

**TRANSDISCIPLINARY STUDIES IN ARTS, SCIENCE AND TECHNOLOGY: THE
INDIAN SACRED ARTEFACTS****Paulo Nuno Martins**Interuniversity Center for History of Science and Technology, New University of Lisbon, Campus of
Caparica, Building VII, Floor 2, 2829-516 Caparica, Portugal,paulonuno2003@iol.pt**ABSTRACT**

Yantra is an Indian Sacred artefact that might help the observer to transcend the dualism of the physical world described, for example, in Indian art through the Rasa, such as love and repulsion, and science through the Complementarity Principle of the "wave" and "particle" of Quantum Mechanics. In this regard, the transdisciplinary approach of the "Hidden Third" argues that the subject/artist/engineer and the object created (whether it be a work of art or science) are interconnected through consciousness. This "short communication" aims to contribute as a starting point for the representation of the Yantras through computational art (contemporary technology), in the category "Human-centered computing", particularly "Visualization" and "Interaction Design".

Keywords:

Hidden Third (Transdisciplinary performance), Yantra (Indian Sacred Artefact), Computational art.

INTRODUCTION

The Indian Art [1] seems to be almost all of religious and Sacred character or of philosophical origin [2]. In this regard, it should be noted that the term Rasa (from the Sanskrit "essence" or "feeling of an aesthetic experience") was a concept proposed by the Indian sage Bharata Muni [3] and is described as a mental, emotional and physical state experienced by the subject or observer in the perception of a work of art (such as painting or poetry). This sage proposed eight states, namely Sringara (from Sanskrit "love, attraction"), Hāsya (from Sanskrit "laughter, joy"), Raudram (from Sanskrit "fury"), Kārunyam (from Sanskrit "compassion"), Bibhatsam (from Sanskrit "aversion, repulsion"), Bhayānakam (from Sanskrit "horror"), Viram (from Sanskrit "courage"), Adbhutam (from Sanskrit "wonder"). Subsequently, the philosopher Abhinavagupta [4] proposed other Rasas, namely Sāntam (from the Sanskrit "Peace"), and the Rasas called by Vātsalya (from the Sanskrit "love of the parents") and Bhakti (from Sanskrit "devotion to God"). This Theory of Art and Aesthetics highlights the *role of the observer's consciousness in the experience* of a work of art. Nowadays, this finding is very important for the philosophy of science, in particular for Quantum Mechanics and the Principle of Complementarity. We know from the formalism of Quantum Mechanics that a quantum particle can be described as a "wave of probability" that we do not know if it exists in space-time. Observation made by an observer makes the quantum particle "turn to" a "wave" or a "particle" (in a mutually exclusive way), and it is not possible to simultaneously observe the "wave" and the "particle" aspect of the "wave of possibility", in space-time. It is the conscious mind of the observer who decides which of two aspects he/she wants to observe. This experiment is known as "double-split experiment" [5]. The wave-particle paradox happens because we consider a single level of reality - the physical. In this case, as in the Rasa, the observer experiences mutually exclusive states of consciousness, that is, love and repulsion, horror and wonder, etc. However, it is possible to have the wave-particle united as one, at another level of reality (the *quantum of energy*) through a transdisciplinary approach known as «Hidden Third», proposed by Basarab Nicolescu [6]. This physicist proposes that the conscious mind of the observer/subject or artist/engineer is interconnected with the observed object (the artistic or scientific work) that triggers the "aesthetic experience". Through the application of the Transdisciplinary concept of the «Hidden Third» there is a unification between the creative mind of the artist/engineer and the created object (the manifested work) which is no more than a "projection" of the patterns of the conscious mind of the observer/artist/engineer (Jung named them by "Archetypes") [7].

METHODS

In this essay about science, technology and Indian sacred artefacts, I collected and analyzed the main scientific articles and books, in this area of research, that are available in libraries. Thus, I selected the 20 most important items, based on the “impact factor” of the article and the “reference” books on this issue with the purpose of being useful to the reader who wants to have only a global idea of this matter, but keeping the scientific rigor of my investigation.

RESULT & DISCUSSION

In this section, I will present the most relevant results of my research work about transdisciplinary performance (computational art) and Indian Sacred artefacts, so important to contemporary society.

I. Transdisciplinary Studies in Arts, Science and Technology: The Indian Sacred Artefacts

Regarding the synthesis of the dualism referred to in the Rasa, I should refer to Darshan's Indian ritual (from Sanskrit "see God") which appeals not so much to a person's physical vision, but to the "refined" state of the conscious mind of the observer that allows him/her to "see" the "essence" (or Rasa) of all living beings, that is, the soul and the Divine. In this regard, I should refer the Indian Sacred Artefacts named by Yantras [8]. These are a symbolic representation of an aspect of the Divine, such as the Mother Goddess or Durga which is presented in various Indian Shrines and has influenced the traditional system of Indian architecture (known as “Vastu Shastra”) that aims to use Vedic beliefs of geometric patterns (Yantra) and positive alignments in order to benefit the habitant [9]. The Yantra [10] (from sanskrit “support of energy” and “instrument”) is an Indian symbol of psychosomatic effect that became known in Western culture through the works of Arthur Avalon (pseud. Sir John Woodroffe) and Henrich Zimmer [11]. This Indian Sacred artefact [12] is composed by geometrical shapes, such as dot, lines, triangles, squares, circles and lotus that forms a 2-D fractal pattern of great beauty. For example, the dot (named by Bindu) represents the initial energy that leads to different forms. The triangle (named by Trokona) could point down (which is the symbol of Shakti) represents the feminine and material energy (one aspect of Creation), while the triangle pointing up (which is the symbol of Shiva) represents the masculine and spiritual energy (another aspect of the Creation). Then, the six-pointed star (named by Shatkona) represents the union of feminine/matter and masculine/spirit that leads to Creation. The circle (named by Chakra) represents the movement linked to the spiritual evolution and progression of the conscious mind. The square (named by Bhupura) represents the physical aspect of the Creation. The lotus (named by Padma) represents the real Self or soul.

In fact, the Yantras are a physical instrument whose main objective is to "tune" the conscious mind of the observer (composed by archetypal patterns without form) and a certain Divine entity 3-D, such as when we participate in a Darshan. Thus, according to the Divine Entity (and the Darshan), so the form of the Yantra also varies. In fact, this important Indian symbol is connected with the Spiritual archetype (the Indian deities) that is within us and is related with sounds, mantras and rituals in order to help the individual to return to original wholeness. There are several types of Yantra for different purposes, such as Yantra of deities, Yantra with astrological significance, architectural Yantra, purposeful Yantra. The main Yantra is designated by Sri Yantra [13], also known as “Mother of all Sacred Geometries”. Furthermore, in Tantra tradition, the Sri Yantra represents the body of the Goddess named by Tripura Sundari. The structure of this Yantra is described in the work named by *Saundarya-Lahari* (from the Sanskrit “the wave of Beauty”). “Sri” means wealth, while “Yantra” means instrument, that is, the attraction of Goddess of abundance, happiness, peace. In fact, Sri Yantra is composed by a central dot that helps concentration on meditation. It is also composed by downward triangles (the Divine feminine or Shakti) and upright triangles (the Divine masculine or Shiva) with a perfect ratio of 3,14 or Phi, that is, the perfection in Creation. This Yantra has also a major lotus that represents the Force of the Supreme Goddess, while the circle represents the highest states of the conscious mind that the observer might experience. The outer square represents the physical instrument – the Yantra - that allows the observer to “tune” with a certain Divine entity. In this regard, one of the earliest known images of the Sri Tantra is found in the religious institution named by *Shrinagari Math* that was established by the philosopher Sankara in the eighth century A.D. This description could be seen in **Figure 1** [14].

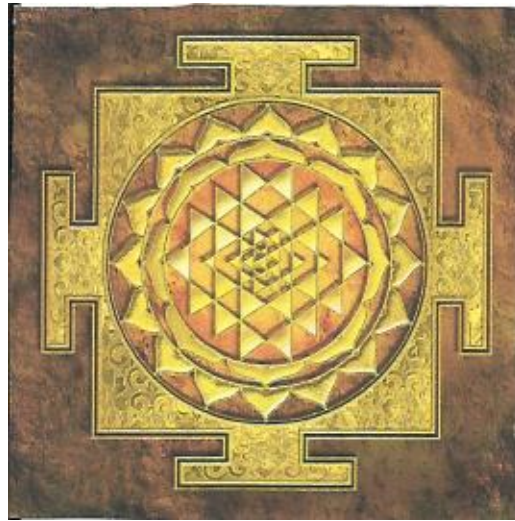


Figure 1 – Sri Yantra Golden Stone
Photo Source: Courtesy of Lila Sravani (Fine Art America)

In summary, the Sri Yantra (as well as all Yantras) is a spiritual instrument that might contribute to the concentration and focus of the conscious mind of the observer [15] in order to transcend the dualism of the physical world described, for example, in Indian art through the Rasa, such as love and repulsion, horror and wonder, and referred to science through the “double-split experiment” and the Complementarity Principle of the “wave” and “particle” of Quantum Mechanics. In this regard, the transdisciplinary approach of the “Hidden Third” argues that the subject/artist/engineer and the object created (whether it be a work of art or science) are interconnected through the several levels of consciousness or reality (represented by the several “stars” of Sri Yantra), described by Western thought [16] and Eastern thought (the Panshakoshas Theory) [17]. A practical application of these Indian Sacred Artefacts might be in the area of management where it is necessary to deal with situations of great tension and stress (for example with the variation of the oil price). In this regard, the Yantras can help the manager in the mind concentration in order to apply a transdisciplinary approach in the solution of the problem that might benefit the company and its workers. Many other areas may benefit from applying these Indian symbols, such as education and teaching (assisting in concentration for exams) [18].

CONCLUSION

This “short communication” can serve as a starting point for the representation of the beautiful Indian Sacred art, in particular the Yantras, through computational art. In this regard, I would classify this “short communication”, according to the ACM Computing Classification System (CCS), in the category *Human-centered computing*, particularly *Visualization and Interaction Design*. In fact, I should refer the works of Stefan and J. Hollos [19] who show how to turn computer software and computational art (small programs written in C programming language) to generate beautiful patterns of an infinite variety of images that could be produced by an interactive substitution process (dot, lines, triangles, circles, squares). In fact, the conceptualization, design and computational implementation of Yantras has been a challenge through ages that Alexey Kulachev [20] sought to solve by looking for mathematical models for the design of the “stars” (union of upward and downward triangles) of Sri Yantra.

However, this researcher has suggested that a deeper study of this Sacred Indian symbol (consisting of several polygons composed of the intersection of many triangles) is required in the future because it demands the cooperation of experts from different areas of knowledge (mathematics, engineering, history, psychology, philosophy, art, etc) in order to solve a large number of calculations that current computers are not able to perform accurately, as well as to find a precise superposition of numerous points of intersection. In this regard, I think that digitalisation could enhance transdisciplinary teaching and learning because it might connect disparate actors (from artistic, humanistic and scientific, technological areas) who might help to make these Indian Sacred

artefacts (the Yantras) and the History of Indian philosophy more comprehensible and useful to the general public [21].

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