga literature (see “Serpent Power” by Arthur Avalon), that some realise above the Ajna (i.e, between the mid of the eyebrows and top of head) and below the Sahasrara a twelve petalled lotus or a sixteen petalled lotus as the case may be. Those who realise the former lotus in the brain stem (possibly in the pons or mid brain) seem to have obtained an integration of twelve bindus or kalas only, whereas in the case of the latter all the sixteen are integrated and realised in the thalamic region, especially in the internal capsule.

However though every Yogi reaches the Sahasrara and experiences the Self or the Universal Spirit, the dynamic nature of the experience having an effect on the transformation of mind, life and body might vary according to the extent of the integration of bindus. In a lesser integration the transformation might be restricted to mind or parts of the mind, or to parts of mind and life. Again some reach Sahasrara above the Ajna by exclusive methods, not by integration of bindus or kalas, but by passing through one of the bindus or kalas of the Moon - as they call it - the sixteenth (Shodasi) kala which is described as fine as hundredth part of a fibre in the stalk of a lotus (Verse 46, 47 and 42 of Shatchakra Nirupana – “Serpent Power” by Arthur Avalon) and named as the nectar giving Ama kala which in turn leads to the seventeenth called Nirvana kala, which is subtle as the thousandth part of the end of a hair. Some reach the same by methods of successive exclusions i.e. by passing the successive stages or states above the Ajna (possibly indicating successive bindus or kalas) termed as the seven causal states in and above the region of the forehead, namely (1) Indu the Moon, (2) Bodhini shakti, (3) Nada in shape like a half (crescent)

Moon, (4) Maha nada shaped like a plough, (5) Anji (crooked in shape), (6) Samana and (7) Unmani which having reached one does not return. The seven states seem to represent status of vibration, from longer wavelengths to shorter ones. This seventh corresponds to the above said seventeenth kala called Nirvana Kala. Perhaps it may be possible to correlate, because of the significant symbols of crescent moon, plough, etc., the locations of these seven states with the physiological parts of the brain in the thalamic region and above. The vacant space within the Nirvana kala or bindu is Para Brahman; it implies that the seventeenth bindu (or seventeenth nerve) is in communication with the supportless void, which is considered as above the top of the head.

## APPENDIX - I

### THE MAGNET AS AN AID TO CONCENTRATION IN YOGA

To bring about equal breath in both the nostrils or as a help for concentration of mind, or the inward concentration of consciousness at the Ajna centre in the mid-forehead or in the depth of the inner heart (Anahata), one may use the magnet as an aid. Two magnets of equal power or strength are required. Two solid cylindrical magnets or round disc-magnets with flat ends of magnetic poles, each having a diameter of about 5 or 6 cms. and thickness of about 1 or 1.5 cms. would suffice. Even the arc segment type of magnet, which in appearance resembles a part or segment of a thick ring, and has a thickness of about 1.5 cms. a width of 3 cms and a curvature length of about 5 or 6 cms. would equally serve the purpose.

In the case of arc segment magnets, the one to be chosen should have a convex face as the north pole and a concave face as the south pole, and the other with a convex face as the south pole and concave face as the north pole. These are available in the market for industrial purposes. However, it is important to see that the two magnets are of equal size and density and charged with equal power or strength of magnetism, which is done by the magnetising machine in one single operation. The magnet should have a lifting power to lift about half kilogram or one pound weight by either pole. "Auroville Electronics" of Laljibhai, Pondicherry. 1, started with the blessings of the Mother, can supply such magnets with poles marked S and N.

Each magnet has two poles automatically of equal power or strength, a south-seeking pole (usually called South Pole), and a north-seeking pole (usually called North Pole). The like poles of two magnets repel each other while the unlike poles attract. Each pole when applied to the body has a characteristic effect on it in health as well as in disease. The South Pole gives energy, heat and strength and removes pain, stiffness and swelling in any part when generally or locally applied. The North Pole draws away heat and gives a cold effect but kills germs and hence is applied in cases of infection. Magnetised water prepared by keeping a glass of water on the South Pole or the north pole of a magnet for 10 to 12 hours or more acquires a characteristic change and hence can be used as medicine for its particular effect. But the use or application of a magnet for the treatment of diseases and the drinking of magnetised water as medicine come under Magneto Therapy. Here we are concerned with the use of the two magnets as an aid in yoga and they are generally applied on the body by simply keeping the palms of the hands or soles of the feet on each of them.

Being comfortably seated in a wooden chair in a relaxed pose facing the west (for magnetic effect) one may rest the legs on a wooden plank kept on the ground, and the hands may rest on a wooden table by placing the left palm on the south pole of one magnet and the right palm on the north pole of the other magnet. The whole body should be relaxed and there must be no tension in the legs or hands or anywhere in the body. Articles and ornaments like watch which get attracted by a magnet have to be removed from the body. Keeping the palms in continuous touch with the magnets kept apart by a distance of about a foot or more but without moving them nor applying pressure on them, brings harmony in the physical forces of the body and in the nervous system, through the magnetic induction of the iron-containing hemoglobin in

the circulating blood and through the magnetic forces that pass into the tissues and fluids of the body. The breath also becomes equal in both the nostrils with an equal flow of air in and through them. It clears off dullness in the system and naturally brings concentration even without any conscious effort for it. Therefore, one can easily meditate or have a pure concentration of consciousness with the help of the magnets.

The practice may be done for 10 to 15 minutes in the morning or evening, when the stomach is empty or with a little amount of warm milk if one is hungry. After the practice one should avoid a cold drink and eating cold food for half an hour, but can take them hot or warm soon after, if necessary. A bath, either hot or cold, has to be taken two hours after the use of magnets. Hence it is advisable to use or apply them after the bath in the morning. As an alternative practice, the magnets may be applied in the same way to the feet instead of to the hands, by placing the left sole on the south pole of one magnet and the right sole on the north pole of the other. However, a pregnant woman should not apply the magnets to her feet.

In their effects, the North Pole corresponds with Ida and the South Pole with Pingala of the Pranayama system. But in the use of magnets on the body, we may correlate and balance the heat-giving south pole of the magnet with Ida, the cool moon-like yogic nervous system on the left side of the body (i.e. the left to right or clockwise vibrating nervous system possibly corresponding with the sympathetic nervous system), and the cold-producing north pole with Pingala, the hot sun-like yogic nervous system on the right side of the body (i.e. the right to left or anti-clockwise vibrating nervous system possibly corresponding with the para-sympathetic nervous system.)

In effect, the circuit of the physical nervous system as well as that of the yogic nervous system is completed, because the touch of the magnets essentially brings harmony to the physical and nervous forces of the body resulting in the equalization of breath in both the nostrils for which Pranayama and *Nadi Suddhi* are so laboriously employed and practised over a long period of time. The effect of the application of the magnets in this respect can be felt after a regular practice for a month or two in the case of those who are not already used to meditation or the process of concentration, or Mantra Japa. However, it is seen that the daily touch of the magnets sustains and prolongs the harmony of the physical and nervous forces of the body even after the time of practice and thereby prolongs also the equal and rhythmic breath during the day. One great advantage of the application of the magnets is that an external physical object or means can be employed here for the time being as a help to forget the body-consciousness or avoid or withdraw from the awareness of the body which is the most difficult thing in yoga. This kind of general application of the magnets also gives health, energy and vitality to the body and prevents diseases and easily restores the body to normal health in case of illness. Magnetised water prepared by keeping two glasses of water, one on each of the south and north poles of two disc magnets for 12 hours or more or over-night from the evening to the next morning, may be equally mixed and used for drinking two or three times a day, early in the morning and after the meals but not exceeding 2 oz. or 50 ml. at a time. If strong, M. G. water may be diluted with plain water and used. M. G. water builds up health, energy and vitality. A glass of water or milk can also be magnetised by keeping opposite poles of two are magnets in contact with opposite aides of the glass tumbler. Magnetised water kept in

the mouth for two or three minutes also brings concentration by itself, though not as quickly as the direct application of the magnets as aforesaid.

Magnetised water rejuvenates plants and keeps flowers fresh for a longer time. Animals kept in a magnetic field have a longer life and fruits kept likewise are fresh for a longer time.

It is evident that the concentration naturally brought in by the touch of the magnets or by use of magnetised water is of a physical kind effected not merely through the harmony of physical and vital and nervous forces of the body but also through the soothing and stilling of the physical mind which is the physical counterpart of mind, a mind instinctively repetitive of thoughts and acting in the physical consciousness and cells of the body. However, this concentration is observed to fit in wonderfully with the inner concentration of mind, life and soul. We may say that the harmony of physical concentration supports and sustains the inner concentration, or that in the different strands of concentration, the physical also joins with the others and is felt characteristically. The characteristic mixture of the physical concentration is specially felt more in the Ashram premises after the application of magnet at home. Gangadharan of Sri Aurobindo Ashram, after experimenting with the use of magnets and magnetised water, also concurred with these findings.

Magnetism passes through glass, stainless steel, rubber, cloth and wood. So a cloth belt can be suitably stitched with one end kept open so as to insert a magnet in it and keep it in position by buttons or some other arrangement. Thus the particular pole of a magnet in a cloth jacket or belt can be used safely for therapeutic purposes without touching the magnet directly oneself. Two magnets, each put in a different cloth belt, or at the free ends of the same belt, may be also used for purposes of yogic concentration as explained above. But the magnet should not be allowed to touch sensitive parts like the head, heart or eyes. Magnets with lifting powers ranging from less than half Kg. to 10 Kgs. are used for treatment, according to the nature of diseases. But for the purpose of Yoga, two magnets each with a lifting power of half a kilogram are sufficient. By the use of magnets of this power and M.G. water for a month, my father Rama who is aged 80 years old is feeling more energetic with an improvement in general health and vitality.

The tendency or temptation to use more and more powerful magnets is like the one to increase the time for holding the breath (Kumbhaka) more and more in the practice of pranayama which may sometimes prove harmful after a certain limit. Such a tendency has to be checked in yoga. If during the application of magnets, one gets dizziness, yawning, headache, dullness or heaviness in the head or sleepiness or sudden pain, or tingling sensation in the nerves or other discomfort, one should break the contact with magnets. The body has to get used to the magnetic power slowly over a period of time. However, the said symptoms are reported as likely to occur when using strong magnets and when the body is unable to bear the forces particularly in the case of weak and aged persons. However, trembling sensation in hands or legs, if any, when newly applying the magnets, would go away after two or three days practice. Adverse effect or sufferings by wrong use or selection of magnet can be removed by placing the hands outspread on a large zinc plate for half an hour. Dr. H. L. Bansal, the Magneto Therapist of New Delhi-22, in his book "Magneto Therapy" recommends the use and application of the magnet in every home as it is a nature-cure

method, curative and disease-preventive and, by accelerating the self-healing power of the body, it promotes general health and vitality. Doctor Hahnemann, the founder of Homoeopathy, mentions characteristic psychological effects also as a result of the use of a particular pole of a magnet and observes the absence of sexual desire\* when using the whole magnet, i.e with its two poles or the opposite poles of two magnets. In the light of the above findings we may conclude that the simplicity of its application, using its static magnetic field or flux and the positive benefits of health and curative *value* especially in diseases where organic degeneration has not set in, and its harmonious support and link with the higher forces of concentration of life, mind and the spirit particularly in yoga, give to the magnet its due and rightful place in our day-to-day life.

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\* The absence of sexual desire observed by Dr. Hahnemann should be taken as a temporary stunning effect, more due to the application of a strong magnet over a long period and that for an hour each time, because his subject daily held in hand a horse-shoe magnet with a lifting power of 5 Kgms. for an hour touching both its poles. The sex-libido cannot be cancelled by magnets alone, unless the will consciously rejects the sex desire. However, the sex energy can be purified and led inwards and upwards by application of low power magnets to the heels of the feet.

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## APPEDIX-II

### A DISCOVERY OF THE YOGA OF MAGNET

In the subsequent experiments done in collaboration with the devotees and inmates of the Ashram, and duly verified as to the results, it is found that the application of two magnets to the soles of the feet, as described in the foregoing article, gives direct and inward concentration into the progressive depths of the heart centre (Anahata) and leads it into the very depth of one's soul i.e. the psychic being, whereas the application of the magnets to the palms of hands, as described in the said article, gives not only direct inward concentration at the Ajna centre in the mid-forehead but also, after a few minutes the upward concentration to the top of the head. Therefore one may conclude that there are surer possibilities of reaching one's soul within the depth of the heart through the touch of magnets by the feet, and of realising the common self above the head through the touch of magnets by the hands, provided one has the needed psychological purifications to a sufficient extent and also the aspiration for the spiritual realization attended with an attitude of surrender to the divine Grace to fulfil the aspiration.

To reinforce the said concentration at the heart centre, one may keep thereat on the chest the palms joined one over the other or interlocked by the fingers. It may be practised in the sitting posture, or in the lying posture when one lies flat on the back comfortably in the bed, in which case, the magnet has to be tied to each sole by separate cloth belt or band so that the north pole touches the right sole and the south pole the left sole. Or as an alternative to keeping the palms in the aforesaid manner, one may apply, in addition to the two magnets, another but small solid cylindrical or coin type of magnet of a lesser power (capable of lifting a weight of about quarter kilogram or even less) so that its north pole touches the said heart centre (not the physical heart) which is in the middle of the pit of chest at the lower end of sternum. The concentration will be further reinforced, if the left palm alone is placed now on the other pole of this magnet. The right hand has to be kept aside and away from the chest or the body. This method gives a very good depth of forceful concentration at the heart centre.

Those who are naturally used to concentration in the head or at the Ajna centre may also use this method, and in such a case, the concentration shifts easily from head to the heart, especially in the lying posture. In the sitting posture, some, if not all, may feel the head slowly bending down towards the chest which is an indication of the inward concentration taking place into the depth of the heart.

Those who want a direct inward and upward concentration in the head for realising the overhead self have to practise the second method and apply the magnets to the palms with the south pole touching the left palm and the north pole the right palm. This would incidentally help also to draw upward the Kundalini consciousness From Mooladhara, the sex centre, though however it is not desirable to do so without the necessary purification or elimination of psychological impurities such as lust, desire, anger, etc. However, experimentally, if in addition to the two magnets, the south pole of a small solid cylindrical magnet is kept touching the perineum, the lowest part of the trunk of body (Mooladhara) or north pole at the root of the sex

organ (penis or possibly its analogous part, the clitoris in the female) on the pelvic trunk, the Kundalini is awakened to rise up. One may feel the body becoming erect in sitting posture. At the least, one may physically feel the pulling inward and/or upward of the organ, perineum and sometimes even the *anus* which gets closed in the process.

One may practise the two broad methods, each for 10 minutes but with a sufficient *interval* of time, say 15 minutes, between them or alternately one in the morning and the other in the evening in order to get a total effect which is very likely to prepare one in due course of time for the realization of soul and the self by the Grace of the Divine Mother. As the Chakras or yogic centres are interlinked concentration at Ajna eventually brings concentration also at the heart and vice versa and both tends to activate Mooladhara resulting in the awakening of Kundalini also.

In short, the touch of magnet is not only an aid for concentration but it is by itself a method of yoga. Its method is direct and effective practical and verifiable as to the results which have a prolonged effect on the inner and outer states of one's adhara. It is yoga as it brings, like other yogas equal breath, stillness of mind and inward and upward concentration. Though apparently a physical yoga, it gives the experience of inner states of being which physical exercises, games and asanas cannot, though the latter may have their own importance to the body, life and mind. Its adaptability and manoeuverability in changing concentration from head to heart or vice versa or in reinforcing the concentration is an added advantage. It supports and strengthens and somewhat quickens the processes of all other yogas, whichever one follows such as Jnana yoga, Bhakti yoga, karma yoga, Tantra, Hatha, Raja Yoga etc. or a combination of these. Yoga is one and indivisible and after all whatever yoga one pursues, one has to do it with the physical body which is itself a field of electromagnetism, influenced by the earth's magnet. The yoga of the magnet evidently links all yogas. Whoever touches the magnet according to the said two methods, knowingly or even unknowingly as in the treatment of diseases or for general health and energy may have to be considered as doing yoga. The yoga of the Magnet is at every one's doors for practice as an art and science with certain imagination and understanding of its technique. Magnet is the bridge between science and spirit.

## APPENDIX-III

### SWAMI RAMALINGAM BRIEF LIFE SKETCH

Swami Ramalingam, popularly known as *Vallalar*, the Great Munificent, may be regarded as the foremost of the saints and sages of the nineteenth century, considering the heights, widths, depths and intimacies of his integral realization of the Divine in all the “inmost, inner, outer and the outermost parts of his being”. He was a yogi who put before the people deathlessness of body as an essential part of the realization of the one blissful Divine, a saint whose very soul-stuff was made of infinite love and compassion, a sage of Truth - consciousness who possessed the divine knowledge and science of deathlessness of body and attained its deathless transformation along with the self-creative power of creating all substances of whatever kind including bodily substances, a born Tamil-poet of divine inspiration who could distinguish the various levels of inspiration and who received in silence the “Word of Truth and Grace from the Cit-Shakti of Grace in the transcendence of Cit Sabha, the transcendent and universal world of Truth Consciousness”. Besides, he was a critic, writer and commentator and also had knowledge in occultism, alchemy, astrology, and medicine particularly in the nutritional and medical *values* of herbs and leaves. He was a musician too with a keen musical taste for lyrical songs and he composed lyrics to express, in an easier and popular style, his highest and sublime realisations of the Divine, particularly that of Truth-consciousness (Satya Jnana).

Of the six volumes of “Arutpa”, the poems of divine inspiration, the last volume is unparalleled in spiritual history as it gives expression to his realization of the vast world of Truth-knowledge and the Beyond, and touches on subjects like transformation and deathlessness of body. If any sort of comparison has to be made at all or even for its own proper understanding, it can be done only with reference to the vast and infinitely detailed spiritual and yoga literature which Sri Aurobindo has fortunately and gracefully left us behind.

The Swami was the one who affirmed openly and clearly in an unmistakable language the deathlessness of his body which he attained by the power of what he called “Arut Perum Joti”, the Vast Grace - Light of the Divine which he identified as the Truth-Light of knowledge, Satya Jnana Joti. In the last decade of his life he started first in 1865 an association of spiritual fellowship called “Samarasa Suddha *Sanmarga* Satya Sangam”, the association for the path of purity, truth, the right and harmony, opened in 1867 a dharmashala at Vadalur for the feeding of the poor and the hungry, inviting the people to express to their fellow-beings and creatures compassion which is the grace of one’s soul for meriting the Greater Grace of the Divine for His realization; and lastly founded at Vadalur, 40 miles off Pondicherry, in the significant year 1872 a symbolic shrine of worship called “Satya Jnana Sabha”, the sanctum of Truth-knowledge in honour and respect of the universal coming of the God of Vast Grace-Light who was about to manifest, requesting the people to receive Him and His rule on earth in all joy and enthusiasm. In this shrine the diffused light of a lamp is worshipped as the divinely sanctioned and blessed symbol of the divine Light of Truth-knowledge or Truth-Consciousness. He even wrote to suggest that this lamp of light, which is kept behind seven coloured screens of cloth representing the seven veils of Ignorance, might be lit up in the shrine until the God of Vast Grace-Light becomes manifest on the earth with His siddhis or miracles such as the changing of

the aged into youth and re-awakening of the dead into bodily life; these siddhis are indications of His manifestation.

Swami Ramalingam was born in 1823 in Marudur near Chidambaram in a Hindu Saivite family as the fifth child and last son of his father Ramayya Pillai and mother Chinnammayyar who had borne him in her womb after she received *vibhuthi*, the sacred ash of blessings from an unknown guest of honour, a Siva Yogi who blessed her with a son like himself. Ramalingam was conscious of his birth not merely at the time of birth but even during all the processes that culminated in fertilisation, as he wrote to say in “Peru Vinnappam” that the emanations of his soul took active part in the formations of the spermcell of his formal father and of the egg-cell of his formal mother with the divine inner light of protection for keeping up the divine qualities of his soul and good physique.

In the fifth month of its age, the child, as was the custom, was taken by the parents to the Chidambaram temple where it broke into mirthful laughter before the deity of Nataraja during the formalities of worship. In front of the adjacent sanctorum called ‘Chidambara Rahasyam” signifying according to popular notion the vacant sunya or void, the child sensed infinity, which is expressed by the swami in one of his songs (Arulvillakkamalai. Stz. 44).

தாய் முதலோரொடு சிறிய பருவமதில் தில்லைத்  
தலத்திடையே திரை தூக்கத் தரிசித்தபோது  
வேய்வகை மேல் காட்டாதே எந்தனக்கே எல்லாம்  
வெளியாகக் காட்டிய என்மெய் உறவாம் பொருளே.

His divinity came to be recognised by the devotees in his early age of eleven years when he began to visit the Shiva shrine at Tiruvottriyur, a suburb of Madras, where he sang impromptu devotional hymns and songs in praise of the one Divine, the Impersonal Person of Formless-Form, in the forms of Shiva and the goddess Uma. Even in these early songs we meet with his intense and fiery aspiration for the Grace-world of Truth-knowledge (Arul Veli) and for deathlessness of body. These songs also touch on his aspiration for spiritual life, purification, consecration, devotion, surrender, compassion and reverence for all beings and creatures and oneness with the Divine. These poems of this period form three volumes of his Arutpa.

Many miraculous events are attributed to the Swami in this period of life at Karungkuli that is two miles off from his later resort of Vadalur. He had mastery over mind, water and rains, fire etc. and over living beings and creatures like serpents, ghosts and spirits of this world and also on vital beings of the other worlds.

The Swami withdrew himself in seclusion for about six months at Mettukuppam three miles away from Vadalur and in the concentrated state of realization of the World of Truth Consciousness and the Beyond, he wrote his master piece of “Joti Agaval” in 1872. This piece of poem describes the self-determinations of the Vast Grace-Light, the poises of the world of Truth-Knowledge, planes of ascent, involution and evolution, golden plane of the earth, purifying and transforming powers of the Light, transformation of his body, knowledge and science of deathlessness of body, general nature and characteristics of the world of Truth-knowledge, the worlds of Satcitananda beyond etc.

The Swami unfurled the flag of his *Sanmarga Sangha* on 22-10-1873, marking the day as its effective beginning and also gave the Mahamantra of Vast Grace-Light by Divine sanction. to the disciples on the same day since when he more actively expected the coming of the God of Light to the earth for His direct reign. About this period he also expressed his will to enter into all physical bodies (i.e., on an universal level). The Swami withdrew in seclusion in a closed room in Mettukuppam on 30-1-1874, promising the disciples that the God of Light was imminently coming and he would disappear from their sight for a period and would come back when the Divine Light became manifested. From his last songs, message and spoken words, it is seen that his dematerialization of his deathless body occurred in the Divine presence and in the process of the stable manifestation of the God of Vast Grace-Light on this earth. Thus the dematerialization of his body was a sacrifice and consecration for a supreme purpose. The Swami was never seen thereafter, and the place of his disappearance was soon inspected by the then District Collector and Medical Officer and they have reported confirming his disappearance. One can very well feel today the spiritual and supramental forces of deathlessness in the place of his last resort i.e., *Siddhi Valaga Maligai* at Mettukuppam as also at Vadalur where the shrine of Satya Jnana Sabha stands as a symbol and monument in honour of the coming of the Supreme Divine to the earth.

Courtesy: Arut Perum Jothi and Deathless Body.

## APPENDIX - IV

### COLOUR RIBBON ON SWAMI RAMALINGAM'S PICTURE

Due to supramental Truth-power of Grace-light in His Body and of Satcitananda-Power in his environment as felt by touch of his picture, (as in His poise with joint palms) as given in this book, one's ignorant body too absorbs and retains Its general power, if for a month the picture (as protected in a plastic cover) is kept on touched by finger - tips of one hand during the intake of food or drinks, or by keeping food-plate or cup itself on it and touching them by both hands for a minute before intake. This promotes general health. After a month one's body-power is felt by touch as nearly equal with that of the picture, as in His Body or environ.

This chart (made on a white cardboard with His picture affixed at the centre) then guides as a divine computer in curing diseases. Purchase 36 color ribbons, one metre in each, sew, or pin by staple their pieces in the 36 squares on the margin (around the four sides of His picture) so as to extend an inch outside. Each color has a specific power as felt by touch. Body's tissues, organs, glands and fluid-contents are of varied colours\*. White, violet, light mauve, deep blue, green, yellow, orange, golden, red, rosy-red, brown and greenish-golden are the twelve main colours to start with for therapy. If a color becomes weak or deficient in the body, disease is attracted. If its color-power is set aright disease gets cured or prevented. So, without pre-judging, first dowse or find out the deficient colours in the body. Keeping one hand or a thumb on the picture, touch each color strip for half to one minute by a fingertip or two of both hands. When gently removing the fingers from each color, observe whether a force is felt in the head. If felt, that color is normal in the body. If not it is deficient. Now lay the "deficient color" ribbon across the first said picture (or a Zerox of it). Keeping finger-tips of left hand on the ribbon, eat and drink by the right hand for a day or two or until that color becomes normal. Disease gets cured, because foods and drinks get charged with that color-power. If dowsing shows many deficient colours, verify them again for deficiency. For treatment, touch morning and evening their ribbons on the picture by fingertips of both hands for a minute each, but take food charged by touch on one distinctive deficient color at each time of food. If after two or three rounds of dowsing and treatment, any two colours persist to be deficient, their ribbons may be joined on the picture and touched on each side for dowsing the "deficient side" and accordingly take food touching on that side of the joint ribbons - OR, by touch of the "deficient side" ribbon by left hand finger-tips and the other by the right, and the food by thumbs for two minutes before intake. If a single color persists in deficiency, warm water for bathing or oil used for oil bath (e.g. gingely oil) may be charged with its color-power by touch and applied on body and washed off after an hour. Or the ribbon may be tied around hands, especially around the forefingers. If pain, inflammation, or other disorder are felt in a localised part of body, e.g., tooth, gum, knee-joint, eye, limbs, stomach etc., - keep one hand or fingers on the trouble-spot and dowse the deficient colours by color chart and treat them accordingly by food as well as by local application of color charged water, milk or juice of sweet sathukkudi orange.

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\* 36 colours include the 25 mentioned to be in His Body by combinations of white, red, green, deep blue (Karumai), and the golden.

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Black grey and slate as such are unhealthy or not so healthy colours. Red or deep red, and especially crimson red and rosy-red give heat to body and nervous system so as to cure cold and phlegmatic conditions (Kapha). Deep rosy-red cures in the long run nervous pains, rheumatic disorders, spondylitis, arthritis etc. Deep blue cures imbalanced vata of excessive nervous vibrations and energy; and deep - rosy red the weak or feeble vata. Green gives cooling effect and cures pitta state of excess heat and fever. Greenish-golden relieves nausea and biliousness. However, each has to treat oneself according to his or her deficient colours.

This therapy supports all medical systems. So, for a quick and complete cure, it can be combined with medical treatment, especially in infections localised or general – when green and its shades (13-19), rosy-green, indigo-green, magenta-green, occur mostly as the deficient. In virus infections the mild black combination-colours also may be deficient, and they have to be used only as double ribbons for example, green (or its shade like olive green) on black. golden on black, blue on black, white on black, etc. Before treatment dowse the deficient colours, as they are likely to have changed on and after the treatment by color and by medicine. Dowse daily and treat accordingly. Excess treatment of greens will harm growth of normal cells of body. Also dowse the right types of suitable food (in cooked or pre-cooked state) by touching them on the picture or outside for example, sample, packets of several kinds of pulses, cereals, vegetables, fruits, milk, curd, sugar, etc. Dowse likewise medicines and vitamins in powder or liquid form. If force is felt in the head on the break off of the touch, it is suitable and curative. If not it is to be avoided or sparingly used during ailment. Sugar and sweets are generally found unsuitable during infection.

In a state of temporary body-equality, dowsing cannot be done so long as it lasts in those who are used to deep meditation. After sometime of activity or by touching magenta-rose (Rose on magenta) for a minute, it can be done.

#### List of 36 Colours Arrangement

1) Medium Red (Red on white) 2) Light Red (White on Red) 3) Red or deep red 4) Crimson red or Mauve-red (Red on mauve) 5) Carmine or Rosy-red (Deep rose on crimson) 6) Maroon (deep red on brown, or red on green) 7) Magenta (Red on deep blue), 8) Orange (Red on golden) 9) Bright Orange (Rose on Golden) 10) Pale Red (light red on coffee brown) 11) Yellow 12) Lemon Yellow (yellow on green) 13) Parrot green (Green on yellow) 14) Medium green (Green on white) 15) Light Green (White on Green) 16) Dark green (Green on Red) 17) Green or deep green 18) Dusky deep green (Green on deep blue) or Green on deep Indigo 19) Olive green (Green on Golden) 20) Medium blue (Deep blue on white) or Indigo the bluish - violet 21) Light Blue (White on deep blue) 22) Violet (Deep Blue on Red) 23) Greenish-Blue (Deep blue on Green) or deep Indigo on Green 24) Deep Blue without black mixed. 25) Coffee powder brown (deep blue on golden) 26) Medium golden (Golden on white) 27) Light golden (White on golden) 28) Light Orange (Golden on Red) 29) Greenish-Golden (Golden on Green) 30) Brown (Golden on deep Blue) 31) Golden (Yellow on Rose) or deep Golden 32) White 33) Rose (Light Golden on Magenta) or Pink which is pale Rose 34) Light Mauve (light Blue on Rose) 35) Light Brown (Light Mauve on Golden) 36) Magenta-Rose (deep Rose on Magenta).

## Concentration Ribbons

Meditation on the Supreme Being of Supramental Light of Grace (Arut Perum Jothi Andavar abbreviated as APJA) may be done after touching for 10 minutes by finger-tips of both hands the following ribbons - Rose, or Rosy-Red or (Deep Rose on Magenta), or the six basic colours in the order of Rose, deep Blue, Green, Red, Golden and White (33-24-17-3-31-32) or the double ribbons as in (33-25-35-29-8-27) i.e., Light Golden on Magenta; deep Blue on Golden; Light Mauve on Golden; Golden on Green; Red on Golden; White on Golden but finally touching 36th (Deep Rose on Magenta)\*.

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\* Meditate especially on Pushya or Poosam (Cancer star) day in each month, when APJA comes seeking us directly.

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The purpose for which colours of the chart are touched shall be clear in mind, either for dowsing of the deficient colours, or for concentration or for general harmony and health of body, Only in the last case, ribbons may be touched, two or three together at a time for a minute with finger-tips of both hands by holding one hand behind the other, and keeping one thumb on the picture. For the purpose of convenience, the ribbons specially meant for concentration may be affixed in two or three rows at the back of the Color Therapy Chart in its lower part, and particularly the double color ribbons shall be fixed one on the other by staple pin on one side.

Color ribbon therapy by color-charged food may be supplemented at one's option, by tying of the "deficient" color ribbon around the fore-fingers or by exposure to the needed color light. The ribbon may be tied around each fore-finger so that one side or loose end of it may be in contact with the thumb, while its other side with the palm or other fingers. In place of ribbon, color kerchief may be used and kept in one's hand.

Deep blue in both hands gives peace and equality to body as also to mind and relieves nervous pain and cures the disturbed vata, and helps to bring sleep and restfulness. Similar effects are obtained with mauvered ribbon in one hand and the magenta in the other. Deep blue also may in addition be tied to both hands around fore-fingers to have additional effects. Intake of food charged with deep blue or with "magenta on mauve-red" brings peace to body and they have curative effects in general.

If necessary, a torch light or a table-lamp light may be covered with the deficient color ribbon or cellophane color paper or be fitted with the color bulb, and the color light may be directed and focussed on the palms for 5-10 minutes, and then on the painful or inflammed part if any for 5-10 minutes. Color light treatment has a quick effect on the system, and hence it may be had once in a day preferably in the evening before food, or 3-4 hours after food. Color bulbs in 40w are available only in the main colours, blue, green, red, yellow and orange. Cellophane color papers are in

green, yellow, rose-red and greenish blue. Color therapy by food is more natural without side effects.

Colours are correlated with the three bodily humours Pitta with green deficiency, Kapha with red, Vata excess with deep blue, and feeble Vata with rosy-red. Those who practise color ribbon therapy by food develop in due course of time a capacity to feel easily the disturbed vibrations of the three humours in the three respective or distinct parts of each fore - finger-Vata in its top part, Pitta in its middle part, and Kapha in its lower part. With fingers of one hand (other than fore-finger) kept on Her picture, the humours are sought to be felt by touching each part of a fore-finger by tip of the fore-finger (or of thumb) of the other hand, and a disturbed humour if any will be felt especially on removing the tip. Thumb picks up even feeble pulsations. When the deficient colours are many, the above simple and new method of diagnosis which is different from the pulse-reading of hands by indigenous and expert doctors - helps to determine the humour and the color mainly affected and the tying of its ribbon around fore-fingers quickly acts to calm down or stop the disturbed vibrations and helps to know the correctness of color. If the three parts of fore-finger do not show any vibrations, it indicates a general normal health.

Digestion depends on digestive heat or hunger of the normal pitta. If digestive heat becomes less, Kapha state may begin, Vibrations of Pitta, Kapha and Vata in their excess can be understood by a study of the pattern of deficient colours, and treated accordingly by intake of food charged with the deficient colours, and treated accordingly by intake of food charged with the deficient colours in their turn, though food may be selected on the basis of heat-giving food like wheat, red gram etc, for Kapha state, food with cooling effect like rice, green gram etc., for Pitta state, and the equalising or balancing food (Samanakari) like milk, lentil, or masurdal etc., for Vata, or the last kind along with the alteration of heat-giving and cooling foods.

Food may be selected also on the basis of six tastes - sweet, soury, saltish, pungent, astringent and bitter. The first three relieves Vata and its gaseous formations by taking sweet food added with a little soury and saltish tastes. The other three tastes would give rise to gaseous troubles or flatulence. The first three taken in excess would result in cooling effects of Kapha. Kapha state is relieved by bitter, pungent and a little astringent tastes. whereas Pitta is cured by sweet, bitter and astringent tastes. These are the broad and general lines of guidance according to the dietetics of the age old Siddha Ayurveda and Unani systems of Indigenous Medicine, but these have to be here linked up with the color ribbon therapy and whatever food is chosen or habitual it shall be taken in after charging it with the deficient color. Books on materia medica of food and dietetics giving medicinal and nutritive *values* of food including fruits and leafy vegetables greatly help to choose the right type of compatible food, as such books give also the classification of foods as hot or cold, as dry or wet as well as the degree or grade of such effects (Refer "Medicinal secrets of your food" by Dr. Aman of Indo-American hospital, Mysore). If these details about various foods are cumbersome to remember and follow, compatible and incompatible food during illness may be dowsed in the manner suggested earlier before, and accordingly taken in with the deficient color-power added to it. For the purpose of color ribbon therapy even the intake of the habitual type of healthy food helps as the color-power added to it makes it have a medicinal effect. Therefore, color therapy by food is fundamental and common to all systems of medicine including allopathy and homeopathy.

## Color Therapy and Magnet Therapy in Psychiatry Cases

Psychotic, neurotic and hysterical patients show mental disorder and also spirit-possession that may remain unsuspected throughout or for a long time. The evil spirit may overtly manifest or remain hidden usually in its attacks of nervous convulsions, fits of abnormal rage and emotional disturbances such as anger, fear, depression of sorrow etc., fits of obsessive thoughts like suicide, fits of confusion and clouding of mental consciousness etc. – the hiding of the spirit being meant to deceive the patient victim and those around him, to keep them unsuspected about itself till it takes hold of the navel or especially lower abdominal centre (chakra) of the patient, wherefrom it clouds his brain-mind in the head through attacks on the nervous system, especially in the initial stages, and later it spreads its influence to other centres, more and more obscuring the patients own individuality and self-control. Hence in the beginning when one, who is taking food by touching Swami's picture or such a near relative, (touches by a finger-tip on the face, or on lower abdominal centre Swadhishtana), of the patient's photo, keeping another finger-tip on his environ, no force of consciousness may be felt. All the attacks of the spirit on the nervous system and its various kinds of manifestations are in the outer nature and consciousness of the patient. It weakens his EBP power which is not felt but his UNO power is felt in the top corners of his photo\*. In the light of these findings, there is a promise for relief, remedy and cure by the following methods of treatment – spiritual, psychological and medical. EBP, UNO and SR powers have been already explained in the opening pages and preface of the book.

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\* This can be also studied by the said person easily in the pictures of many kinds or psychiatry patients (given in psychiatry books), by touching each centre (chakra) of their body, even though dressed but simultaneously touching in the close environ of head and waist and then at the top corners of their picture.

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- a) Half the battle is won if the patient becomes or is made aware of by others, that there is an evil spirit acting with an evil force behind its attacks and that he can be free from it. The spirit begins to lose its ground, when once it is sought to be exposed, even on the basis of an assumption, though not hunted out by deliberate methods. This is a psychological effect.
- b) The near relatives have to help such a patient in the simultaneous treatment by color ribbon therapy as well as by magnet therapy. Daily in the morning, before food. North pole of Swami's spiritual magnet has to be kept first on his top head, then on forehead, heart, navel and lower abdominal and sex or pubic centres, successively for 5 minutes at each centre, while the patient shall touch its south pole by left palm only. It leads his consciousness into the inward levels and hence the restoration of normal consciousness is made possible. The hidden spirit begins to lose its hold in the brain-centres in the head, and hence moves down to a lower centre and when magnet is shifted there also, it moves to a still lower centre giving the patient uncomfortable pressing sense or compression at each such lower centre, before being relieved by magnet application. The spirit may even speak through the patient, that it would leave

him off. It may descend finally into his leg or foot. In the case of lower centres, from navel downwards, a heavier magnet (i.e., high-powered with a lifting power of 2 to 5 Kgs.), may be applied in the lying posture for significant results. Head and heart centres shall be applied only with a low power magnet with a lifting power of half a kgm. At the least, top head and lower abdominal centre be applied with magnet in the said manner.

- c) EBP power which is weakened in the environ of the patient due to mental disorder or attack of evil spirit may be activated and strengthened by the following radiation method. Keep a small but full picture (head to foot) of the patient on the picture of Swami Ramalingam. Take a long wire with plug and bulb at the ends. Lay the wire so as to pass on and touch the patient's photo (from head to foot), which is already kept on the Swami's. Switch on the light of the bulb for 24 hours daily. The reinforced EBP and UNO powers around the patient, as supported by Swami's Body-power now vibrate in the environ of the patient and enter into him counter-acting the bad forces of the hidden spirit which is usually of a lower vital nature in Kind. A small size picture of the Swami shall also be kept in contact with the two wires of main switch of the house.
- d) In addition to the two joint pictures, may be joined for radiation a mantra and prayer paper written and signed by the patient, in which Name of Arut Perum Jothi Andavar is written repeatedly, with a prayer at the end, invoking His Grace for curing the patient's mental or other illness. Or the said paper may be radiated by a separate wire line passing on it.
- e) The patient or his relative may touch by finger-tips of one hand the photo of the patient on its top corners, environ, and head, and likewise by the other hand the Swami's picture. Swami's eyes shall be also looked into\*. This spiritual-cum-psycho-logical method may be done with the chant of Arut Perum Jothi mantra of the Swami (given below His picture) or by simple remembrance of the Divine for cure. When the Swami is remembered to be within the patient, in his mind and body, no evil spirit can stay there or even around his outside atmosphere. This has its psychotherapeutic effect. The patient shall be asked to touch his navel centre (Nabhi) and tell his own vital being and nature there, not to fear the spirit, nor consent to the morbid suggestions of the hidden evil vital spirit nor take them as his own for example, the suggestions of suicide or that the patient is changing into an animal. While so doing, he shall also touch the Swami's picture and see into His eyes.

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\* After which the latter shall see into the eyes of the patient, and repeat the process for a few times. Or keep the patient's picture (small size) on the Swami's so that their eyes come close in one line, and now see the Swami's eyes first and then those of the patient in his picture or directly into his eyes. Repeat it for a few times.

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- f) For color ribbon therapy, the weak or deficient colours in the patient's body may be found by joint dowsing by which, – along with the patient his near

relative too puts and removes his finger on and from each ribbon on the color therapy chart (bearing Swami's picture at the centre). The helping relative will feel in his head, when the patient removes his finger from a color, the force of the color if it is normal and absence of force if it is weak in the patient. The patient has to take treatment necessarily for the deficient colours through food. Or the close relative may prepare and give color-power-charged food to the patient. The "deficient" color-power may also be radiated to surround the patient, by keeping its color ribbon on the electric wire above referred to in clause (c). At the least, the patient shall be advised to take daily food and drinks, by touching the Swami's picture by one hand.

- g) The regaining of consciousness by head or by any other centre (chakra) of the patient due to the treatment can be tested and felt as a force, if and when a near relative (or psychiatric doctor) touches directly by a finger-tip such centres in the photo of the patient (of course, on the mid line of his dressed-up body, from head to pelvis) – or by keeping in addition another finger-tip on the close environ of his head, waist or leg, but without touching it or the clothing.
- h) Sedatives like Brahmi Chrutam (ghee with Brahmi leaf essence) is given at bed time to induce sound sleep in the patient. Patient's excessive heat in head, in the navel, and in the palms as especially felt during restless jerks of hands and convulsions, is cooled down by application and massage of Mahabhirungaraj oil to the top head daily once, and by its oil-bath once or twice in a week. North pole of a heavy magnet when applied to the navel centre cools down the area and reduces restlessness of movements of limbs.

## APPENDIX - V

### THE INTERNATIONAL SOCIETY FOR THE INVESTIGATION OF ANCIENT CIVILIZATIONS

The International Society for the Investigation of Ancient Civilisations is a non-profit, non-commercial research organisation founded in 1979 at Indiana by Dr. R.P. Anjard and Dr. N. Mahalingam when the latter visited the former at Indianapolis, Indiana, U. S. A.

The purpose of the Society is to conduct research into the science, philosophy, culture, influence and history of ancient peoples. Emphasis has been directed to natives of America, ancient India, Egypt and several selected areas and their peoples. Archeo-astronomy is a field of specialised study.

Research is performed through personal communication by Society members with established authorities throughout the world. The society staff includes international authorities and leaders of several native American groups. Results are shared internationally with staff and society members. Many articles have been published internationally by individual society staff members.

Although the society has offices in several countries including India, the Society Headquarters address is 10942, Mentego Dr. San Diego, Ca-92124, U.S.A.

Dr. R. P. Anjard is the International Director. Dr. N. Mahalingam is the Chairman for India.

During the last seven years the ISIAC has published twenty-two books; six books are in print now.

In India, astronomical research is done by Mr. G. S. Sampath Iyengar of Gorur, Karnataka, who is a Vedic Scholar; he lives at Bangalore.

The research on history comes directly under the Chairman Dr. N. Mahalingam. Research on Vedic Studies is done by the Vice Chairman Mr. M. Sundarraj who has authored eight books on the subject.

Dr. W. Raymond Drake of England and Dr. Erich Von Daniken of Switzerland are researchers in Cosmology.

The ISIAC conducts a Seminar every year. So far, it has conducted Seminars on the following themes:

1. *Mythology to History through Astronomy*
2. *Date of Ashoka*
3. *Date of Buddha*
4. *Date of Adi Sankara*
5. *Comparative Indian Philosophy and Literature*

## APPENDIX- VI

### LIST OF BOOKS PUBLISHED BY THE INTERNATIONAL SOCIETY FOR THE INVESTIGATION OF ANCIENT CIVILIZATION

Name of the Book	Author
1. Mythology to Historythrough Astronomy	Dr.N.Mahalingam
2. Ancient Hindu Astronomy	Sri. G. S. Seshagiri
3. Riddle of the Ring	Sri. G. S. Sampath Iyengar
4. Gems from Pre-historic Past	Dr. N. Mahalingam
5. Glimpses from our Glorious Past	Sri. Swamy Sakhyananda
6. A peep into the Historic Past	Sri. V. G. Ramachandran
7. Some Thoughts on Hinduism	Dr. N. Mahalingam
8. Some thoughts on Vegetarianism	Dr. N. Mahalingam
9. Thirukkural	Sri. S. M. Diaz
10. Discourse on Ancient Hindu Astronomy	Sri. G. S. Seshagiri
11. Siva Around the World	Sri. V. G. Ramachandran
12. Ancient World	Dr. N. Mahalingam
13. Three Gems	Dr. N. Mahalingam
14. Hindi Problem and Ultimate Solution	Sri. K. N. Anandan
15. Rig Vedic Studies Series I to VIII	Sri. M. Sundarraj
16. Veda and Vedanta	Sri. M. Sundarraj
17. Veda and Tantra	Sri. M. Sundarraj
18. Kongu History Part – I	Sri. V. Ramamurthy
19. Cosmic Continents	Dr. W. R. Drake
20. Gauthama the Buddha	Sri V. G. Ramachandran
21. The Calendar of the Bharath – Then and Now	Sri. G.S.Sampath Iyengars