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Column Rank in the Interior Design of Contemporary Architecture-A Comparative Analysis Study

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Abstract
This research aims to analyze the column as an important element in architecture and interior design and its status in the contemporary architecture. It identifies the rank and mechanism of evolution and changes through its presence during the historical development to the present day as a structural, esthetical, functional and symbolical element. The study found that the column still have the same esthetical, functional and symbolical effects; on the other hand the result show that there is poor relationship between the column as a structural element and all the previous attributes, that rarely the esthetical, functional, or symbolical columns represented a structural element and vice versa.
Keywords: Column, Pillar, Interior Design, Contemporary Architecture.

1. Introduction

Column is one of the most important elements in Architecture and interior design that we can see through the history till now in different ways of expression, navigating between structural, functional, esthetics and symbolic need

Centuries of architectural culture have created an inexhaustible variety of forms of columns. In Egyptian architecture, and through Greek epochs which were named after their orders. Time and again the proportioning and decoration of a column or pier served as an indication and characterization of certain architectural style. The strategic role of the column can be identified more precisely by looking at the time line development in architecture and interior design where explicitly addresses the question of the column as an architectural element. The already complicated relationship between the column description of itself as an aesthetic existing and as an object within a building as a structural need in the architectural terms. The translation of column between architecture and art work both ways, each has an attraction for the other that manifests itself in many different ways.

All previous studies and research condense on the column itself by focusing on the lineage, proportions, structural construction and style. There is no sufficient study for the status of the column within interior design and the mechanism of evolution and changes in presence during the historical development to the present day. The column as an element was discussed in this paper to analyze the historical development in the way of expression and reflection in order to access and evaluate the column rank at the contemporary architecture and interior design

1.1 Procedural Definitions

Column: Generally any body which supports another in a vertical direction (Gwilt, 1881). It is an upright decorative and supporting pillar, especially one consisting of a usually round shaft, a capital, a base and/or an upright pillar, typically cylindrical, supporting an arch, entablature, or other structure or standing alone as a monument. There are five main orders of columns and various species of columns, depends on form, function which marked the boundary of place and time.

Pillar: A column of irregular form, disengaged, and always deviating from the proportions of the orders, whence the distinction between a column and a pillar (Gwilt, 1881). It is a tall vertical structure of stone, wood, or metal, used as a support for a building.

Pier: A solid between the doors or windows of a building. The square or other formed mass or post to which a gate is hung. Also the solid support from which an arch springs (Gwilt, 1881)

2. Background

Column as an element in architecture has been discussed by a number of authors, focusing on the lineage, structural construction, form and function. Most of the focusing was on one side or two of the column's rank. Some authors studied the column as a structural element such as Boyd who focused on the post and lintel construction associated with Greek architecture, the arch and the barrel- vault associated with Roman architecture and its effects on columns as a structural support (Boyd, 1978). Salvadori consistent with the previous author and focused on the relationship between the building structure strength and the columns as supports since the first beginnings of architecture and the emergence of columns (Salvadori, 1980). Some authors considered the column as a structural and esthetical element. Kostof wrote about the emergence of

columns supporting the major religious architecture of the world, with a particular focus on sacred places, cities, and buildings, he also discussed ancient's different styles of ornamentation for columns as an esthetic element (Kostof, 1985). On other hand, some authors covered the column as an aesthetic and a functional element. Krier wrote that centuries of architecture culture have created inexhaustible variety forms of ` and piers which named after their orders. Proportioning and decorating a column of pier served as an indication and characterization of a certain architectural style. Besides, the author wrote about the column as a functional element used to divide space, giving historical example of each case of division (Krier, 1983). Other authors mentioned the column as a structural and symbolic element such as Fergusson who wrote about column as a main support for any building. He described the development of different types, giving full details about each type and buildings that present it through the history of architecture in all countries, discussing and analyzing the principles of the column as a symbolic element and giving examples through history of architecture (Fergusson, 1874). The column's symbolism took place in other studies, such as Rykwert who focused on the column effects as a symbolic element. His opinion was that column signifies wisdom and symbolizes fortitude and constancy. Column is a metaphorical heraldic device, implying that its bearer supports others who are weaker (Rykwert, 1999). Moffett also described the column as a sculpture in the ancient Greek architecture giving the caryatids as an example "it's a sculpture of a female figure used as a column, which represents a dramatic story and symbolize the defeat and destruction of their homeland. The column used not just to support and carry the building, but to carry on the memory of the event" (Moffett, 2003).Tucker has clarified the relationship between column as a sculpture and its spiritual influences. He recognized that sculpture is a separate thing, as the easel picture, but it did not require a wall like the picture and did not need a roof. It is an object that could exist for itself alone giving the character of a complete thing that one could look at from all sides. He believed that column is sculpture supported with a large field of symbolism (Tucker, 1974).

3. Research hypothesis

Ho.1 column is a supporting pillar.
Ho.1.1 there is a strong relationship between column and the construction structure.
Ho.1.2 there is a strong relationship between column and roof.
Ho1.3 there is strong relationship between column and rigid supporting materials
Ho.2 there is no relationship between column and the human vision towards it.

4. Research methodology and analysis

The research includes a comparative analytical study of the column from the beginning and through place and time and the different expressions in results affiliate.
Vision and philosophy of this study will be substantive analytical in the approach within the limits of the research problem on one hand, and based on assumptions derived from objectives, on the other hand, led to conduct the study in four levels as follow:
- Column as a structural element.
- Column as an esthetical element.
- Column as a functional element.
- Column as a symbolic element.

4.1 Column as a structural Element

Depending on the term of Need and desire, Architecture began as a shelter. "We are accustomed to thinking of Architecture as shelter: a home to live in (A roof over our heads)" (Kostof, 1985).
This statement leads to the major problem of how can the roof stands?

4.1.1 Transforming from the shelter to architecture

Producing in the form of huts made of branches or saplings set close together in the sand as a palisade, then braced on the outside by a ring of large stones (see fig.1) within the long axis was lined with larger posts to help hold up the roof (Kostof, 1985).
Until they were able to give up roaming the surface of the earth in search of food, they had been exposed to the weather, precariously protected by tents of animal skins, perpetually on the move, they cooked over campfires and gathered in small tribes.
Supporting tents was the first beginning of columns in architecture.
Tents were supplanted by more substantial abodes. Due to people sedentary, the clustering of huts created the need for larger huts where village problems could be discussed. Houses in Egyptian structures, which began around 2686 B.C. and ended around 2498 B.C, were built of mud-brick walls with columns made from bundles of reeds tied together. The walls of buildings were mostly battered, and the columns were short in proportion to their diameter (Salvadori, 1980).

4.1.2 Using post-and-lintel construction

Stonehenge is a prehistoric monument located in the English county of Wiltshire, one of the most famous sites in the world (see fig.2).Stonehenge is composed of earthworks surrounding a circular setting of large standing stones and sits at the center of the densest complex of Neolithic and Bronze Age monuments in England including several hundred burial mounds.

All significant Iron Age civilizations of the Near East and Mediterranean made some use of columns. In Ancient Egyptian architecture as early as 2600 BC the architect Imhotep made use of stone columns.

In later Egyptian architecture faceted cylinders were also common. The Egyptians, Persians and other civilizations mostly used columns for the practical purpose of holding up the roof inside a building, preferring outside walls to be decorated with reliefs or painting

In any ancient Egyptian hall, such as a Karnack temple of Ammon at the great hypostyle hall (see fig.3),

it's often said that one cannot see the hall for the columns, due to the absence of the load- bearing arch in ancient Egypt. It was difficult to span large aerial distances with stone- hence the need for a large number of support columns to support the roof (Fergusson, 1874).

4.1.3 Using structures built in compression

The imposing quality of roman construction is a result of applying engineering skills to the problems encountered in everyday life. Roman construction exploited structures built in compression: the arch, the vault, and the dome techniques developed by other civilizations but used in a very limited fashion (Boyd, 1978). In Roman hands, however, these became the basis for hitherto unimagined structures on a scale not possible with post-and-lintel construction. A true arch consists of wedge shapes stones set in a curved shape, often a semicircle (see fig.4); such building requires a temporary timber framework. The weight of the masonry in vaulted construction pushed downward and outward on the walls or columns on which it rests, and this overturning force of thrust must be countered by supports. Vaulted construction (see fig.5) thus requires walls or piers much thicker than those used in post- lintel buildings (Moffett, 2003).

4.1.4 Using structures built in open plan system

By development of various construction materials and applications, architecture today has various diversities; columns of the building structure, floor structure have lot varieties. Such varieties of structures facilitate the building designers, and constructors to select the appropriate column's grid with an appropriate unit weight, compressive strength, lateral tensile strength in construction, and then consider the suitability of the construction costs, so that the design of buildings can be more convenient and flexible. The most epidemic and appropriate structural system is as follow:

In the open plane system the location of existing columns and load bearing walls is often one of the most troublesome factors for interior design. Columns cannot be moved, and load bearing walls may by pierced of partially removed only after review and design by a structural engineer, and then only at significant expense. Existing structural elements may affect the spacing of rooms, the positions of new partitions, or the locations of large areas. New partitions can coincide with column locations so that columns do not awkwardly end up in the middle of a room (see fig. 6). If the size of a room must exceed the column spacing, the room should be centered between the columns so that the columns are off to both sides as much as possible. In spaces used for open office planning or restaurant dining rooms furniture placement can be planned around the columns or service spaces like closets and storage rooms, or space dividers can minimize the effect of the columns.(Ballast, 2010).

4.2 Column as an Esthetical Element

Centuries of architecture culture have created an inexhaustible variety of forms of columns and piers. In Greek architecture epochs were named after their orders. Time and again the proportioning and decorating of a column of pier served as an indication and characterization of a certain architectural style. It remained for our times to give up the continuous refinement of this archaic form (Krier, 1983). The column always consists of three parts, a base, a shaft, and a capital.

4.2.1 Column shaft

Early columns were constructed of stone, some out of a single piece of stone. Monolithic columns are among the heaviest stones used in architecture. Other stone columns are created out of multiple sections of stone (see fig.7), mortared or dry-fit together. In many classical sites, sectioned columns were carved with a center hole or depression so that they could be pegged together, using stone or metal pins. The design of most classical columns incorporates entasis (the inclusion of a slight outward curve in the sides) plus a reduction in diameter along the height of the column, so that the top is as small as of the bottom diameter. This reduction mimics the parallax effects which the eye expects to see, and tends to make columns look taller and straighter than they are while entasis adds to that effect.

4.2.2 Colum capital

A classical column and entablature proportioned and decorated according to accepted modes. The ancient Greeks developed the Doric, ionic, and Corinthian orders (see fig.7), and the romans the Tuscan and composite orders.

The Doric order, the most massive of these five, has a plain capital, a fluted shaft and base. The Ionic order is slimmer and its capital has prominent scrolls or volutes. The Corinthian order is the most attenuated and richly decorated of the three Greek orders. The Tuscan order is similar to the Doric, but fluted (see fig.7). The Composite order combines in its capital the acanthus leaves of the Corinthian order with the prominent volutes of the ionic (Kostof, 1985).

4.2.3 Colum base

The base itself was divided into two parts: the rubble foundations and the stepped platform wrapped around it (see fig.7) on which the columns stood and raised the temple above the approach level (Rykwert, 1999).

4.2.4 The entablature

Entablature always includes an architrave, a frieze, and a cornice (see fig.7). To these the Italians often added a pedestal below and a balustrade above, but these are not parts of the "Order", which is always understood to include only the six parts first mentioned (Fergusson, 1874).

4.2.5 Development of column's styles

Through centuries, columns had extensive attentions as an esthetical element which caused on several new styles based, in a way, on the principles of the classic Greek and Roman's (see fig.7).

Nowaday, many styles appeared with totally different principles of form and proportions, which changed standards, but it didn't change the column as an esthetical element. Some concrete or steel pillars decorated with a skin of different materials (see fig.8), but some are really new generation of columns style such as:

- John wax building:

It is a modern example of a new column style. At the great workroom and the lobby, the columns virtually are the ceiling, discrete round slabs rest on each column, and the space between adjacent columns is open to the sky, filled only with a network of glass tubing (see fig.9), Wright called the columns" dendrite form"- tree- shaped which entered an element of the universe to his forest. The light seemed to be the matter of which the great room was made. This quality of light, enveloping the columns, lends a greater reality to the enclosed space. The columns generate the space and the light makes it tangible. Space as a stuff of architecture, is nowhere more available to human experience than it is in building (Lipman, 1986). Wright's use of the columns, both technically and spatially, was a major innovation in twentieth- century building.

4.3 Column as functional element

The purpose of a building is to perform a function. The function of most buildings is to protect people from the weather by creating enclosed but interconnected spaces. The spaces may be many and small, as in apartment houses, or few, perhaps even a single space, as in church or theatre. The function of the building is fulfilled by the construction of surfaces. The structural components of a building assure the elements required to fulfill its function will stand up. Column, Beams, and floors structure make possible the architectural component (Salvadori, 1980). Column used as a spiritual isolation at the interior space, and to make a semi space between the inside and outside making the view looking like it had been framed in a way of getting multiple aesthetic pictures from different vision angles.

4.3.1 Using column in interior spaces:

Columns often used for technical or functional reasons, such as dividing one space to two, three and four spaces depending on the columns location in each case, giving the space entirely different relations and directions. They alter the scale, and are confusing when it comes to describing proportions (Krier, 1983).

4.3.2 Divide space into two parts

When divided by means of a row of columns, two relevant rectangular spaces are created (see fig.10-1).

Each space has its own personality depending on the proportions of the division. For example one is the main space and the other is sub space. In this case column could use to create a corridor as a semi space between inside and outside, such as in the outdoor courtyard and at the balcony. This type usually used at Islamic Architecture (see fig 11) providing severe weather Protection.

4.3.3 Divide space into three parts

When divided by two rows of columns, in this case the emphasis is laid on the main space in the middle part which is narrower than the two border areas (see fig.10-2).In this case the space in the middle gains the character of a route, and so the areas on each side become more significant.

4.3.4 Divide space into four parts

This case shows an enclosed space with the skeletal canopy construction inside. A space within a space emerges. By that, the shape of the entire space is intensified; the canopy defines an almost sacred area and the edges become a silent zone; a threshold area which, although existing inside the space, does not fully belong to it (see fig.10-3). In this case the column used to create medial space between the indoor and outdoor by creating a corridor as a semi space between the inside and the courtyard. This type usually used at the Roman house and the Islamic house style (see fig 12) which Provides ventilation and privacy in the same time.

4.3.5 Divide space into several spaces

The fully skeletal interior space is of course only conceivable at a larger scale (see fig.10-4). Here one thinks of a space designed for special functions: the vast hypostyle hall of the Great Temple of Ammon in Karnack (see fig.3) with its 134 sandstone columns (Krier, 1983).

4.3.6 Using non supporting columns to divide space

With the usage of the open plan system in structural considerations and the partition walls that located with the existing columns, the columns start to be a part of the walls. This led to create a new style to divide space (see fig.13) or to determine a zone by creating non supporting columns (see fig.14).

4.4 Column as a symbolic Element

Symbolism: is the practice of representing things by symbols, or of investing things with a symbolic meaning or character. A symbol is an object, action, or idea that represents something other than itself, often of a more abstract nature. Symbolism creates quality aspects that make literature like poetry and novels more meaningful.

Characters are symbolic analogues to features in that they require semantic (dual) interpretations. For example, a column may have the property of supporting a certain load but may appear too fragile to be trusted for this purpose (Margolin, 1995).

Columns symbolize fortitude and constancy. It is a metaphorical heraldic device, implying that its bearer supports others who are weaker. A serpent coiled round a column signifies wisdom with fortitude.

The temple building proper, was the dominant Greek building type, not only because it dominated the fabric of the city, as its tallest- or its highest- building, but also because its most prominent feature, the column and beam (and the exact relationship between them) in their different genders, was developed in and for the temple building as the core of Greek architectural thinking and practice (Rykwert, 1999).

4.4.1 Support columns for symbolic effect

Symbolic knowledge, for the ancient architecture is, the better they can fulfill their task as depositories of cultural memory. The system of column decoration was itself an integral part of this crucial body of knowledge; they usually use explicit Characters for symbolic effect such as:

- Dendera Hathor temple:

In the city (Dendera) on the western shore of the Nile south of the city, Hathor was the goddess of peace, love, happiness, music, and dance. Sistrum is an ancient Egyptian musical instrument closely associated with Hathor. Hathor's head forms the top of the 24 columns (see fig.15) each column bears a four-sided capital, which occupies about one third of the column height. (Assmann, 2003).The Egyptians believed that if they mistreated Hathor, she would make everyone unhappy so no one would want to dance or sing.

- Classic columns:

Wisdom, Strength and Beauty are qualities related to the Grecian orders, which are 'suggested by the diversity of form in the human frame'. The Master's column, the Ionic, representing Wisdom (see fig.7), was created to meet the need for grace and elegance, which were lacking in the earlier Doric order. The Ionic order was employed in the erection of the temple of the goddess Diana This column 'is formed after the model of a beautiful young woman, dressed in her hair', represented by the volutes, those lovely spiral scrolls appended to each side of the capital. Senior Warden's or Doric column, the simplest of the Grecian orders, representing Strength, is in a sense both counterpart and companion to the Ionic. It has no ornament except moldings on either base or capital. The composition of this order is both grand and noble being formed after the model of a muscular of a full grown man. It is principally used in structures where strength and a noble simplicity are required.

The Junior Warden's or Corinthian column, representing Beauty, is the most sophisticated of the orders of Grecian origin. It retains the volutes of the Ionic column, adding rows of leaves, and is ten diameters high, giving it more slender and elegant proportions than the others. Paradoxically, this column, adorning the position of the most junior of the three principal officers, is the most graceful, elegant and beautiful of the three (Curl, 1991).

- The Caryatids:

A sculpture used as a column, which represents a female figure (see fig.16). according to the Roman architect Vitruvius, who speaks at the beginning of the first book of his "De Architectura", the name (karyàtis) means "woman ": the women of that city of the Peloponnese in fact would have been enslaved, while keeping their clothes and attributes matronly, after the defeat and destruction of their homeland, as punishment for the support given to the Persians. Following the Greek architects would sorreggenti depicted as the weight of the building to carry on the memory of the event (Martine, 1994). The explanation of Vitruvius should however be correlated with prior wars between Greeks and Persians that took place at the beginning of the fifth century BC. Vitruvius had thought, do not seem to betray the fatigue resulting from the hold the weight but rather seem to represent the unperturbed.

In Romanesque art, frequent application of the human figure to the architectural decoration produces some examples of figures used as supports "capital of the three caryatids". During the Renaissance (see fig.17), the

pattern is again taken up along with many other decorative elements of classical origin. The search for an overabundance Decorative favored used during the 17th and 18th centuries and the reason was also used extensively in the field of neo-classical.

4.4.2 Non support columns for symbolic effect

Sculpture is a separate thing, as the easel picture, but it did not require a wall like the picture. It did not need a roof. It is an object that could exist for itself alone, and it's a well to give the character of a complete thing about which one could walk, and which one could look at from all sides. And yet is has to distinguish itself somehow from other things (Tucker, 1974). At the other hand the sculpture sometimes used to express the column effect without supporting a roof such as:

- Trajan's column:

It is a Rome column, built about 112 AD to celebrate Emperor Trajan's victories (see fig.18). It is regarded as one of the masterpieces of the ancient world with its 35 m (115 ft.) stylized Doric column. It is covered with an unbroken band of relief sculpture containing 2,500 human figures (see fig.19) two thirds life-size (Stephenson, 2013).

- The endless column:

The Endless Column (often it is called the Column of Infinite) symbolizes the "Infinite Sacrifice, designed to memorialize Romanian soldiers killed in World War I (see fig.20). The column is a quintessential example of Modernist sculpture and it is considered by Sydnei Geist the top point of the modern Art Made from 17 cast-iron pieces stacked a soaring 96 feet high with a half-unit at the top. The incomplete top unit is thought to be the element that expresses the concept of the infinite (Alexandra, 2007). Brancusi had experimented with this form as early as 1918. It was built, as Brancusi put it, to support the vault of heaven.

5. Conclusion and study results

By reviewing the historical development of structure methods, construction technologies, orders and materials in one hand, and columns position as an aesthetical, functional and symbolical element, on the other hand, the study found:

• Column through history was a supporting pillar with an aesthetical, functional and symbolical effects (see fig. 21-1).

• With The use of modern construction systems, including open plan system and using partition walls according to the structural columns grid, the columns become:

- Visible element: when column is within a structural grid at the open plan system. In this case it is a pillar construction which eventually needs design proposals solutions to be acceptable in the interior design of the whole space; it would be by adding materials as a mask to the pillar.
- An invisible element: when column is hidden within the wall partitions system. In this case, the column disappeared and replaced as a pillar for the building. The intangible of column in interior space led the designer to use non supporting columns instead (see fig. 21-2), in order to get an aesthetical, functional and symbolical element, in addition for compensation of psychological sense of attribution in space.

• The study found that column turned from a pillar construction decorated in advance and Proud of what it has to express meanings of aesthetic and symbolic reflect of place and time within design concept. On the other hand, column turned to a constructional pillar hidden between walls, as to be shied of highlighting, and at best conditions, the designer will start a new phase to hide the pillar within a design or a mask of finishing materials. This case isolates structure from the rest of column positions, which was within the column configuration, and replaced by non-supporting columns to perform all tasks except supporting. However the cultural background and the historical experience add a psychological effect of supporting adding comfort to the space of interior design. It is not necessary to be a supporting element in order to be a column. The reverse is not true in all cases, because in the case of a hidden supporting column between the walls has abandoned all the attributes of the column and only supporting attribution. In this case it is shifted from column to construction pillar only.

• By the previous conclusion about the absence of supporting mandatory of the column, it led to the non-mandatory use of rigid material.

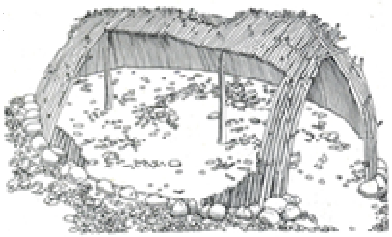
• Through the study of various examples, the study found that the columns, through the historical development used as a main purpose to support roof, but over time and found columns bearing roof symbolically, Here comes the psychological factor (see fig. 21-3) and expertise in the sense of the role of column supporting, in other words, it is not necessary to have a roof for column existing.

• The study found, through the evolution of column from of its inception through classic period and modernity to this day that the column went through different issues:

- Different forms.
- Different materials.

- Supporting columns and non-supporting columns.
- Roof existing and non-roof existing.

In all cases and with all the influence changes, the sense of human remains towards column, as a supporting column that gives a reflection of stability and comfort in addition to the psychological aesthetic, functional and symbolic in the method of interior design.



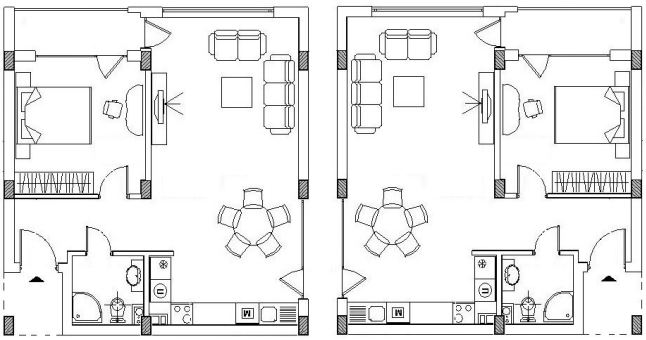
1: Huts made of branches

2: Stonehenge, beginning idea of stone column

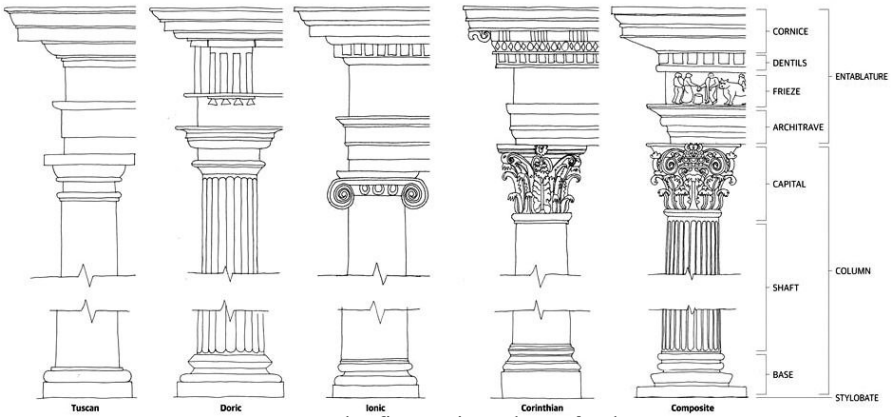
3: Karnack temple of Ammon at the great hypostyle hall

4: Inside Romanesque Church

5. Interior of the church of **ST**. Annunciate



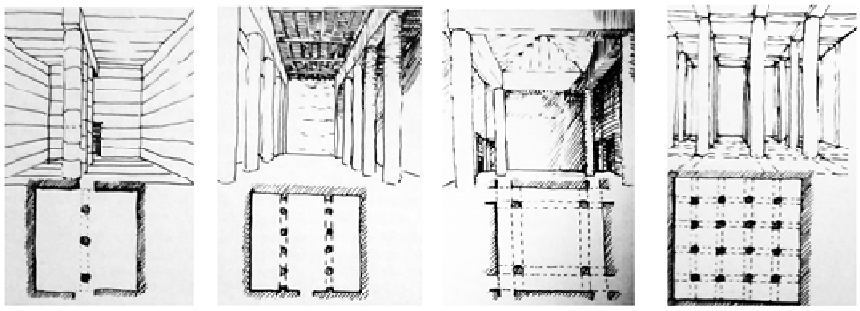
6. The flexibility of design within a grid of column



7: The five main orders of columns.

8: Mask for a concrete pillar

9: Johnson Wax Buildings

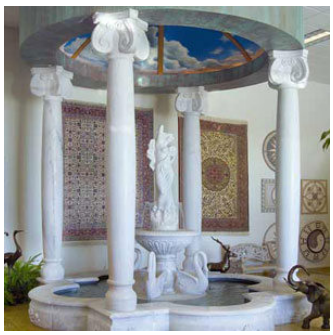


10: Using columns to divide space

11: Islamic Cultures, Balcony, Andalusia

12: Islamic Cultures, courtyard, Cordoba

13: Using non supporting Tuscan gypsum columns to divide space.

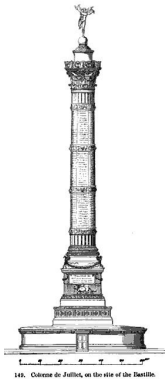


14: Using non supporting column to determine zone

15: Dendera Hathor temple

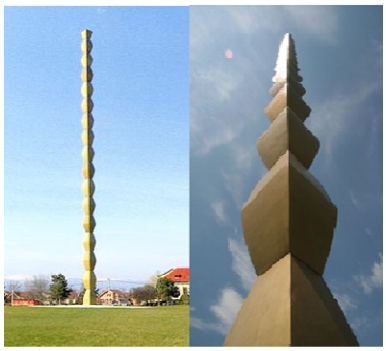
16: Caryatid: sculpture used as a column

17: The nymphaeum at 16th century palace

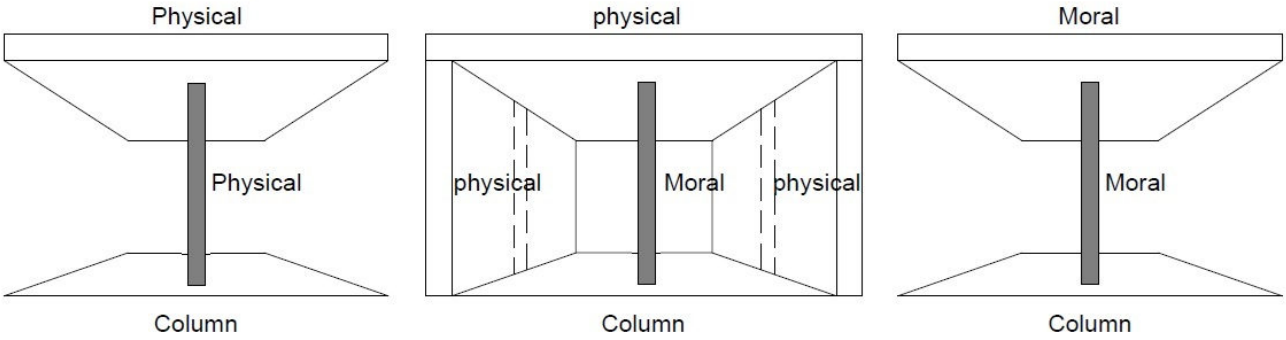


18: Trajan's column in Rome

19: Details at Trajan's column in Rome



20: The endless column



-1- **-2-** **-3-**

21: Column Rank in different cases (drawn by the Researcher)

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