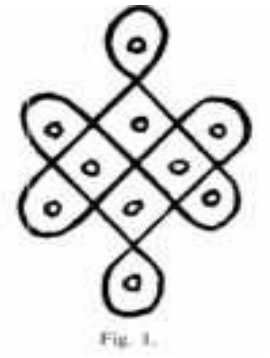
Dr.Gift Siromoney

Home | Biodata | Biography | Photo Gallery | Publications | Tributes
[Back to Kolam List]



# Kolam

South Indian kolam patterns
*Kalakshetra Quarterly*, Vol.1, No. I April 1978, 9-14
Gift Siromoney

**INTRODUCTION**

Any one traveling through rural Tamil Nadu during the months of December and January will be richly rewarded by the sight of a variety of patterns decorating the courtyards of even the humblest of homes. These patterns are referred to as *Kolam* in Tamil and it is a general term for all kinds of decorations. In addition to being used as threshold patterns the same patterns are also used as tattoo designs[1] and as decoration on the walls of rural houses. There are also certain patterns which are used as magical designs or *yantras* and such Tantric designs are also used in the *puja* room. (See facing Page)

Contrary to popular belief, the common threshold patterns are *not* very ancient. The practice of decorating the floor may go back to about six hundred years and not more. A few designs may be traced to the Jain temples of South Kanara and at least one to Mahayana Buddhism.

In recent years a lot of theoretical work has been done on *kolam* patterns from the point of computer mathematics. Furthermore some simple mathematical properties of some common *kolam* designs have also been established.

A survey[2] on the practice of the art of *kolam* in Madras city showed that new patterns of *kolam* are still being created and the tradition of drawing *kolam* still continues in Madras.

**ANTIQUITY OF KOLAM DESIGNS**

Many a custom in an ancient country like India is often believed to have an ancient origin and is believed to have continued from time immemorial. On the same grounds it is generally believed that the custom of drawing threshold designs is also very ancient. However in Tamil literature the use of the word *kolam* for drawing patterns

on the floor is met with for the first time in a *Kuravanji* called *Madurai Meenatchiammai Kuram*[3] and a little later in *Kutra$la Kuravanji.*[4] The former work belongs to the sixteenth century and the latter to the seventeenth. In both these works the reference is to the preparation of the floor and the drawing of a *kolam* as a prelude to the worship of Ganesa. In villages, nowadays, the floor is made smooth by sprinkling it with a mixture of cow dung and water but in literary description the floor is made smooth by a paste made of *Kumkum* and sandalwood as well as *punugu*, a product of the civet cat. There is no reference to *kolam* in Tamil word-lists called *nigandus*, in earlier Tamil literature or in the ancient paintings or in travellers' accounts. However some of the geometric patterns and *yantra* or Tantric designs that are used in *kolam* are quite ancient.

There is a common design sometimes referred to as *mitta$i pottalam* (Fig. 1). It is drawn with one unending line. An angular version of the same design (Fig. 2) is used in Tibetan Tantric Buddhism and is called the "knot of eternity" or the "knot of meditation". It is shown prominently on the Bodhi leaf carried by Garuda (Fig. 3). Today it is used as the emblem of the Buddhist Meditation Center at Barnet, Vermont, U.S.A.

There are many interesting and complicated designs made up of a single unending line where dots or *pullis* are used as a frame for drawing these designs. Today the dots are used as an integral part of the *kolam* but similar designs carved on the walls of temple gopurams do not show the dots. Such an example (Fig. 4) can be seen on the *gopura* walls[5] of Acharapa$kkam village about 100 kms south of Madras. One can be certain now that the *pulli* is a clever device for assisting the artist to draw the design easily. The *pulli* pattern is used as a skeletal frame-work by which village women are able to memorize the design.

The South Canara district of Mysore region is studded with Jain temples and each temple has an ornamental flag-staff or *dhvaja stambha*. The Thousand Pillared Basti at Mudabidare built in the fifteenth century has many ornamental pillars.[6] In some of the pillars there are some complicated designs similar to the *kolam* patterns made of unending lines. These designs do not have any dots. The unending lines are clearly depicted showing a line superimposed and going over another line at the crossings.

It is quite likely that many of the designs originate from silken or coloured cord decorations fitted on wooden pillars during the Vijayanagar period which is famous for elaborate ornamentation.

Many of these patterns are abstract designs but there are also conventionalized forms of common objects such as the mirror, the swing, the vase and the lotus flower. In a *kolam* called *a$sanapalakai* (Fig. 5) the design is similar to the weave of a palm-leaf mat used for sitting on. Some designs represent coiled serpents.

Patterns used as threshold designs are also used as tattoo designs and the angular versions are more commonly used for that purpose. The threshold versions are more rounded and are closer to the original cord decorations.

The Tantric designs or *yantras* are drawn on small copper sheets and framed and kept in houses and in shops. Such designs can also be seen inscribed on stones set up by those practising black magic. One such stone called *mandaveli kal* can be seen today at Padu$r village on the Madras-Mahabalipuram road. Some of the designs are given in a well known Tantric work called *Soundaryalahari* attributed to Sankara. Designs derived from that work are used as *Navagraha kolam* meant for the different days of the week. There are also elaborate *kolam* designs which are used on special occasions and festivals.

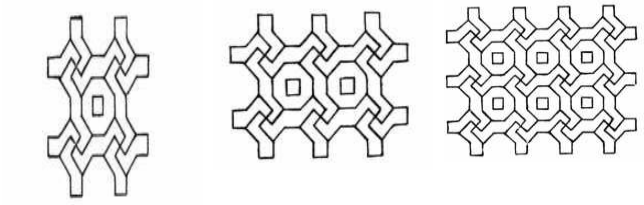


Fig 5. Asanapalakai

One can see that in the South Indian *kolam* patterns, many designs derived from purely secular motifs, magical motifs, abstract designs and philosophic and religious motifs have mingled together.

In every village the best designs are displayed not in the temple and its environs, not in the Harijan colony

but in the streets where the agricultural and the artisan communities live.

**SIMPLE MATHEMATICAL PROPERTIES**

Let us now consider a certain class of kolam patterns with dots. We discuss only those designs in which there is one dot and only one dot in every space bounded by *kolam* lines. Each design will have dots, crossings of lines, and edges which connect the crossings. Let us take those designs in which there are exactly four edges at each crossing. A large number of common kolam designs belong to this class[7] and such designs have some elegant mathematical properties.

The number of dots (*pullis*) is always equal to the number of crossings plus one. If the number of *pullis* is five then the number of crossings is always four even though more than one kind of *kolam* can be drawn for a given number of *pullis*.[8]

The number of edges is always an even number. In fact it is equal to twice the number of crossings. If the number of crossings is four, then the number of edges is eight.

Connecting the number of *pullis*, crossings and edges there is an interesting result. The number of *pullis* plus the number of crossings is equal to the number of edges plus one. For example if there are five *pullis* in a *kolam*, the number of crossings is four and the sum of these two is nine. Furthermore the number of edges is twice the number of crossings and it is eight. Eight plus one gives the same number nine.

**KOLAM AND PICTURE LANGUAGES**

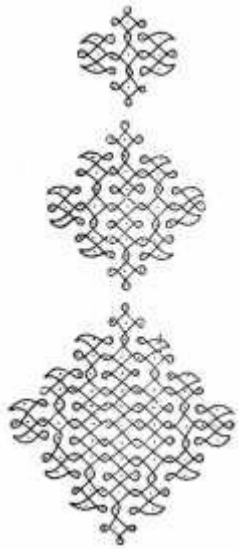
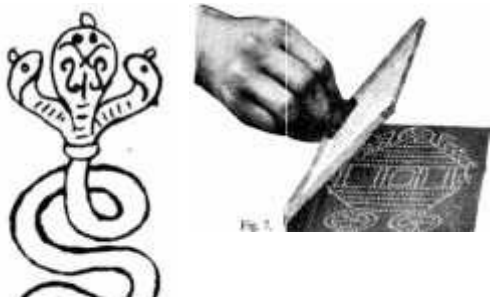


Fig. 6. Katharikol

In the late fifties, Noam Chomsky revolutionized the study of linguistics by defining languages in modern mathematical terminology. He defined grammars also in a formal manner and established a hierarchy of formal languages on the basis of formal grammars. For Chomsky, a language is a set of strings of symbols that are formed strictly according to the rules of a particular grammar. The number of rules are few compared to the inexhaustible number of sentences that can be formed. Language is looked upon as a set of well-formed sentences and a person who knows the language can generate any number of well-formed sentences. Just as there are different kinds of natural languages there are different varieties of *kolam*. Take the example of the *kolam* called *a$sanapalakai.* It is more or less rectangular in shape but one who wishes to draw that *kolam* can choose to draw it in any size and proportion. The practitioners of the art of *kolam* can fill any given rectangular space by choosing the size of the unit subpatterns in any manner they wish. The number of well-formed pictures of *a$sanapalakai* (Fig. 5) is infinite. This supplies a two-dimensional analogy of the one-dimensional languages of Chomsky. The two-dimensional sentences are the pictures or the *kolam* patterns. Following such a frame-work, two-dimensional formal language theory was developed in Madras and now there are a number of powerful results[9] that deal with the generative capacity of two-dimensional grammars defined in a fashion analogous to the one-dimensional grammars of Chomsky. Furthermore a hierarchy of picture languages has been established.

The three main classes of kolam recognized in computer mathematics[10] are the Finite Matrix Kolam, the Regular Matrix Kolam and the Context-free Regular Array Kolam. The first one is the simplest and consists of distinct single patterns.



Examples of the Regular Matrix Kolam are *a$sanapalakai* and other rectangular repetitive patterns. These are obtained by simple rules called regular rules. Examples such as *kathariko$l* (Fig. 6) require more complicated array rewriting rules and more powerful grammars. Using a finite set of rules and a Context-free Regular Array Grammar such *kolam* designs can be generated. Instead of the usual rectangular grid, models that fit radial and hexagonal grids have also been developed in Madras. However there are still a few

designs that defy formalization. Two-dimensional picture generating models are of interest in the area of pattern recognition by computers.

**KOLAM IN MADRAS CITY**

There is no doubt that the art of *kolam* is more widely and intensely practised in the small towns and villages than in Madras city. There is too much pressure on time for the city housewife and too little space for practising this ancient art.

A study[2] was undertaken by students of the Statistics Department of the Madras Christian College about four years ago and they found some interesting results. It was found that about one-third of the younger generation surveyed showed a lot of interest in practising the art of kolam in contrast to about ten per cent who were not at all interested in the art. About three-fourths of the women were found to use the old patterns but there were others who designed new patterns. Apart from the traditional styles, new patterns, including those taken from embroidery design books, were used. Some used coloured powder to fill in the designs and such designs are called *rangoli* in Tamil Nadu. Some put in a message in English and call it "English Kolam"!

To save time in "drawing" the *kolam*, many women use devices such as perforated rolling tubes and perforated trays (Fig. 7). Some prefer the *ma$ko$lam* which is applied when wet and stays for a longer period. However there are many who use rice powder which is later consumed by ants and this is a traditional form of feeding ants. Young women deftly design the *kolam* with pinches of flour held between the thumb and the first finger and letting the powder fall in a continuous line by moving the hand in the desired directions.

How does a particular design travel from one area to another? How long does it take for a particular pattern to be accepted in a new area? Before the advent of printed *kolam* books[11] how did the designs move from the districts of Andhra Pradesh and Mysore into interior Tamil Nadu? What are the favourite intricate designs of the different regions? These and other questions await further study.

**REFERENCES**

1 John Layard, " Labyrinth ritual in South India: Threshold and tattoo designs," *Folk-Lore* (England), 48 (1937), 114-182. Not being aware of the comparatively recent practice of the art of *kolam* Layard argues the case for its connection with prehistoric megalithic cultures.
2 R. Hari, " Powder patterns," *Madras Christian College Magazine,* 43 (1974), 56-57.
3 *Madurai Meenatchiammai Kuram, verse 6*
புழுகாலே தரைமெழுகு பிள்ளையார்வை
பொற்கோல மிட்டுநின்ற நாழிவையாய்

4 *Thiru Kutra$la Kuravanji*, Madras, 1972, p. 72
குங்குமஞ்சந்தனக்குழம்பிற் குழைத்துத்தரை மெழுகிக்
கோலமிட்டுக் குங்கிலியக் கொழும்புகையுங் காட்டி

5 There are at least five different examples of *kolam* at the entrance tower. One is the design given in fig. 1. Another is an example of coiling serpents. A third design is illustrated in fig. 4 and it is similar to the *kolam* design given in B. P. Bayri, *Rangavalli*, Part 4, Udipi, 1974, p. 41.
6 Gururaja Bhatt, *Antiquities of South Kanara,* Udipi, 1969.
7 The *kolam* in fig. 1 belongs to this class but not the one in fig. 6 since there are empty spaces without dots. There are more general formulas to take care of such cases. See Gift Siromoney and Rani Siromoney, *Mathematics for the Social Sciences*, National Book Trust, New Delhi, 1976
8 G. Siromoney, R. Siromoney and K. Krithivasan. "Abstract families of matrics and picture languages", *Computer Graphics and Image Processing*, 1 (1972), 284-307.
9 Kamala Krithivasan, *Studies in Parallelism and Picture Languages*, Ph. D. thesis, Madras, 1974.
10 G. Siromoney, R. Siromoney and K. Krithivasan, " Array languages and kolam ", *Computer Graphics and Image Processing.* 3 (1974), 63-82.
11 Some of the *kolam* books are printed in newsprint and the cost of production is kept low. In some books both the Telugu and the Tamil names are given for the different *kolam* designs. There are however a large number of designs which are in general use but have not found their way into the books.

**Home** | **Biodata** | **Biography** | **Photo Gallery** | **Publications** | **Tributes**