<u>Sacred Geometry</u>

Sacred geometry ascribes symbolic and esoteric meanings to certain geometric shapes and certain geometric proportions. It is associated with the belief that God is the geometer of the Universe. The geometry used in the design and construction of religious structures such as churches, temples, mosques, religious monuments, altars, and tabernacles has sometimes been considered sacred. The concept applies also to sacred spaces such as temenoi, sacred groves, village greens, pagodas and holy wells, and the creation of religious art.

The belief that a god created the universe according to a geometric plan has ancient origins. Plutarch attributed the belief to Plato, writing that "Plato said god geometrizes continually". In modern times, the mathematician Carl Friedrich Gauss adapted this quote, saying "God arithmetizes". Shing-Tung Yau expressed a belief in the centrality of geometry: "Lest one conclude that geometry is little more than a well-calibrated ruler – and this is no knock against the ruler, which happens to be a technology I admire – geometry is one of the main avenues available to us for probing the universe. Physics and cosmology have been, almost by definition, absolutely crucial for making sense of the universe. Geometry's role in this may be less obvious, but is equally vital. I would go so far as to say that geometry not only deserves a place at the table alongside physics and cosmology, but in many ways it is the table."

According to Stephen Skinner, the study of sacred geometry has its roots in the study of nature, and the mathematical principles at work therein. Many forms observed in nature can be related to geometry; for example, the chambered nautilus grows at a constant rate and so its shell forms a logarithmic spiral to accommodate that growth without changing shape. Also, honeybees construct hexagonal cells to hold their honey. These and other correspondences are sometimes

interpreted in terms of sacred geometry and considered to be further proof of the natural significance of geometric forms.

Geometric ratios, and geometric figures were often employed in the designs of ancient Egyptian, ancient Indian, Greek and Roman architecture. Medieval European cathedrals also incorporated symbolic geometry. Indian and Himalayan spiritual communities often constructed temples and fortifications on design plans of mandala and yantra. Many of the sacred geometry principles of the human body and of ancient architecture were compiled into the Vitruvian Man drawing by Leonardo da Vinci. The latter drawing was itself based on the much older writings of the Roman architect Vitruvius.

The geometric designs in Islamic art are often built on combinations of repeated squares and circles, which may be overlapped and interlaced to form intricate and complex patterns, including a wide variety of tessellations. These may constitute the entire decoration, may form a framework for floral or calligraphic embellishments, or may retreat into the background around other motifs. The complexity and variety of patterns used evolved from simple stars and lozenges in the ninth century, through a variety of 6- to 13-point patterns by the 13th century, and finally to include also 14- and 16-point stars in the sixteenth century. Geometric patterns occur in a variety of forms in Islamic art and architecture including kilim carpets, Persian girih and Moroccan/Algerian zellige tilework, muqarnas decorative vaulting, jali pierced stone screens, ceramics, leather, stained glass, woodwork, and metalwork. Islamic geometric patterns are used in the Quran, Mosques and even in the calligraphies.

The Agamas are a collection of Sanskrit, Tamil, and Grantha scriptures chiefly constituting the methods of temple construction and creation of idols, worship means of deities, philosophical doctrines, meditative practices, attainment of sixfold desires, and four kinds of

yoga. Elaborate rules are laid out in the Agamas for Shilpa describing the quality requirements of such matters as the places where temples are to be built, the kinds of images to be installed, the materials from which they are to be made, their dimensions, proportions, air circulation, and lighting in the temple complex. The Manasara and Silpasara are works that deal with these rules. The rituals of daily worship at the temple also follow rules laid out in the Agamas. The symbolic representation of the cosmic model is then projected onto Hindu temples using the *Vastu Shastra* principle of *Sukha Darshan,* which states that smaller parts of the temple should be self-similar and a replica of the whole. The repetition of these replication parts symbolizes the natural phenomena of fractal patterns found in nature. These patterns make up the exterior of Hindu temples. Each element and detail are proportional to each other, this occurrence is essential to sacred geometry.

The construction of Medieval European cathedrals was often based on geometries intended to make the viewer see the world through mathematics, and through this understanding, gain a better understanding of the divine. These churches frequently featured a Latin Cross floor-plan. At the beginning of the Renaissance in Europe, views shifted to favor simple and regular geometries. The circle in particular became a central and symbolic shape for the base of buildings, as it represented the perfection of nature and the centrality of man's place in the universe. The use of the circle and other simple and symmetrical geometric shapes was solidified as a staple of Renaissance sacred architecture in Leon Battista Alberti's architectural treatise, which described the ideal church in terms of spiritual geometry.