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Soviet Land

20 YEARS OF
SOVIET LAND
NEHRU AWARDS



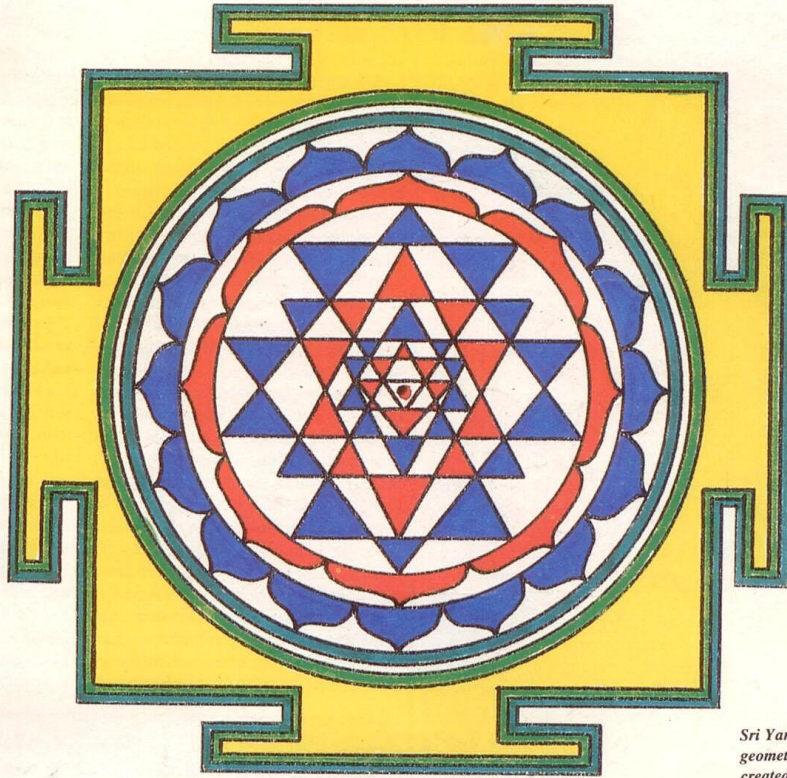
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MATHEMATICIAN KULAICHEV'S HOBBY

By ALEXANDER SAPSAI



Sri Yantra, a complex geometrical figure created in ancient India.

An algorithm describing Sri Yantra, an intricate geometrical diagram created in ancient India, has been produced after years of research by Alexei Kulaichev, Candidate of Physics and Mathematics, Senior Researcher at the Biology Faculty of Moscow State University. Intensive scientific research, the application of modern exact sciences and electronic computers, have led to conclusions that have aroused the interest of historians, ethnographers and other experts in many countries. According to the hypothesis advanced by Kulaichev backed up with mathematical calculations, the standards of mathematical thinking in ancient India had been much higher than were believed. Alexei Kulaichev describes his discovery in an interview with our correspondent.



Candidate of Physics and Mathematics Alexei Kulaichev, Senior Researcher at the Biology Faculty of the Moscow State University, who has suggested an algorithm for drawing Sri Yantra.

Question: When did you get interested in such diagrams and what attracted you to Sri Yantra?
Answer: Back in 1969 my friend Alexander Lyutsko, a philosopher from Minsk, came across an original ancient Indian ritual image in one of the old monographs. It was Sri Yantra. He told me of the find. I was struck by the austere geometrical beauty and regular design of the figure. I tried to copy it. The task, however, was not so easy. The copying demanded more than such simple tools as a pencil, a pair of compasses and a ruler. It was then I got down in earnest to studying such literature on Indology. **Question:** What do you think is Sri Yantra?
Answer: Sri Yantra is one of the rare geometrical patterns (diagrams) which

were used by believers in practising rituals in the ancient philosophical teaching of Tantrism. Having its roots in ancient India, this trend also came widespread in the medieval times in Japan, Nepal, China and especially Tibet. Its elements further traced in modern Hinduism and Buddhism.

Yantras constitute geometrical diagrams, with each element symbolising various aspects of cosmogonic and psychophysical 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 to 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 temperature of substance and radiation in the past).

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

AN EXPERT'S COMMENT:

Dega Deopik, a leading Soviet Orientalist of Institute of Asian and African Countries, Moscow State University: The geometrical Sri Yantra diagram is an interesting object of Tantrist esoteric practice and has not yet attracted enough attention of the specialists. 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 deals with its origin, dating, variability, and reproduction and employment techniques whose tackling requires the joint efforts of historians, ethnographers and other experts.

Question: Has the problem been treated in scholarly literature or has it been ignored by contemporary Oriental studies?

Answer: 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. 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. There was yet another attempt by British researchers Nikolas J. Bolton and D. Nicol J. Macleod to 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 devoted much attention to its structural complexity.

AN EXPERT'S COMMENT:

Ivan Kovalchenko, Corresponding Member of the USSR Academy of Sciences, a prominent Soviet historian, Moscow State University: Kulaichev's study has been devoted to a highly interesting monument of visual art—Sri Yantra—which has for centuries been used in practising rituals in 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 solu-

tion of the geometrical structure requires the use of a fairly complex apparatus of modern mathematics (for example, computers to solve numerically a system of non-linear algebraic 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.

Question: What is so interesting about Sri Yantra mathematically?

Answer: Take, for example, the central part 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 has 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 thorough 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 insufficient to analyse the structure of, for example, that same 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 other questions that I cannot answer.

AN EXPERT'S COMMENT:

Dega Deopik: The concept of Sri Yantra made up from interlaced triangles draws provoking analogies with the Central Asian art of the Neolithic and Bronze Ages, where similar configurations are a regular occurrence, in particular on the spherical surface of some vessels. These have not been investigated mathematically at all, and Kulaichev's work is an example of their fruitfulness. **

SOVIET RESEARCH

URDU LITERATURE HAIL

A discussion on "Indo-Soviet Cooperation with special reference to Central Asia and Urdu Literature" was held in Delhi. It was organised by the Soviet Desh, the Urdu edition of the Soviet Land in connection with the 60th anniversary of Central Asian Republics.

Participating in the discussion eminent Indian poets and writers stressed the commendable research work done by Soviet scholars in the field of Urdu literature. They laid special emphasis on the work done in Uzbekistan.

Presiding over the discussion eminent Urdu poet Mr. Ghulam Rabbani Taban said that the October Revolution had greatly influenced India's struggle for independence. India and Central Asia had a long history of close contacts, he added.

"Long long ago it were the Boudh Bhikshus of India who carried Buddha's message to Central Asia. It spread there. Then dawned the medieval period of our history. During this period, the extensive exchange of material, cultural and literary

wealth between our regular feature. It is that many outstanding men-of-letters migrated to Central Asia and got settled there. Under their impact a new cultural flowering of their culture developed, which is known as the Culture of India," he scored.

Dr. Qamar Raza Khan, a leading Urdu scholar, speaking at the occasion said: "Our relations with Central Asia during the worst years were tried their best to keep India in the dark. The October Revolution and Socialism, however, our contented. He pointed out that Uzbek books were being translated into Urdu and said that the University introduced Urdu language many dec-

RESULTS OF

The Soviet Land magazine had organised the Quiz-84" devoted to the subject "USSR Stands for International Cooperation" (the details of the Quiz-84 are given in issue No. 5/84 of the magazine). The quiz evoked wide interest among the readers of the magazine. The quiz evoked wide interest among the readers of the magazine.

The Jury for adjudging the contest carefully selected the best entries received for the competition and at its meeting on October 22, 1984 unanimously decided to award the prizes as follows:

FIRST PRIZE

Mr. Rajiv Maheshwari,
43-B, Hostel Apartments,
Pusa Campus, IARI,
NEW DELHI—110012

SECOND PRIZE

1. Miss Sandhya,
E-241, Greater
Pusa Campus, IARI,
NEW DELHI—

2. Mr. Durgalal,
14-15, Jeevan
Anandgar, Gurgaon