

## :: DOKTORANDSKÉ ŠTÚDIE

### :: Art Geometry in past

#### :: Introduction

This article deals with exploitation and requirement of geometry in past.. It analyses some selected parts of history, which refers the best to the exploitation of geometry within the creative art process. The purpose of this thesis is to show how the supported geometric constructions positively affect and extend the designer's work and consolidate the position of geometry in crative designing process.

Geometry plays a very important role in the field of human consciousness. When the teachings of geometry are used to show the ancient truth that all life emerges from the same blueprint, we can clearly see that life springs from the same source, the intelligent force some call „God.“ When geometry is used to explore this great truth, a broader understanding of the universe unfolds until we can see that all aspects of reality become sacred. Understanding the simple truths of sacred geometry leads to an evolution of consciousness and an opening of the heart that is a next step in the process of human evolution.

All things throughout our universe seem to follow the same fundamental blueprint or geometric patterns. These ' geometrical archetypes reveal to us the nature of each form and its virational resonances. They are also symbolic of the underlying metaphysical principle of the inseperable relationship of the part to the whole. It is this principle of oneness underlying all geometry that permeates the architecture of all inseparability and union provides us with a continous reminder of our relationship to the whole -a blueprint for the mind to the sacred foundation of all things created.[ 1 ] We can call this blueprint „ Sacred Geometry“.

Sacred Geometry is a term that is used by archaeologists, anthropologists, and geometers. It includes the religious, philosophical, and spiritual beliefs that have surrounded geometry in many various cultures throughout history. The „sacred“ aspect of geometry has evolved as a result of different cultures.

'Geometry (Greek geo = earth, metria = measure) arose as the field of knowledge dealing with spatial relationships. Geometry was one of the two fields of pre-modern mathematics, the other being the study of numbers. In modern times, geometric concepts have been generalized to a high level of abstraction and complexity.' [ 2 ] Geometry is abstract form of mind. It is reflection of objective reality and practical needs. This specific abstract form has been absorbed because of its practical importance and is still developing.

The exploitation of geometry in design is one of the factors, which can achieve valid measure of aesthetic perfection. The application of geometry and creative analysis in design presents auxiliary means but it is necessary for design of the industrial products. The value of geometry and its need for common life can be traced already in the past. However a lot of regulations are valid up till now.

We can find and look through the value and the status of geometry in the past. This is opportunity to realise its authentic reality.

#### :: The Ancient Egyptians

The sublimity of geometry can be understood in the Ancient Egypt. The Egyptian civilization did not look at science and art as separated branches. They understood everything in mutual connections.

„The Flower of Life“ - the symbol of the holy Egyptian geometry describes the first acts of God, when he created the universe. The Egyptians believed that the divine movements depart from the single point so-called the Eye of Horus. This point can part with itself and create a line by multiplying . This way, the father-God shows his energy and the mother-God transforms his active faith. The son-God connects them turn back with the obtained knowledge. Thus the Egyptians understood the Trinity that is expressed in geometry with the equilateral triangle. The equilateral triangle is the base of tetrahedron. Tetrahedron is one of five fundamental shapes in which the matter is grouped. With the rotation of tetrahedron the sphere is created. The sphere is the expression of integrity. All the building blocks of the universe can be found within the first virtual sphere. They are called the Platonic Solids. Then the God made the move from the sphere's center to its border. This point is the base of a new sphere. The intersection of these two spheres presents very important shape called Vescica Piscis. Two equilateral triangles can be filled in it. Next, the new spheres are created by the movement on the first sphere border. This geometrical figure is endlessly repeated, it is the base of all living.

:: *The flower of life - the symbol of the holy Egyptian geometry.*

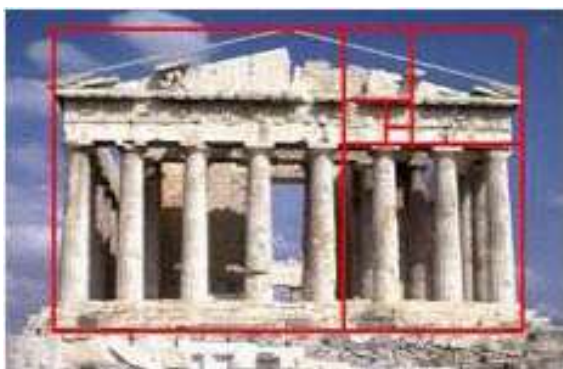


The symbol of Flower of Life is considered to be sacred among many cultures around the world, both ancient and modern. The symbol can be used as a metaphor to illustrate the connectedness of all life and spirit within the universe. From the models within it, the symbol of Flower of Life has the ability to demonstrate how all things come from one source and are intimately and permanently woven together.

### :: The Ancient Greeks

The Greeks applied rules as a means of bringing order to the perceived chaos of nature and the world around them. They consciously sought order, clarity, balance, and harmony in their works. Rules provided a measure of control, and through control a form of comprehension. To maintain order it is necessary to apply rules, and the tradition that supports them. This is the nature of the „classical“ which is perforce traditional and conservative.

The ancient Greeks used certain geometrically-derived ratios. In this culture, the cube traditionally symbolized kingship and earthly foundations. The Golden Section traditionally symbolized philosophy and wisdom. Therefore, if a building was dedicated to a king it would bear traces of cubic geometry and a building dedicated to a heavenly god would be constructed using Golden Section proportions. The Greeks believed that everything, from the human body to the entire cosmos, was governed by an order accessible to human reason.



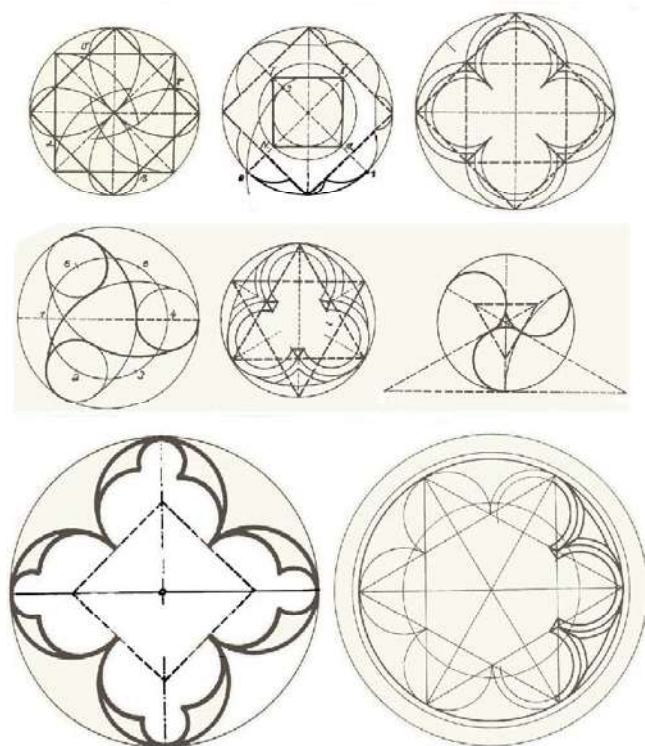
:: The Parthenon - a geometrical masterpiece.

The Parthenon is known as a geometrical masterpiece. It is very pleasing to the eye due to the unique architecture. The lines that are perceived as horizontals in fact are curved upward in the middle. The platform upon which the columns of the temple stand is slightly curved on all four sides. All of the columns are tilted inward slightly, and are placed closer together toward the corners of the building.

### :: The Middle Ages

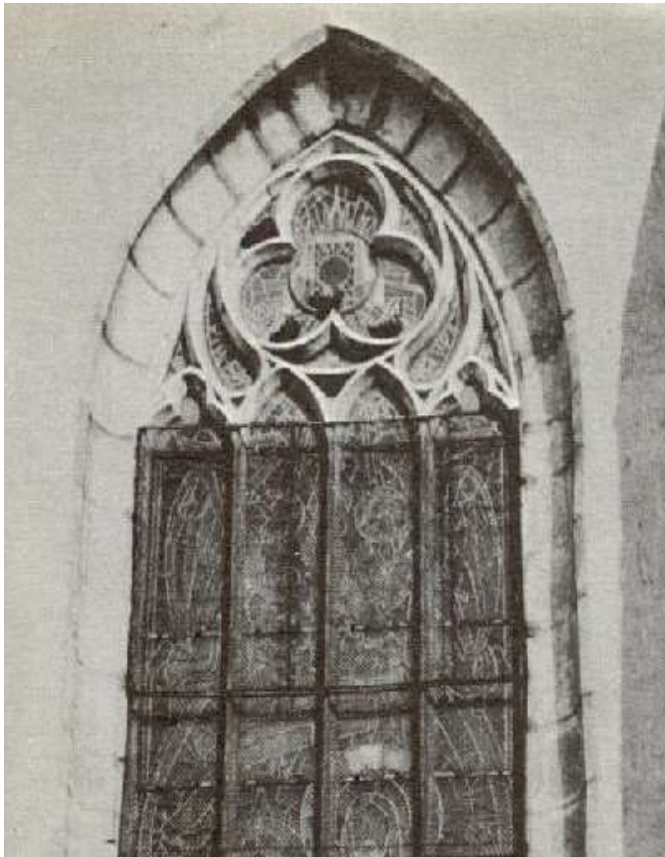
The exploitation of geometry as a very important component unit to achieve geometrical harmony can be observed the best

in Gothic period. The medieval flying buttress was born from the desire for building higher; and the pointed arch arose from the necessity of efficiently transferring the extra weight from above. All architectural work of those days was supported by geometry. The whole complex and also the details were composed with the use of geometry. The Gothic architecture applied quadrature, triangulation, modular system of circle or irrational proportional relationships as an outline and a support.



:: The Gothic geometrical constructions.

The whole architectural mass was well-balanced and the details were in harmony with it. The stonework tracery, fractional arc and rectilinear lines are an instantly recognizable feature of Gothic. It decorates fan vaulting, rose windows, arcaded cloisters, to simple windows and doorways. Many of the following shapes morph and grow from an interesting variety of other shapes - including triangles, pentagons, hexagons, circles, or circles within circles. The basic Gothic arch begins simply enough with a straight, horizontal line. (The trefoil begins with a simple equilateral triangle). The double-curve ogee (oh-jee) was introduced from the Arab world in the 14th century and became popular throughout medieval England. It can also be referred to as a keel arch for its apparent resemblance to ship construction. The rosette tracery was composed to the circle and subsequently divided by polygons inscribed in it.



:: The Gothic architecture, the trefoil detail.

The later period of Gothic applied the regular hexagons as a modular grid. The Sacred geometry serves as a door into the minds of Gothic masters.

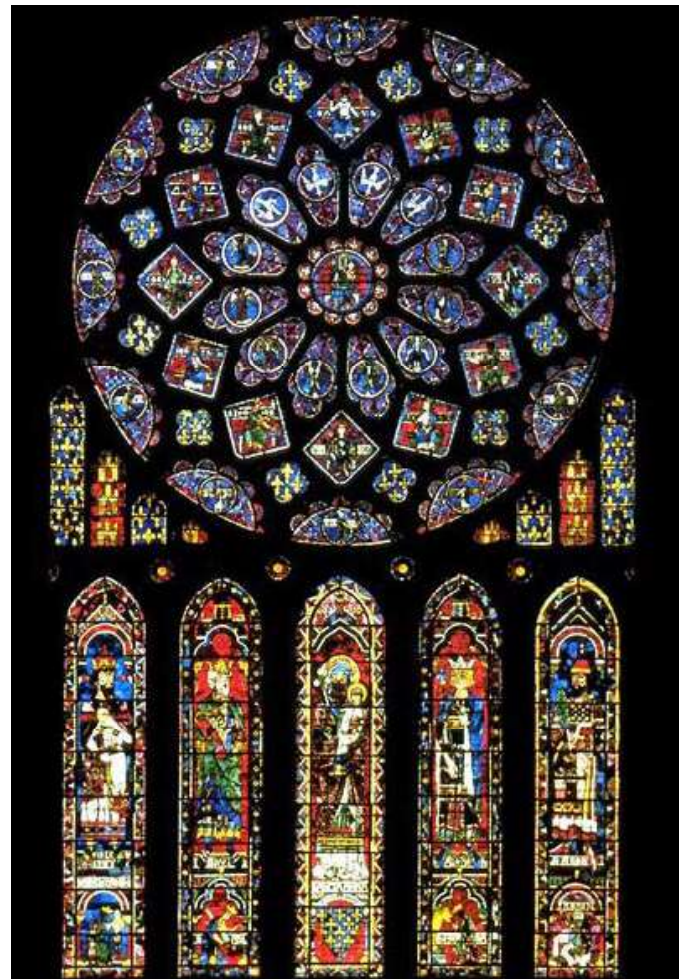
### :: The Islamic geometry

Islam views the depiction of living beings, particularly people, as a potentially blasphemous attempt to rival the creative powers of God and such pictures are rigorously excluded from most of religious settings. The Islamic art consists of three main elements: calligraphy, arabesques and geometrical design using limited numbers of geometric shapes in different ways. These three elements are often combined in the decorative

### :: Scheme of single object

Geometry can be interpreted as representing universal harmonious laws that express the unity within the diversity of our world: the same geometry can be found in the snowflake or in the arrangement of the flower petals.

The geometrical pattern is the symbol of Islamic art. This Islamic pattern, unique as an art form, is also unitary in its aim and function. These geometric patterns are generated from several shapes. The circle and its centre are the point at



:: The Chartres Cathedral - The Rose window, south transept.

:: The geometrical pattern 1 - the symbol of Islamic art.



with all Islamic patterns begin and is an apt symbol of religion that emphasizes one God. The circle has always been regarded as a symbol of eternity, and is not only perfect expression of justice- equality in all directions, but also the most beautiful parent of all polygons, both containing and underlying them. Three fundamental figures come from the circle in Islamic art, the triangle, square and hexagon. The triangle is symbolic of human consciousness and the principle of harmony, the square, the symbol of physical experience and the hexagon, of heaven. Another symbol prevalent in Islamic art is the star – the symbol of equal radiation in all directions. These shapes are combined, duplicated, interlaced and arranged in intricate combinations. Symetry plays a part in most Islamic patterns and with repetition gives unity to the more complex designs. Geometric ornamentation suggests a remarkable amount of freedom and it offers the possibility of infinite growth. The development of infinitely repeating patterns represents the unchanging laws of God.



:: The geometrical pattern 2 - the symbol of Islamic art.

The previous part is only short indication of the status of geometry in the past. The following periods developed geometrical knowledge and used them in common life.

### :: Conclusion

The relationships contemplated in environment even in space held the artists spellbound long before. They were the support and the ground for the construction of many art works and they subsequently featured new object. The result of designer's work allows to be perfect if it satisfies the essential requirements such as the purpose, the beauty and the technical

perfection. It can be achieved as well by the exploitation of geometry as a base of the construction in designing process. So we can talk about geometrical harmony – the excellency of the shape accomplished by the application of the geometrical constructions. The main role of the designer is to transform the idea of his work to the suitable form. The application of geometry presents the essential part in the designing process and can achieve valid measure of the aesthetic perfection. Geometry supports the precision of the shape.

Methodes of geometric application are needful as an asistent component for all designer's work. But we cannot forget that this aspect is only a part of the complex designing process. Designer's creation must be rectified by essential component of intuition, invention and fantasy.

### :: References

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- <sup>2</sup> <http://www.en.wikipedia.org/wiki/Geometry>, april 2006.
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- <sup>4</sup> SEMBACH, K-J. - LEUTHÄUSER, G. - GÖSSEL, P.: 20<sup>th</sup> Century Furniture Design. - Koln : Taschen, 1990.

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