

Sri Yantra — an enigma

An algorithm describing Sri Yantra, an involved geometrical diagram created in ancient India, has been produced after years search by Alexei Kulaichev, Candidate of Sciences and Mathematics, senior researcher at the Faculty of Moscow State University. In his scientific search, the employment of exact sciences and electronic computers have led to conclusions that have excited the interest of historians, ethnographers and other experts in many countries. According to the hypothesis advanced by the young scientist and backed up with mathematical calculations (Kulaichev presented them at the meeting of Moscow University historians and mathematicians), the standards of mathematical

as a pencil, a pair of compasses and a ruler. It was then that I got down in earnest to studying such diagrams. I browsed through special literature on Indology and anything that had any bearing on the subject...

Sri Yantra, or the Great Yantra, is one of the rare geometrical patterns (diagrams) which were used in ritual practice by believers in the ancient philosophical teaching of Tantrism. Arising in ancient India, this trend also became widespread in the medieval times in Japan, Nepal, China and especially Tibet. Its elements further found their way into a number of well-known Oriental philosophical systems. For instance, the ideas and methods of tantrism can

perature of substance and radiation in the past).

There is every reason to believe that the Sri Yantra diagram dates from before the first millennium BC.

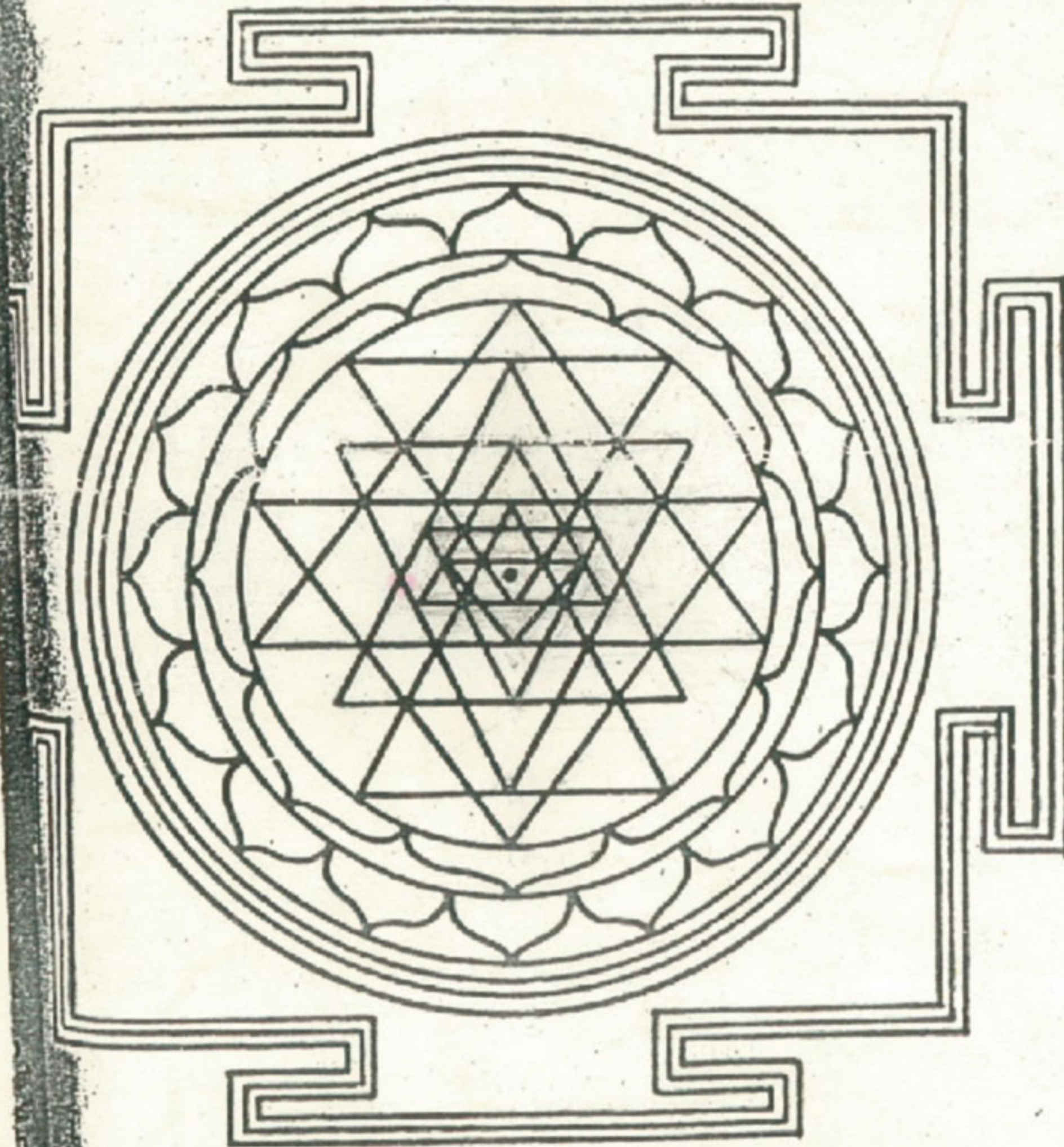
The geometric Sri Yantra diagram is an interesting object of Tantrist esoteric practice and has not yet attracted enough specialist attention. As the mathematical analysis data obtained by Kulaichev show, Sri Yantra possesses several complex properties which pose a problem even for modern science. It especially concerns its origin, dating, variability and reproduction and employment techniques whose tackling requires the joint efforts of historians, ethnographers and other experts.

undertake a structural analysis of Sri Yantra. Their experiment in search of numerical regularities of the "golden medium" type—which was known to sculptors and architects of ancient Greece as the rule defining the most impressive proportions in geometry—though not entirely successful, largely facilitated the task of subsequent explorers of the Sri Yantra phenomenon.

To judge by publications, scholars have not yet had their attention attracted to the structural complexity of Sri Yantra, nor to questions connected with the origin and genesis of that surprising and mysterious geometrical figure.

Ivan Kovalchenko, Member of the USSR Academy of Sciences, a prominent Soviet historian, Moscow State University says:

"Kulaichev's study has been devoted to a highly interesting monument of visual art—Sri Yantra—which has for centuries been used in the ritual practices of India. His examination of the image's geometrical pattern has revealed that Sri Yantra has a whole array of non-trivial mathematical properties. A strict solution of the geometrical structure requires, according to Kulaichev, the employment of a fairly complex apparatus of modern mathematics (for ex-



A Russian senior researcher using a computer has formulated a rule to reproduce Sri Yantra.

This little known historical and ethnographic material demonstrates the link between Sri Yantra and the cosmological and anthropological concepts of ancient India, which fit in surprisingly with present-day theories, a fact that emphasises the significance of further research.

Scholars became aware of Sri Yantra at the beginning of the 20th century, thanks to works by British scholar John Woodroffe. Studies of the philosophical and ritual implications of yantras in Tantrism were continued by the German Indologist Heinrich Zimmer. Some other investigators, very few in number, unfortunately, who mentioned Sri Yantra in their works, confined themselves only to a verbal description of the image. Among the few serious investigations one can mention a fundamental treatise by the Indian scholar Madhu Khan, who summed up some achievements in this field. One was an attempt by British researchers Nikolos J. Bolton and D. Nicol J. Macleod to

ample, computers to solve numerically a system of non-linear algebraical equations. To our present way of thinking mathematics in ancient and medieval India did not dispose of the requisite mathematical and technical facilities, so the origins of Sri Yantra appear mysterious in many respects.

Sri Yantra a mathematical enigma: Take, for example, the central fragment of the figure—a 14-gonal star formed by the intersection of nine large triangles. The ingenuity of the image lies

in the fact that most of the straight lines forming it pass through three, four, five and even six points of interception with other lines. To build such a figure and to analyse it for an algorithm is an extremely challenging task. It has been accomplished only on a computer which has had to perform more than a hundred million operations to do this. Besides, each step in image building and analysis involved the solution of a whole series of related problems, both computational and programmatic.

Sri Yantra cannot be built by using traditional methods. Only a deep knowledge of such exact sciences as modern higher algebra, numerical analysis and geometry, as well as contemporary mathematical methods, can ensure success. I wish to note, however, that the present-day level of scientific and technological knowledge is sometimes insuf-

ficient to analyse the structure of, for example, some star of Sri Yantra and the number of its possible configurations. Their analysis involves a complex system of algebraic equations and complicated computations which are beyond the capability of the present generation of computers.

A rather unexpected conclusion, isn't it? And this only about a figure made up of a visible number of very simple geometric elements, a figure that can easily be held in the palm of a hand. This raises a number of far from trivial questions. How such an object could have appeared in antiquity? How did people there come to know that nine triangles arranged in such a way can intercept each other, their numerous crossing points coinciding? There are many more other questions that I cannot answer. —APN.

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SRI YANTRA AND ITS MATHEMATICAL PROPERTIES

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ancient India had been much higher believed.

Kulaichev describes his discovery in an article with a Novosti reporter.

In 1969 my friend Alexander Lyutisko, who came from Minsk, came across an ancient Indian ritual image in one of the museums. It was Sri Yantra. He told me he was struck by the auster geometric regular design of the figure. I tried to reproduce it in an augmented form. The task, however, was not so easy. Its implementation demanded more than such simple tools

now be traced in modern Hinduism and Buddhism.

Yantras constitute geometric diagrams, with each element symbolising various aspects of cosmogonic and psycho-physical views of Tantrism. Some of these reveal an uncanny resemblance to facts of modern natural sciences. For example, the conceptions of Tantrism on the global dynamics of the Universe are close in some of their details to the Big Bang and Hot Universe theories (as is generally called the theory of the Universe's evolution saying that the Universe had a high density and tem-