

THE TYPOLOGY OF THE MEANDERING SYMBOL AND AN APPLICATION OF THIS TYPOLOGY TO THE CRETAN LABYRINTH.

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Abstract: *The meandering symbol has had a universal appeal throughout history. It is an integral part of many myths, religions and rituals. As a symbol it has a quasi-universality that is flexible both in representation and meaning. Despite this flexibility the meandering symbol can be classified into precise mathematical structures. The turns and forks of the meandering figure divide them into two main categories, unicursal pattern (one path) and multicursal pattern (many paths). The purpose of this paper is two-fold; firstly, to outline a paradigm for unicursal patterns. This paradigm is achieved by the reduction of the symbol into fundamental elements and through these*

fundamental elements a classification system is developed that reveals the symbol's essential structure. Through this method, symbols that visibly appear to be similar can be shown to be innately different structures and the converse to this, symbols that appear to be different can be shown to have the same underlining structure. The structure of these symbols can be compared and the variation, structural connections and the transformation from one structure to another can be analyzed. The second purpose of this paper is to analyze the development of one particular meandering symbol, commonly called the Cretan Labyrinth, and its application in ancient Rome.

1.THE TYPOLOGY OF THE MEANDERING SYMBOL

The meandering symbol or labyrinth with a unicursal topology has one path, turning and changing directions from outside to the centre, never crossing itself and with concentric levels in its geometry. In strict mathematical term the unicursal labyrinth's topology is that of a straight line, but in this paradigm the emphasis is on the features such as turns. There are three main categories in unicursal labyrinths. Firstly, the simplest and most common unicursal labyrinth which is called simple, alternating, transit labyrinths or SAT labyrinths. SAT means that the direction of the path changes whenever the level of the labyrinth changes. Secondly, the Roman labyrinth, the standard layout of the Roman labyrinth is in four sectors however this number can be extended. These four sectors in the standard layout give an appearance of relatively perfect four-fold rotational symmetry. The final category of unicursal labyrinths is the Church labyrinths, these are a great deal more complex than either the SAT or Roman labyrinth but their structure can be analyzed by the same algorithm.

To analyze these symbols it is first necessary to unroll the labyrinth. This reduces the symbol to a fundamental form, which consists purely of the geometry of the turns. This is done by ironing out the spirals and squashing down the length of the path from turn to turn. P. Rosenstiehl developed this algorithm of unrolling the labyrinth in an article that analyzed the topological structure of the labyrinth at Chartre Cathedral. With further analysis these fundamental forms can be broken up into fundamental elements. These fundamental elements are the minimal building blocks of the fundamental forms. Interestingly there are only seven fundamental elements that are required to make up the fundamental forms of the three different categories of the unicursal labyrinths. Each labyrinth's topology can be classified, but it is also possible to make a closer examination of the variations, structural connections and the transformation from one structure to the next, which this analysis can highlight.

2. APPLICATION

The labyrinthine symbol known, as the 'Cretan Labyrinth' is a meandering symbol, it is a SAT labyrinth on eight concentric levels with a very defined topology in terms of the above section. The earliest known of these symbols is on a clay tablet from the palace of Nestor, Pylos. It was buried in the ruins of the palace for thirty-two hundred years and forgotten. A seventh century BC Etruscan wine pitcher that was found in Italy is decorated with the same symbol, it has the same topology as the symbol found at Pylos. Both the Pylos and the Etruscan labyrinth have a ritual significance. The symbol next appears on fourth and third century BC coins from Crete as a symbol of Crete. In Virgil's fifth book of the Aeneid, Virgil uses the concept of this symbol as a ceremonial horse ride, called the 'Trojan game' in the funeral games of Aeneas' father. In the sixth book Virgil describes gates of a temple to Apollo, which were designed by Daedalus the architect of the original Cretan labyrinth. These gates tell the story of Minos, Theseus, the Minotaur and the labyrinth. After the viewing these gates Aeneas sets out to enter the labyrinthine underworld of the dead. In the underworld Aeneas was shown the glories of the prophesized of Rome and at the zenith of these prophecies was the Emperor Augustus.

Augustus used poets such as Virgil, together with the art and architecture of Rome to *create and build on existing traditions of history to create a consolidated and secure* history for Rome. Within the writings of Virgil were visual symbols that stood for Roman and cosmic unity. These symbols began to represent the unity of cultures: Greek, Etruscan and Latin that made up the created past and the prophesied future for the Roman Empire. The secular and the religious beliefs behind this cultural diversity were reflected in the art and the symbols of the Empire and the Roman labyrinth mirrored this fusion.

The relatively perfect four-fold rotational symmetry of the standard layout of the Roman labyrinth is thought to have evolved from the templum, the Etruscan division of the heavens, underworld and the earth. The templum is an integral part of Roman town planning and the inauguration of a city. By analyzing the topology of the four-fold rotational symmetry of the standard Roman labyrinth there are four fundamental forms. Each of these fundamental forms has the equivalent topology of the Cretan labyrinth. These structural connections of symmetry and topology highlight the cultural transferences of ideas in a very visual and geometric way.

References

- Aristotle. 1953. *On the Heavens*. Translated by W. K. Guthrie. London: William Heinemann Ltd.
- Attali, Jacques. 1999. *The Labyrinth in Culture and Society*. Berkeley: North Atlantic Books.
- Bennett, Emmett L. 1960. Anonymous Writers in Mycenaean Palaces. *Archaeology* Vol. 13, no. 1: p26-32.
- Blegen, Carl W. 1953. King Nestor's Palace, New Discoveries. *Archaeology* Vol 6: p.203-207.
- Campbell, Joseph. 1993. *The Hero with a Thousand Faces*. London: Fontana Press.
- Cicero, Marcus Tullius. 1971. *De Divinatione*. Translated by William Armistead Falconer. London: William Heinemann Ltd.
- Doob, Penelope Reed. 1990. *The Idea of the Labyrinth*. London: Cornell University Press.
- Heller, John L. 1946. Labyrinth or Troy Town? *The Classical Journal* Vol. 42: p.175-91.
- Kern, Hermann. 2000. *Through the Labyrinth*. Munich: Prestel.
- Rosenstiehl, P. 1985. How the "Path of Jerusalem" in Chartres Separates Birds from Fishes. In *International Congress on M. C. Escher*, ed. H. S. M. Coxeter.p.221-230. Rome: North Holland.
- Stahl, William H. 1978. *Roman Science*. Westport: Greenwood Press.
- Virgil. 1964. *The Aeneid*. Translated by W. F. Jackson Knight. London: Penguin Books Ltd.