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The Sub Atomic Particle Dance and Its Relationship to the Study of Charge Conduction While Monitoring Bone Fracture-Healing.

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ABSTRACT

In this paper an analysis is made on the relationship between the electronic equilibrium that is achieved as the process of fracture healing is nearing the final stages as shown in certain studies. It also discusses the things that were told by Professor Fritcjof Capara American Physicist in The Tao of Physics. We also ponder over how similar analogy was born out of Kekule's dream of Ouroboros and how there is a similarity in the discovery by keen observation, inspiration and dedication in both these occasions.

Keywords: dance, bone, fracture, healing

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INTRODUCTION

In life certain things are not fully understood and are still murky. There are still mysteries in certain areas of science which man tries to explore. A perfect example is the electrical events that occur in fracture site during its healing. When we pass a current across a fractured limb, we are unsure of the exact quantum of current that passes through each tissue for example the bone, the skin, the muscle etc. But on the whole the current stabilizes [1-5]. This paper will deal with electric concepts that exists in nature and conversion of one element to other and its association with events of fracture healing.

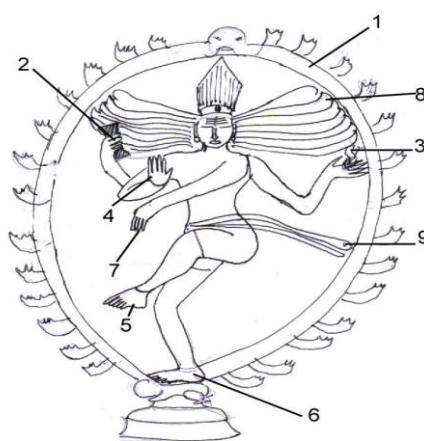
Ancient India and Science

The Siddhas in ancient India practiced alchemy as a passion. People were searching for methods of converting elements of one type to another. Such myths in the west are seen in stories of Midas. Recently, by bombarding one element with charged particles another element is produced. Also in India, there is enough literature where men who lived long before Jesus, have tried methods to produce electricity. There are also certain verses in the scriptures which talk about the origin of electricity. We also register even as early as 4000 BC, scripts describe a form of electrical battery from an earthen ware with copper-sulphate, wet saw dust, mercury and copper plates. Coming to the idea of positive and negative charges is referred to in Hindu mythology by Max-Mueller. He attributes Narasimha, an avatar of lord Vishnu formed from a blast of a club hitting a pillar by a bad character called Hiranyan. This, Maxmuller feels, is an electrical phenomenon of clash of positive and negative characters [6].

There are two clear aspects of electric charge in association with fracture healing will be considered in this paper. One is the subatomic dance and the next is discovery of benzene ring that is from an inspiration from a dream form.

Lord Nataraja's cosmic dance resembles sub atomic particle dance

Obviously, movement of charge is called electricity. Such movement of charges between the components of a circuit can occur if there is an energy gradient. i.e. from more electro-negativity to a lesser negativity. When an electrical field is stable then there is no current flow i.e. milieu (environment) is stable. When there is an irregularity in the flow of current, it is due to the milieu that has irregular charges i.e. environment with irregularity. Electrons are believed to jump to a nearby atom when an external electric current is applied. But in reality these electrons keep jumping even in the absence of an external electric source like a DC generator [7].



1 –Arc of fire -outer limit of an atom 5-Left foot signifying release

2-Right upper hand holding drum of creation 6-Right foot on the demon-equilibrium

3- Left upper hand holding fire of destruction 7-Left lower hand pointing to left foot for surrender

4 - Right lower hand showing the sign of blessing 8-the curls of hair moving showing the speed of the dance
9 –The drapes of the lord.

Shown in figure is the “Anandathandava” of lord Nataraja [8-10]. The parts of the Nataraja who is dancing with the upper right hand , the lower right hand , the upper left hand and lower left hand, the right leg, the left leg, locks of his hair, his drapes ,and the arc of fire around him. The details of his holding and his specific postures are described in the figure. This cosmic dance is compared to the jumping of these sub atomic particles [1]. For a simple analogy, index and thumb of left hand is kept in position of ‘O’ and the other five fingers of the other hand are put inside this O and moved in an erratic manner within this O , then probably we can have a visual replication in a coarse sense. Thus Nataraja itself can be assumed as a single atom and parts of his body that move can be taken as sub atomic particles i.e the four arms, two legs, curls of hair and the drapes around his waist. The arc around him shall represent the outer shell of the atom. When he stands on a single leg, he represents a state of equilibrium. Even while making such a stance in a statue, such equilibrium is necessary. It is evident from the geometry of the construct of a statue.

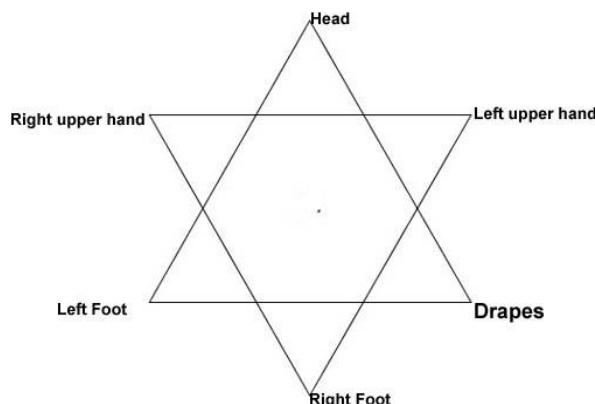


Figure 2: A six pointed star and its similarity with the dance of Lord Nataraja

The statue is having the form of a six pointed star. Figure 2. The right leg standing on a demon signifies the lowest point of the star. Thus this geometry is one of stability or equilibrium though there are dynamic things happening even in this equilibrium. The cosmic dance of Nataraja is thus not only a celestial event, but is also a symbolic representation of stability. It not only denotes the sub atomic particle-dance but also shows the steadiness of charge flow. The importance of this posture is evident from the fact that the Anandathandava statue is kept in CERN, the European Center for Research in Particle Physics in Geneva [11]. In Tamil, ‘aattam’ means dance. It also by sound similar to ‘atom’. It is also called as koothu. Professor Fritjof Capra an American physicist said “Ananda K. Coomaraswamy, seeing beyond the unsurpassed rhythm, beauty, power and grace of the Nataraja, once wrote of it “It is the clearest image of the activity of God which any art or religion can boast of” [12]. Professor Capra explained that "Modern physics has shown that the rhythm of creation and destruction is not only manifest in the turn of the seasons and in the birth and death of all living creatures, but is also the very essence of inorganic matter," and that "For the modern physicists, then, Shiva's dance is the dance of subatomic matter [12]. It is certainly as Professor Capra concluded: "Hundreds of years ago, Indian artists created visual images of dancing Shivas in a beautiful series of bronzes. In our time, physicists have used the most advanced technology to portray the patterns of the cosmic dance. The metaphor of the cosmic dance thus unifies ancient mythology, religious art and modern physics [12].

Electric charge conduction studies on fracture healing

From 2004, we have been doing researches to study electric charge conductivity in fractured limb. Our works included conductivity tests with phantom media with an apparatus that can support fracture in vivo.¹³ Later from 2009 onwards we started to publish the results of our human electric stimulation studies mostly on acute adult tibial fractures [1-5]. Later we consolidated the works and derived a relationship between actual original shape of the fractured bone ends when they are opposed together [12]. From 2009 onwards we started to publish our results in journals [1-5] and started to receive different types of queries from different readers. In general we are of the opinion that empirical electric current stabilization is the one line explanation for most of the queries. In our earlier paper we have outlined certain perspectives of studies that use electric current to study fracture healing [14]. Fractures do occur in different shapes and the severity of violence also varies. In the studies we also found different individuals had different level of current in the end. But the stabilization was the key to assess and prove that the bone fracture is indeed united fully. One

should know that Nataraja's cosmic dance posture is equilibrium with continuous posturing. The posture itself means continuous contraction of various muscles to maintain equilibrium with gravity. Similarly in the fracture callus, though is asymptotic; we can assume that there is continuous jumping of electrons.

Conversion of elements to a stable form and achieving equilibrium

Nataraja cosmic dance posture is taken as equilibrium of subatomic particles. In our study of fractures [1-5] asymptote or equilibrium of electrons denotes (a method to identify) bone fracture healing .These studies have found out that the bone heals as the electricity becomes asymptotic. Transfer of charges is assumed a method of continuation of an electrical activity. What charges enter and leave the fracture site is the question. The energy absorbed is zero when the current output is asymptotic. Types of processes or activity may differ.

Similarity of the Capra's Nataraja dance analogy with Kekulé's Ouroboros dream and the discovery of benzene structure.

Though it was Michael Faraday who isolated Benzene in 1825 and assumed its empirical formula to be CH. Later In 1834, the German chemist Eilhard Mitscherlich found that benzene's formula was C_6H_6 . It was not until in 1865, Friedrich August Kekulé (1829-1896) proposed a structure for benzene, consisting of alternating single and double bonds which is cyclic. This is for the first time it had been proposed that a hydrocarbon chain actually formed a ring. Later in 1890 in a meeting Kekulé revealed that his inspiration of the cyclical structure of benzene came from a dream of a snake consuming its own tail - the appearance of a Ouroboros [15] (Figure 3)



Figure 3: A snake consuming its own tail - the appearance of an Ouroboros

Kekulé recollects two separate events. First in London while he was travelling in a horse drawn bus, in a reverie Kekulé saw atoms "gamboling" and dancing and forming permutations which did not exist before. To quote him "Now, however, I saw how, frequently, two smaller atoms united to form a pair; how a larger one embraced the two smaller ones...while the whole kept whirling in a giddy dance. I saw how the larger ones formed a chain, dragging the smaller ones after them but only at the end of the chain." Later he sketched these dreams. This was the origin of his theory of carbon bonding in chemical structures. Later after seven years in Belgium, while still sleeping by the fireplace, he again saw atoms which he said "gamboling before my eyes." Now his inner sight "rendered more acute by repeated visions of the kind, could distinguish larger structures of manifold conformation: long rows, sometimes more closely fitted together all twining and twisting in snake-like motion." Then he was startled to see one of the "snakes" seizing hold of its own tail, and whirling "mockingly" before him. This image of the whirling snake gave Kekulé the idea of cyclical structure of the benzene ring [15,16].

However there were a number of problems like the less reactivity in the presence of double bonds Kekulé suggested that the location of the double bonds would change before any attracted molecules had time to react with them . further attributed to a less reactive isomer which can interchange-Kekulé's rapid equilibrium model) [15].

This later evolved into the idea of resonance between the two structures of benzene as proposed by Kekulé. But years later X-ray crystallography has resolved Kekulé's structure of benzene it found out that the double bonds (0.133 nm) were not shorter than single bonds 0.154 nm as expected , but both were of an

equal length (0.140 nm) . it also found that Benzene to be a perfect hexagon with all internal bond angles were 120 degrees [15].

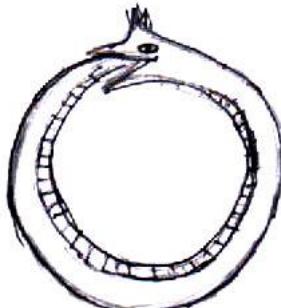


Figure 4: A comparison of the dance between atoms of Ouroboros(left)and the subatomic particle dance inspired by Lord Nataraja (right)

The comparison of the Ouroboros and Nataraja's cosmic dance is simple. Both analogies emerged from the thoughts of atomic and subatomic dances by the respective scientists Kekule and Capara. Surrounding the Nataraja's dancing pose is an atmosphere of twirling arms and curls of hairs snakes however around this is a circular structure of the arc of fire compassing the statue. This outer arc of fire probably depicts the outer limit of the atom. The parts of Nataraja depict the subatomic particles, while multiple atoms depict the ourabora snake. When persons are immersed in work such semblances occur [16].

Certain observations emerge from this study. We feel that scientific findings and inspirations are omnipresent like God and one should see science in everything. Why should we talk of mythology instead of science? It is because anything can inspire anybody. One should answer why should a dream of gamboling atoms like a snake eating its own tail inspire the benzene ring formation? The idea of the Ouroboros or snake eating its tails is from 1st century AD [17]. But when Kekule found it in a state of sleep or half sleep it inspired him to work on a ring structure of benzene. Though several refinement were needed like X-ray crystallography to identify the final explanation of the structure.¹⁵ So also the dance of Nataraja is there for years immemorial, the dance has stimulated a non Indian and a non Hindu, Professor Fritjof Capra to form the idea of semblance to the sub atomic dance.

CONCLUSION

In the irregular current the jumping of electrons is in an erratic fashion. In an asymptotic current, electrons jump in a fashion that the charge passage is channelized and hence there is equilibrium. Thus the jumping of electron should be there even in an asymptotic output. Lord Nataraja's cosmic dance posture itself has the semblance to sub atomic dance of particles even in a fracture callus when studied with electric current.

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