

# Alice Boner

## and the Geometry of Temple Cave Art of India

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### Introduction

Alice Boner (1889-1981) was a Swiss-trained sculptor and artist who lived in the ancient Indian city of Varanasi (a.k.a. Benares) from 1936 until 1978. Her passion was oriental art, particularly the art of India. India's rich cultural history goes back at least three millennia, although sadly much of its art is lost: in India the climate rapidly destroys anything remotely perishable, and over the course of centuries much of what did not succumb to climate was intentionally destroyed in the various Mogul invasions and endless strife between local contending kingdoms. Notable exceptions are massive sculptural reliefs in stone that date from the 6<sup>th</sup>- 9<sup>th</sup> centuries and appear in a number of sites around India. It is to these that Alice Boner was drawn over and over again. Fortunately for us she kept a diary, and though she wrote into it rather infrequently, what she did write was deeply personal and offers a fascinating insight into her creative artistic life, her struggles and doubts, and the passions that led her to her discoveries about the geometrical underpinnings of this Indian temple cave art.

In August 1940 she had an epiphany at the famous temple caves at Ellura. To quote from her diary of August 20:

*I had been here twice before and each time I had been completely taken out of myself... So I went again this summer... In order to approach the images I started to draw them. It was stiflingly hot and I was on the point of fainting, so I had to lie down on the ground to regain my senses. The drawings were awfully dull and inartistic. But in the peace of the guesthouse I started analyzing them in their geometrical scheme and to build up the diagrams in terms of lines of energy. From such an analysis, all of a sudden, a revealing light broke forth. I grasped with my inner intuition of form that there I was really touching the hidden meaning, and that I was approaching the mystery of their unique and incomparable power of suggestion and expression... And where previously I had only seen the magnificent composition, the powerful movement, the supremely alive modeling of form, all these more or less aesthetic considerations gave way to a symbolic, underlying conception to which they were only humble accessories.*

What she discovered is one half of the story that we tell here. The other relates to her personal creative artistic expression. Although trained as a sculptor, she decided early on that working in stone in India would be too consuming in time and energy and she chose instead to paint. Sometime in 1946 she decided to create a triptych – three large paintings – representing each of the three primary manifestations of God in the Hindu theology: the Creative aspect, the Preserving aspect, and the Destroying aspect. This project was to consume much of her time, thought, and energy over the course of the next 10 years and there are many entries in her diary relating to her struggles in depicting in line and form what she intuitively felt about metaphysical concepts involved. Although nothing explicit appears in the diaries, it seems implicit that geometric form was an important ingredient in her conception of these works, and it is natural to wonder if she may not have used the same geometrical principles that she had

discovered in the Indian sculptures as a guide to her own paintings. Here we will see explicitly that she did.

### **The underlying geometry**

The role of geometry in art is nothing new. We know of it in the theory of proportion in Greek art, in the richness of the tilings in Islamic art, and in the use of perspective in Renaissance art. Furthermore these things are more or less rather apparent to the viewer.

In Indian sculptural art the primary entities are celestial and other mythological beings depicted in significant scenes from Indian folklore and legend. In fact, given the injunction against depiction of the divinity in Islamic art, it is remarkable to see how totally opposite the Indian hindu experience has been, with its kaleidoscopic and often very sensuous depictions of gods and goddesses. In fact these two very different outcomes probably stem from the same original idea: if no conception of God can be complete, then one either makes no images or many.

Although often full of life and energy, there is little evidence of any formal underlying geometrical principles Indian temple cave art, even when one consciously looks for it. In fact several of the serious scholars of Indian art were to expressly declare that there are none. To quote the great Heinrich Zimmer: *[Each separate form element] seems to be floating in the air all by itself. They all enjoy a life of their own and do not depend on any free artistic economy that would govern the detail of their appearance and build them up together, as supporting parts, into a structured whole. The meaning of whatever might appear individual in them does not depend on their being related to an artistic total that would control them throughout, turning them into mere members of an artistic organism.* (quoted in the Preface of [2]).

Given this backdrop, let us consider the geometrical analysis given by Alice Boner a panel called Narasimha Avatara, which is inside one of the temple caves at Ellura. This is taken from her book *Principles of Composition in Hindu Sculpture* [2].



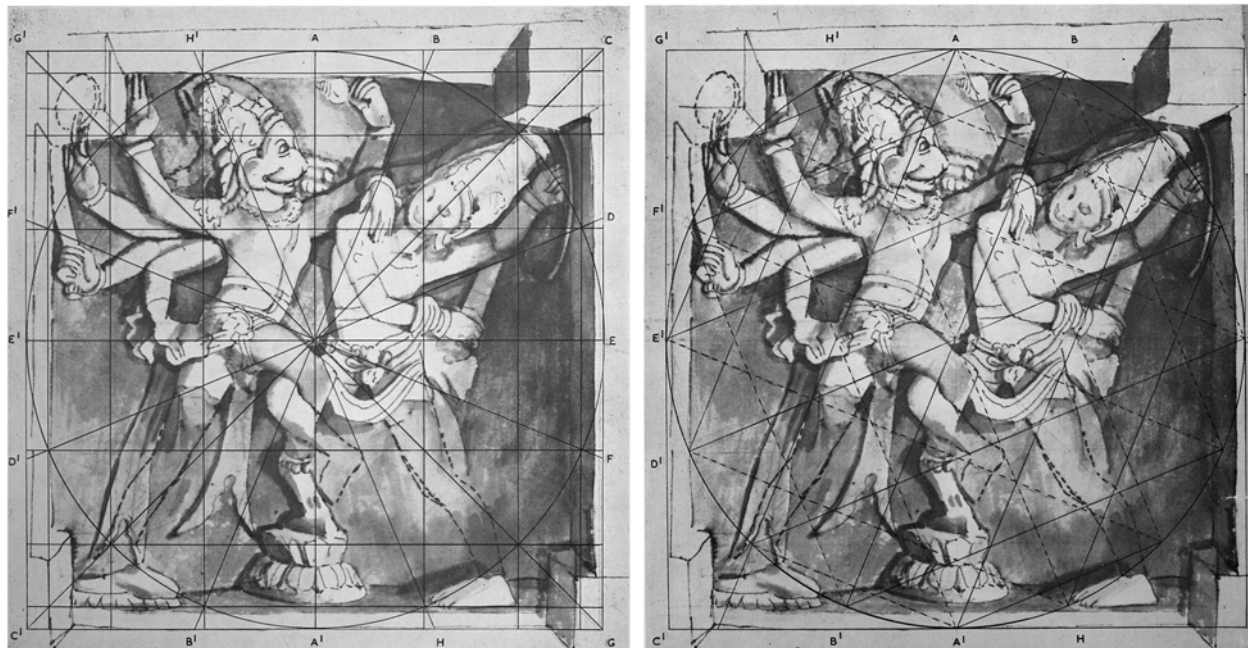
**Figure 1:** Narashima Avatara, Ellura (taken from [2])

The panel dates from the 8<sup>th</sup> century. The figures are roughly life size. Ellura is a phenomenon that has to

seen to be fully appreciated. It is a complex of monumental architecture built, not by assembling stone, but by the simple process of removing it. The panel shown here is small part of an elaborate cave temple that was hewn out of solid rock: images, columns, freestanding statues, and all. It depicts the destruction by the god Vishnu of the asura (= demon), King Hiranyakasipu, who, based on some powers that he had won, decided to make personal claims to divinity and insist that he be worshipped. The panel is unfortunately rather damaged, but it still conveys the energy and tension of the moment, as Vishnu, transformed into the form of a man-lion called Narasimha, prepares a death-dealing blow to the asura.

Alice Boner's suggestion is that although the panels are square or rectangular, the primary geometrical feature is a single circle<sup>1</sup>, inscribed in the square or having two opposing sides as tangents in the rectangular case. The circle is divided by diameters, here 8, and generally 6, 8, or 12, into equal sectors, the vertical and horizontal diameters being the fundamental.

The intersections of the diameters with the circle form the basis of a rectangular grid (see Figure 2, left side). Note that the grid spacing varies vertically and horizontally. This forms what she calls the **space-division** of image. It is static in nature and serves to locate the important elements of the composition. In our panel we see how the vertical neatly divides the space for the two opposing forces. The two central grid interspaces are taken with the bodies of Narasimha and the asura, while the horizontal interspaces divide the bodies into the heads, torsos, and thigh regions.



**Figure 2:** Space and time divisions for Narashima Avatara (taken from [2]).

Boner's real insight is that there is a further division into an oblique grid obtained by selecting two or three families of parallel chords, also based on the cutting points of the diameters and the circle. In our case there are two families (see the right hand side of Figure 2). She calls this the **time division**, and it is this that determines the direction of the movement.

*Narasimha's body from his foot on the ground, his leg, his trunk, his face and left upper arm with the*

<sup>1</sup> For extended rectangles two or three circles may be used, as we will see below.

*sankha is channelled into the space between C'A to B'B (the first oblique interspace). The drapery falling behind the leg is doubling and reinforcing his movement.*

To these two main features, the static space division and the dynamic time division, Boner adds the further notion of the **integration** or artistic synthesis of the two, which gives the composition its specific character and meaning. Here she writes: *A fierce clash between two opposing forces is brought into a simple but eloquent formula: From the lower corners of the panel the bodies of the contending enemies are rising towards one another in converging oblique lines. ... Further up the slant of their bodies reaches the point at which they should crash into one another ... One movement is carried victoriously across the middle line dividing the two figures, while the other is broken by this thrust and has to recoil upon itself at right angles.*

Boner spells all this out in more detail and more axiomatically, but the main points are the circular field, the division by diameters, the space and time divisions, and finally the integration. In her book she analyzes 21 panels in this manner and makes a convincing case that these principles occur again and again in this genre of work. Unfortunately space does not allow us to show here the great diversity of images that she has fitted into this geometric formula.

Boner discovered these hidden laws of composition for herself. However, initially she was very reluctant to publish them. First of all such leading figures as Zimmer had said they did not exist. Second she felt sure that if there had been well-understood principles of composition such as she was suggesting, then, even given the ravages of India's climate and history, some knowledge and textual evidence of them would have survived. However, Boner was well connected and eventually she was led to a scholar of ancient architecture, Sadasiva Rath Sharma, who not only immediately understood what she was talking about, but was even able to point to other examples. More importantly he pointed out to her a 10-11 c. work in Sanskrit, the *Silpa Prakasa*, which though primarily a manual on the construction of a temple, also gives detailed instructions on how the images are to be carved on the walls. Together they were to publish a translation of this work along with an annotated analysis of it [3].

The book is by no means an earlier version of what Boner was suggesting. However, it makes certain things very clear. The circle and its vertical and horizon diameters were the primary principles behind temple images. Images, which by their nature were for worship, had to be constructed with extreme attention to appropriate ritual and detail. Thus one can assume that the compositions of the panels were guided by strict principles and, given the wide spread distribution of such works of art across India, that these principles were fairly universally understood by the artists of those times. Boner considered this book as confirmation of her general thesis and it gave her the necessary courage to publish her findings. The book was published in 1962. It is still in print.

### **The triptych**

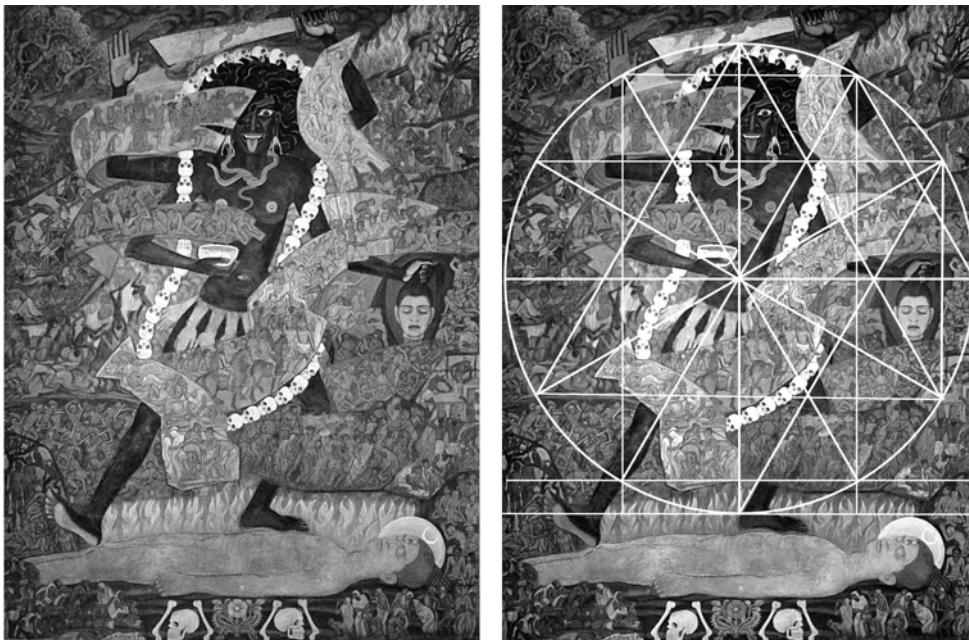
Jan. 1, 1946: *I woke up with a sense of alertness and greeted the sun when it had just risen over the horizon. I went up and greeted my Krishnaji [an image of Krishna to which she was devoted] and my Vishvarupa Krishna. ... I thought of what might be left over in my life and surrendered it in thought to Krishna. I felt that I had no great desires left, except the one that I may be granted to accomplish my three great paintings, my trilogy Shrishti, Sthiti, Samhara [also called Prakriti, Visvarupa, and Kali] and that painting them was not only painting them, but realizing their intrinsic contents.*

In order to understand the context of these three paintings it is necessary to recall a basic idea in Hinduism – or sanatana dharma (the eternal way), as it is more properly called. According to this there

are three fundamental qualities or tendencies in Nature: a centripetal pure ascending tendency, called **sattva** which is associated with order, knowledge, and light; a centrifugal descending tendency, called **tamas**, towards darkness, inertia, dissolution which is associated with time and destruction; and finally a third tendency, called **rajas**, arising from the tension between the first two, which is associated with motion, activity (mental and physical), expansion, and creation in all its myriads of aspects and forms. The constant interplay of the three tendencies is the play of the physical and mental universe. Each is personified in the form of a god: Vishnu, preserver; Shiva, destroyer, and Brahma, creator. Yet each is only a manifestation of power of Brahman (the Immensity), which is beyond all categories of conception. Each of the three panels of the triptych is devoted to one of these three tendencies: sattva in the form of Vishnu, tamas in the form of a manifestation of Shiva called Kali, and finally rajas in a scene, which though highly metaphysical is primarily naturalistic in content. I will cover these in the order of increasing sophistication as far as the underlying geometry goes.

The canvases are large – about a meter in width – and very colourful. Larger resolution colour versions of the three images may be found on the CD accompanying this Proceedings.

**Destruction - Kali:** *Time (Kala) is that which disassociates all things. Conceived as a divinity, the Power of Time is represented as the goddess Maha-Kali. ...Kali is represented as supreme night, which swallows all that exists [6]. She dances [amazingly] on the dead body of Shiva, the corpse of the ruined universe.*

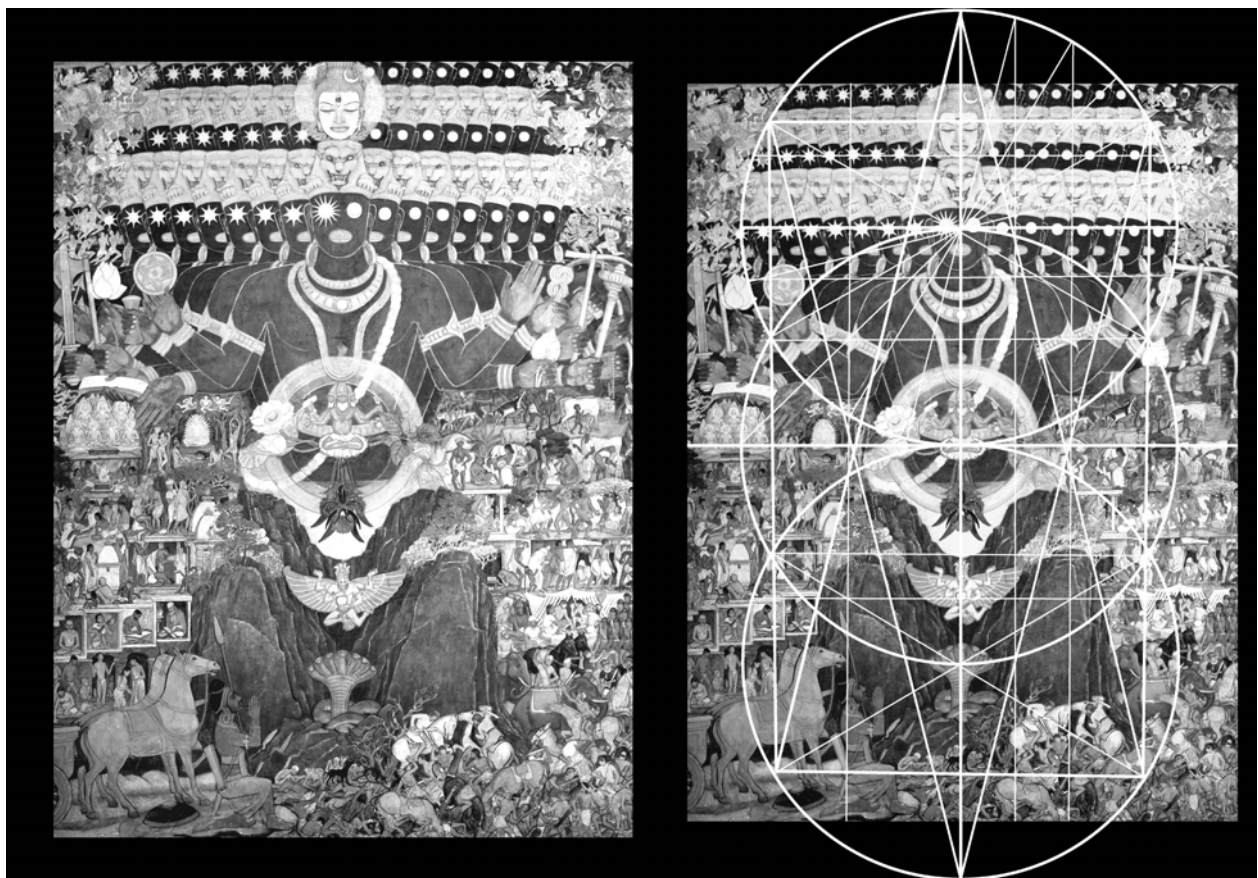


**Figure 3:** Sumhara Kali (Destruction)

The geometrical foundation of the painting is a very simple, a circle centred exactly on the navel of Kali. There are six diameters and the space and time divisions (superimposed here) are straightforward. The symbolism of the four hands representing the power of destruction [the sword], the fate awaiting each of us [the severed head], the open hand removing fear, and the bowl of blood [which is in the so-called giving hand] is quite standard, as is the necklace of skulls. Perhaps the minimization of structure here (much less than the other two paintings) represents the tendency towards lack of creativity, lack of form, and ultimately dissolution.

This image was actually the last of the three that she painted. Geometrically it is the most straightforward. Nonetheless, it consumed vast amounts of Boner's thought and time, from 1953-56 and she was never satisfied with it.

**Preservation – Visvarupa:** This painting represents one of the great moments in the *Bhagavad Gita*. Arjuna, the great warrior, stands on his chariot between the two contending armies of what is about to be an epic internecine battle. With him is his chariot driver who is no less than Krishna, one of the manifestations of Vishnu. Arjuna, mighty warrior though he is, seeing the carnage about to ensue, with his family and friends pitted against each other, loses heart and feels his spirit fading. He wants no part of this battle. Turning to Krishna, he begins to question him. The text, which is something akin to the sermon on the mount for millions of Hindus, is a theological and philosophical discussion of the nature of reality and divinity, and as well as a practical spiritual manual for daily living. Arjuna knows that Krishna is not only a personal friend but also nonetheless a manifestation of the supreme godhead itself. Still, when he asks Krishna to show his real form he is completely unprepared for what he sees. This is the source of the often quoted *...now I am become Death, the destroyer of worlds...* which Oppenheimer used to describe the testing of the first atomic bomb.



**Figure 4:** Vishvarupa (Preservation)

The image here is based on three overlapping circles. It is a form that occurs in some of the more elongated rectangular panels in the temple cave art, and which Boner discusses in her book. No doubt she used the three circles here in reference to the story of the famous three strides of Vishnu: the Asura King Bali has acquired sovereignty over heaven and earth. Vishnu appears as a dwarf and makes of King

Bali the seemingly innocuous request as much land as he can stride in three steps. Being granted this, Vishnu assumes his divine form and with one stride covers all of earth, with a second all of heaven, and with a third, the underworld, crushing King Bali in the process. In the painting Vishnu appears in his universal form, covering all of the cosmos, *blazing with the light of a thousand suns ... infinite of arms, eyes, mouths, and bellies... the sun and moon his eyes ... shouldering the sky in hues of rainbow... .*

Geometrically we see three equal circles, centred one radius apart, the centres being directly between the eyes of Vishnu, on his navel, and on a multi-headed serpent (*When he is asleep and creation is withdrawn, Vishnu is represented resting on a thousand-headed serpent called Endless [4]*). The circles cover heaven, the earth, and the underworld. The division is by 12 diameters. The geometrical formalism is striking, with the space division used, particularly horizontally, to indicate repetition and hence order and form, while the time division emphasizes its vastness. Note the great vertical sweep up and down suggested by the two elongated triangles running from top to bottom that frame the main figure.

**Creation – Prakriti:** This panel is geometrically and also, I think, artistically the most interesting of the three. Here we see the multitudinous forms of the natural world in a sort of evolutionary sequence from bottom top. As we move up through the plant and animal kingdoms we see the emergence of man, the beginning of agriculture, the discovery of fire and its use in worship, the aspiration to higher things, and the evolution of the human mind and culture.



**Figure 5:** Prakriti (Creation)

The geometrical underpinnings to this work are more subtle than in the others. In keeping with its subject, Boner has created something new, going beyond the strict formalism that she had established in her theory. The key feature is the womb-like structure that emerges like some exotic plant form the cosmic ocean out of which all creation seems to explode. Within this womb is a couple embracing, in the very act of creation. The centre of the circular field is their kiss. The division is into eight diameters, but in fact it is the two diameters nearest the vertical that carry the main symbolism. The one diameter passes along the axis of the womb through the unborn fetus, through its fiery transformation by spirit, to the family grouping with the mother and her two children, and then to the father aiming to the sky about to

release an arrow from his bow. The second diameter passes directly to the great source of all earthly life, the sun, which is of course a symbol for the Immensity itself. The secant created by the points of intersection of this diameter and principal horizontal diameter at the circle's circumference passes directly through the fingertips of the devotee worshipping in front of his fire. The secant vertically symmetric to this gives rise to a major dynamic thrust to the upper right, originating at the centre of the rainbow arc (just off the picture), passing again through the fingertips of the devotee, as well as his head, and the heads of the mother, father, and older child and finally up through the head of the soaring eagle that is the target of the arrow.

There is a second circle of the same size situated laterally one radius to the right of the one that I have shown. Its interior seems to correspond to the terrestrial part of the image and its circumference traces the arc of the womb-family grouping. However its importance seems subordinate to the remarkable symbolic logic of the first circle, so I have omitted it for the sake of clarity.

There are numerous symbolic references in this painting, for example the representations of the five senses, the sacrificial ram above the fire, the lion lying along the diameter to the sun whose meaning I do not know, and no doubt many of which I am simply unaware.

### **Conclusion**

Alice Boner discovered a uniform geometric foundation for a certain genre of sculptural relief that appears in Indian art of the 6<sup>th</sup>- 9<sup>th</sup> centuries. Her theory is convincing in its general applicability and the kind of intellectual coherence that it gives to this work. Though she does not say so, and apparently no one has previously tried to check, we have seen that she applied these same principles to her own work. The triptych shows the geometric form in three ways – simple, complex, and imaginative, in keeping with its three subjects, using each of the three types of circle division appearing in the temple panels.

These paintings, along with a number other pieces of her art, are to be found in a specially designed exhibit dedicated to her in the Bharat Kala Bhavan (museum of fine art) on the campus of Benares Hindu University in Varanasi. Alice Boner's contributions to the art of India were recognized by the prestigious award of the Padmabhushan by the President of India in 1974 and with an honorary doctorate from the University of Zurich.

### **References**

- [1] Alice Boner, *Alice Boner Diaries: India 1934-1967*, eds. G. Boner, L. Soni, J. Soni; Motilal Banarsidass Publ., Delhi, 1993.
- [2] Alice Boner, *Principles of Composition in Hindu Sculptures*, E. J. Brill Publ., Leiden, 1962.
- [3] *Silpa Prakasa*, tr.. Alice Boner and Sadasiva Rath Sharma, Leiden, 1966.
- [4] Alain Danielou, *The Gods of India*, Inner Traditions International, New York, 1985.
- [5] *Guide to Bharat Kala Bhavan*, Banaras Hindu University, 1998.
- [6] *Bhagavad Gita*, tr. Swami Prabhavananda and Chritospher Isherwood, Vedanta Press, 1987.
- [7] Heinrich Zimmer, *The Art of Indian Asia*, (completed and edited Joseph Campbell), Bollingen Series, Pantheon Books, 1955