International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 05 | May - 2023 SJIF 2023: 8.176 ISSN: 2582-3930

STUDY AND ANALYSIS OF VOIDS IN BUILT FORM

Ar. K. CHITHRA , ARAVIND.M AND LAVANYA.M

ABSTRACT : Greek philosophers coined the term "void" to describe completely empty spaces. It has been the focus of several philosophical works, theories and scientific research, especially in the field of physics, as well as exercises in the study of spatial design. In contrast, it is hardly ever used to describe places of any quality after its role in architecture and urban planning is replaced with that of space. This study aims at exploring the use of void as courtyard and then at reintroducing the term to understand and treat unintentional voids emerging in built forms.

1.INTRODUCTION

This question has directly or indirectly been asked for over 2,500 years today. Several philosophers, who were at the same time the first scientists of their era, were occupied with the question, or unavoidably faced with it in constructing their philosophies. When the sciences were separated from the air and began to appear as modern sciences, as we know today, the question concerning void was taken over mostly by physicists, who never ceased finding some matter in what was previously defined as a void to prove that it should not be called void anymore. Any relevant response to the question was meant to be void to be defined as something else. While void was endlessly gaining new definitions, the question has persisted.

1.1 VOID

1.1.1 THE CONCEPT OF VOID IN WESTERN PHILOSOPHY

The concept "void," or "keno" in Greek and "vacuum" in Latin, was originally used in Greek philosophy, namely during the Pre-Socratic period (Hendrich, 1995: 902). The primary concerns of nature philosophers in the 6th and 5th centuries B.C. were what the substance of everything in nature was, how changes occurred, and how they were coming together in a new order. These questions seemed to be the main focus of the void notion. According to Guthrie (1978: 1), pre-Parmenidean and post-Parmenidean philosophy should be distinguished from one another. The Pre-Socratic era's defining figure, Parmenides (6th–5th century B.C.), of the Eleatics, aimed to combine the fundamental ideas about the nature, change, and order of things in a cogent way. This is frequently seen as the pragmatic and significant component of his philosophy. Parmenides is regarded as one of the most important figures in the history of western philosophy because of his pursuit of logical consistency, which is also known as the very first instance of philosophical self-criticism (Dunkel, 1998: 37-38). He developed a monistic viewpoint by discarding characteristics of objects that distinguished them from one another, as well as dismissing changes in things and movement, for the purpose of this logical consistency:

In most cosmologies there is a tendency to seek a unity and homogeneity of the primary elements and to avoid discreteness and discontinuity. This tendency led to an early crisis in Greek philosophy, in the monism of Parmenides, which asserted that the first principle of all things must be "the one", without qualities or differentiation and without change or movement.

(Edwards, 1967: 217)

Since Leucippus and Democritus were the only atomists who affirm void, they are virtually invariably mentioned whenever a definition of void is searched in philosophy. The term "void" is frequently used in philosophical dictionaries, where it is described as "empty space" (Blackburn, 2005: 384), "passive and empty space" (Bunin & Yu, 2004: 729), or "utterly empty space" (Hendrich, 1995: 902). It is clear why the idea of void has usually been associated with ancient Greek philosophy. First, the idea of void rose to prominence when it played a crucial part in atomism; the demise of atomism must have meant the concept's oblivion. Second, Aristotle's rejection of the void cast doubt on the idea's future and had a long-lasting impact on philosophy and science up to the Renaissance. Third, philosophy in the Middle Ages was somewhat constrained by newly developed human-oriented problems and was unable to challenge the dominance of the church.

1.1.2THE CONCEPT OF VOID IN SCIENCE.

A huge region of space that is unusually empty of galaxies. Recent research has shown that voids are not entirely empty, but they are under dense and contain far fewer bright galaxies than average.

(Hawley and Holcomb, 2005: 534)

It is evident that defining a place or a portion of space need not be completely empty on a cosmic scale. Containing "much fewer bright galaxies than average" is sufficient to classify those areas as voids. Similar circumstances apply to quantum theory, which asserts that the majority of an atom's interior space is a vacuum even if it cannot be declared to be completely empty. According to the most recent findings in nuclear science, an atom is basically made up of a nucleus at its center, which contains positively charged protons and electrically neutral neutrons (aside from hydrogen), and a cloud of negatively charged electrons rotating at its edge to define the atom's outer limits. It is understood that the distance between the nucleus and the orbit of electrons is at least 10 million times the size of the electron, albeit it varies from one element to another. The ground suggests that an atom is a perfect emptiness because of the empty space created by the electromagnetic field that exists between them. Without a doubt, emptiness cannot be proven to exist according to quantum physics. If nothingness is completely empty, it should be free of all physical matter. However, quantum theory does not consider that space to be completely empty just because it is free of matter. Since there might at least be energy, even though there is no matter. The uncertainty principle of quantum physics eliminates the concept of vacuum since it is impossible to establish that any space does not contain at least one object, whether its energy or particles, despite the fact that this cannot be proved either. However, if zero-point energy is recognized, it may be possible to characterize nothingness as "a quantum sea of zero-point waves," which may be shown by two energy sources with opposing wavelengths that cancel each other out.

1.1.3THE CONCEPT OF VOID IN DESIGN

I believe it is important to first provide a disambiguation before moving from the realm of philosophy and sciences to that of design. When philosophy and sciences were combined, the term "void" had a wide acceptance and a more or less established definition. In the early 17th century, when sciences were armed with experimentation and observation, the differentiation was made. The void that Leucippus described could not be perfectly matched by what Torricelli produced in a tube. The problem has been addressed at two extreme

scales in the contemporary period of science, either cosmic or atomic. What contemporary science refers to as void has changed over time, not merely in terms of magnitude at a particular moment. In the world of modern science, what was formerly thought to be void was frequently proven to contain something and therefore lost its property of being void. It is clear that the natural philosophers could never have considered whether the void they have spoken of contained energy waves or a few fewer bright galaxies. As long as it was devoid of physical life, philosophers believe that the void had been sufficiently emptied. In this sense, philosophy's definition of the term "void" was more solid than science's the idea of void in design is similar to that in philosophy in that it has a more established and widely accepted definition. Most people almost always mean and comprehend the same thing; therefore, a formal definition is not necessary. The general features and some basic differences between the meanings of void in different fields may be summarized as follows:

a) Void in physics does not include anything except probable energy waves at atomic scale, or fewer bright galaxies than average at cosmic scale.

b) Void in philosophy does not include other corporeal beings or objects.

c) Void in design usually does not include any depiction on sheet (or on screen) at design phase. But once it is applied on earth, it definitely includes energy waves, but absolutely not any galaxies; it may witness temporary presences of human beings and some other living organisms as well as other unanticipated objects that do not disturb its being void.

I will first quickly describe how void is used in architecture and urbanism. The term "void" in architectural and urban terminology typically refers to generated empty spaces that happen as a result of intentional or unintentional human action, unexpected events, or both. This contrasts with the concept in philosophy and the sciences, where voids are not generated but rather found and then defined. As a result, I will examine the idea of void in design, particularly in architectural in two categories: designed or deliberate voids, which are produced as a result of intentional human action, and unintentional voids, which typically appear in urban patterns and arise as a result of unexpected events or human error. In the following study analyzing the effects of providing void in the built form in the aspect of courtyard.

1.2 COURTYARD

1.2.1 WHAT IS COURTYARD?

Courtyard is nothing but an open space in a building, surrounded or defined by building elements like rooms, or walls, or buildings. Courtyard style houses are the most repeated and popular style of architecture of all region in the world. It can be in the form of square, rectangle, round, or amorphous created by placing rooms or buildings around it

In the history, residential courtyard serves as a focal point of it. Most of the rooms have direct connection to courtyard. Courtyards servers as private open space with privacy. Courtyards are used as a social gathering space at function time, not only that it serves as a source of air flow and thermal comfort for the residence.

Due to its large openings, it supplies light and air to the connected rooms and helps in air flow with respective of opening and orientation of the room. The gentle breeze and shadings in the courtyard help in making the space more comfortable and habitable condition. Its primary benefit of the courtyard is to provide a sense of enclosed outdoor space to the residents. different activities can take place at different times of the day.

Privacy is the most important factor of courtyard. To maintain it, the entrance is screened or walled. Courtyard provides acoustic privacy. Courtyards observe the noise of the house by itself and the surrounding

rooms act as a noise barrier to the inner heart of the house and Street this helps in providing quiet and private outdoor space to enjoy. This arrangement encourages the family members to use as group. Alternative terminologies used for courtyard are court, cloister, cortile, or quadrangle, to designate similar spatial enclosures but usually associated to specific building types, Monasteries, Italian Palazzo (medieval house), Universities (Schools etc.) respectively.

FIG - 1 AND FIG- 2 - COURTYARD

1.2.2 WHY DO WE NEED COURTYARDS?

Houses with courts make a lot of sense since they not only offer ventilation and private outdoor space.They provide the essential break required in structures. Architecture needs pauses to connect and hold apart covered spaces, just as any excellent work of art needs breaks to let the mind connect and hold separate events. e.g. monalisa painting has 9 layers of rework by davene One of the few architectural features that allows for a vertical connection to the heavenly infinites, it is. No matter your level of spirituality, you have a deep-seated need for this connection. There are more justifications for courtyards. The movement of the shadows might provide the impression of time because of the closeness of the surrounding surfaces are. The special characteristic of idea of allowing the weather to return to the core of a building where it can be seen. These features of courtyards work together to give them a sense of closeness.

It is also reported that constructing a courtyard dwelling is more expensive due to the increased exterior wall surface, but this is compensated by the possibility of lower energy costs due to the increased outdoor area created by transforming indoor space.

The potential of the architect to enclose the courtyard in today's urban environment creates considerably more usable area than a typical house with a front and backyard.

FIG.3 – CONTEMPERARY COURTYARD

Additionally, modern technology is helpful, especially for windows, doors, and lighting. Manufacturers of windows and doors now provide 8" broad panels that may be joined to form a 32" long stretch. A similar transformation of the courtyard into a usable area at night because of LED lighting has stopped it from becoming "dead space."

2. HISTORY OF COURTYARD

2.1 ORIGIN AND EVOLUTION

According to studies of "The Historic Evolution of Courtyards" gathered by Hinrichs, Oliver, Schoenauer, and Sullivan (1989), the first form of courtyard architecture probably evolved from the gated compound houses of the early agrarian communities or the nomadic tribes' encampments. However, the form remains to be equally common in all of the cultures and climate zones of the world. Historically, according to Hinrichs (1989), shows that time, civilizations, and even weather seem to have minimal impact on courtyard-style dwellings.

The earliest courtyard dwellings discovered in historical excavations date to the third millennium BC. They were typical dwellings observed in the ancient Mesopotamian city (2112 B.C.), Assur (150 B.C.), Babylon, and the Tigris and Euphrates basin (604 B.C).

Indus Valley dwellings were reportedly being developed on the same philosophies in between years 2000 and 1500 BC. The houses were planned as a series of rooms opening on to a central courtyard. The courtyard provided an interior open area for communal activities as well as lighting the rooms, functioning as a heat radiator in the summer and an absorber of heat in the winter. Even now, on the Indian subcontinent, courtyard housing is still followed, after the Indus Valley Civilization's downfall around 900 B.C.

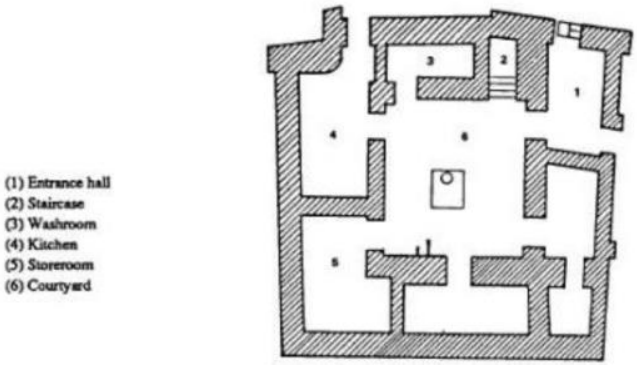

FIG 4 – PREHISTORIC PROTOTYPE

The embryonic versions of the courtyard Have evolved from some combination of three prehistoric prototypes:

- Cave dwellings
- Encampments of nomadic people, and
- Fenced compounds of early farmers.

2.2 GREEK COURTYARDS

Between the fifth and second century B.C., Greek dwellings incorporated courtyards. The structure of the house that was discovered close to Thessalonika has a peri-style floor plan, a courtyard surrounded by columns, around which the rooms are placed and open to it.

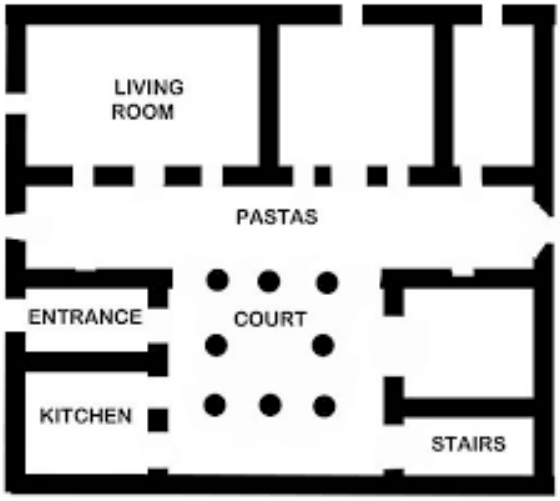

FIG.5 – GREEK COURTYARD

2.3 REBIRTH OF ATRIUM

The contemporary atrium, as distinguished to the open-air Roman atrium or the courtyard, did not arise until the emergence of iron and glass technologies in the 19th century, despite the intermittent adoption of this type of layout across time. In Europe, a whole new style of architecture influenced by glass and iron began to emerge. One of the most notable examples is the Crystal Palace in London's Hyde Park, which Joseph Paxton created in 1851.

FIG.6 – CRYSTAL PALACE IN LONDON

In example, the glazed atrium and the arcade were two spatial styles that originated and thrived during the 19th century. The arcade was exclusively intended for commercial purposes, whereas the atrium had wider functions. The arcade, a glass covered passageway flanked with shops on their sides, was created to provide a sheltered public space to facilitate sale of luxury goods. The best-known example is probably the Galleries Vittorio Emanuale II in Milan built in 1867.

FIG.7 – GALLERIES VITTORIO EMANUALE II

The first known mention of the atrium becoming an interior space is the Reform Club in London, which was constructed in the first part of the 19th century. The project took inspiration from an Italian pallazo, but added a glass roof and metal framework to its cortile (Italian term for courtyard). The "Bon Marche" by Boileau and Eiffel is one of the most famous examples of the concept being used in France's huge department stores, known as Galleries. The design was equally successful in a wide range of other structures, including hotels, museums, flats, and libraries. But as the century comes to an end, the idea lost favor in Europe due to worries regarding fire safety. At the beginning of the nineteenth century, the atrium entered a new phase in the United States.

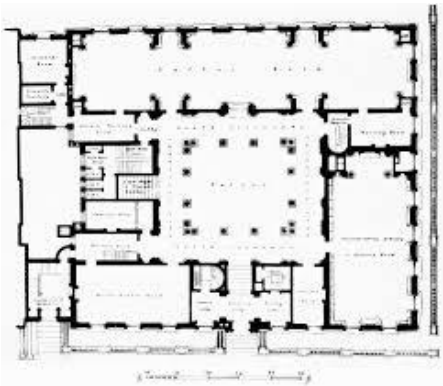

FIG.8 – BON MARCHE PLAN

FIG.9 – BON MARCHE

Following the First World War, a further decline occurred as the world economy shrunk and the Modern Movement promoted more cost-effective styles of architecture. Amsterdam Stock Exchange, the Beurs, designed by Bergiage, and the Frank Lloyd Wright's Larkin Building in Buffalo, New York are examples of this era's atrium structures.

Following a dormant period for more than two thirds of the 20th century, the atrium concept is currently experiencing new rediscovery. Even though rebirth of the atrium has a number of founders, it is frequently credited to an important structure: The Ford Foundation Headquarters in New York City by Roche and Dinkeloo in 1968. The designs showed a remarkable resemblance to their century-old ancestors.

FIG.10 – FORD FOUNDATION HEADQUARTERS

3.TYPES OF COURTYARDS

3.1 CONCEPT OF VERTICAL COURTYARDS

They can be considered of as the contemporary continuation of the old courtyard. It has an ideal representation of an isolated landscape allowing various social interactions, similar to traditional courtyards. The most vital factor in the development of vertical courtyards is population density.

The advantages of an individual house and high-density housing are combined in the vertical courtyard towers, which provide an alternate solution. Its reserved personality permits closeness without sacrificing open space. In order to improve the potential density of this conventionally horizontal collection of dwellings, the design goes one step further. The proposed vertical courtyard tower preserves access to light and air, seclusion from sight and sound, construction efficiency, and a regeneration of open space and street life.

3.2 EVOLUTION TO VERTICAL COURTYARDS

The courtyard first became a common shape in the first urban communities. Therefore, it's possible that the characteristics of urbanization, such as a lack of seclusion and a limited land area, influenced how the home was designed from the beginning.

However, as our population increases and our resources become more limited, this becomes less and less sustainable, making the use of vertical towers a viable alternative. We thus assume that the new urban form that may address our issues by going vertical.

If correctly constructed, a vertical tower gives its occupants a sense of community and, most importantly, it is simpler and less expensive to maintain. Concerns in the formal, socioeconomic/political, and environmental domains will all be addressed by a well-designed vertical tower. It is also thought that the climate, particularly in hot and dry parts of the world, controlled the evolution of courtyard shapes.

3.3 CONCEPT OF AIR COURTYARD

It is a courtyard created by a change in shape, an angle, and an air connection. It is a symbol of the traditional courtyard's contemporary inheritance. The vertical courtyard type suggested by "Air Courtyard" is regarded as an excellent architectural option for the middle-high structure.

In order to increase the city's natural beauty, widen the stereo space, and create a location for leisure, tourism, and entertainment, Air Courtyard places a strong emphasis on landscaping and vegetation on the roof. However, it also places a strong emphasis on practicality, such as enhancing heat insulation and expanding the green space to use it as a location for inter-human connection. In multi-story and tall residences, Air Courtyard is designed to establish a platform for communication, private or semi-private area, surrounding or semi-surrounding, vertically formed stereo courtyard.

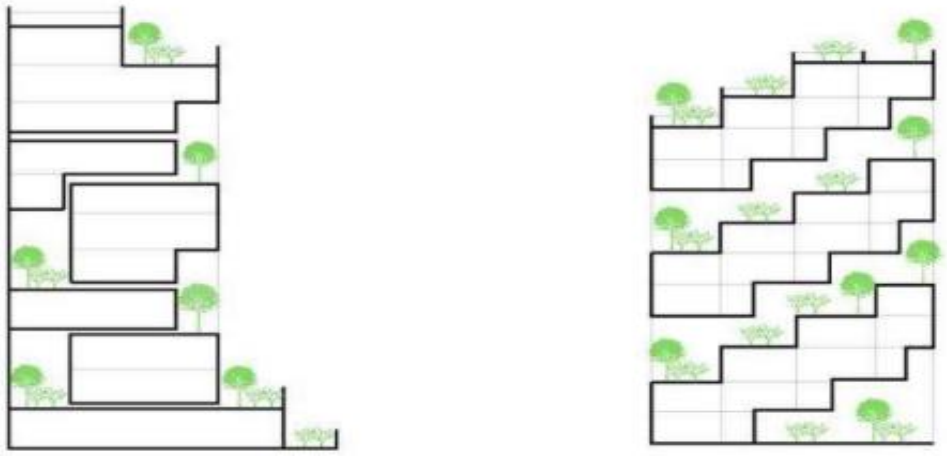

FIG.11&12 – TYPES OF AIR COURTYARD

In FIG.6.1, each two houses are connected, so as to form a higher air courtyard by the use of space, for this kind of housing design, it owns the flexibility and variety, and also enriches facade effect. While in FIG.6.2, the middle part of high residential building can be emptied to form a public courtyard through design. If the emptied part be designed as a step-like drop, it will turn public garden into private, and will form a constant greening from up to down.

4.CASE STUDY

4.1 HIGH-RISE COURTYARD APARTMENTS, L.A., U.S.A

High-Rise Courtyard Apartments/ The Wilshire Tower proposal recently opened at the LA A+D Museum, for the exhibition Shelter: Rethinking how we live in Los Angeles.

PAR has plans to create a 930-foot-tall stack of individual houses in LA. Rethinking how people live in Los Angeles, USA, PAR proposes a new model of high-rise courtyard housing, integrated with mass transit, on Los Angeles County Museum of Art's (LACMA) proposed tower site on Wilshire Boulevard.

The tower typology, an important element in the contemporary metropolis, has become anonymous, defined mainly by its height. Typical residential skyscrapers, while successfully providing density, rarely produce unique living environments with access to green space, qualities that are emblematic of Los Angeles living.

PAR's proposal, completed in close collaboration with Buro Happold, creating a 930-foot-tall stack of individual houses, each with a direct connection to nature through oversized terraces, some containing common spaces and leisure zones.

- Form evolution - Form design of the 80 storey tower evolves through iterations that respond to structural, environmental and programmatic criteria.
- Views - Single stacks of residential floor plates horizontally frame expansive views of LA., relating to city's urban form.
- Shifted Terraces - Floor plates shifting provides a direct connection to nature for the tower's residents through oversized terraces. Dense vegetation on south and west terraces naturally buffers the environment while north and west terraces provides leisure zones.
- Public Spaces - Open space at the ground level connects the building to the district, enabling host of social public activities to integrate with other programs.

FIG.13 – HIGH-RISE COURTYARD APARTMENTS, L.A., U.S.A

4.2 WEST END VERTICAL COURTYARD HOUSING, BOSTON, U.S.A.

During 1960's, the old dense urban fabric was completely wiped away and rebuilt with Corbusian residential towers. This vertical courtyard housing is designed to bring back the dense street activities that once existed in the west end in contemporary times. To accommodate the housing, this building is planned to tie in all neighbouring activities. A strong axis was established throughout the site to bring the neighbouring elements. A raised terrain was designed to provide underneath parking and park above. The housing tower was located at the corner of the site to create maximum attention for the site. The overall site diagram follows a twisted axis that emerges from surrounding context, which directs the views and unit plan diagram

4.3 ELEMENTS TOWER, CHICAHO, ILLINOIS, U.S.A.

"Humans were created with in inhale desire to live in community, we seek out fellowship in all environments. Our desire to fit in drives our decisions, lifestyles, and beliefs."
-Joshua Nieves + Architecture Design, architect of Elements Tower

Zoning has created segregated regions that separates humans from nature. Elements Tower reunites the four elements of nature-fire, water, wind, and earth with the fifth element, us.
Utilizing the spatial efficiency of the three-story, Chicago- style town home and the communal aspects of courtyard living, Elements Tower has created interactive sky- communities. Together, with the elements, this

tower has brought the community of a courtyard, enhanced by the natural elements, into high-rise living. Elements Tower has reversed the negative effects of seclusion, found in typical residential towers, and reunited the five elements.

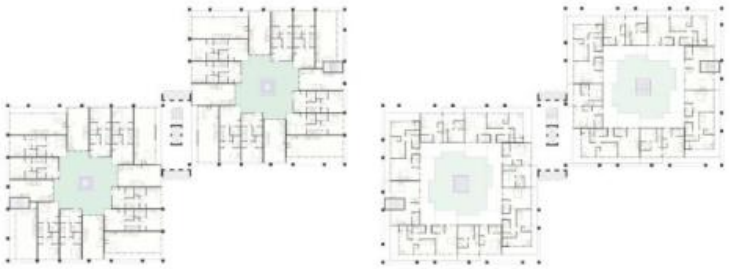

FIG.14 – PLAN OF ELEMENTS TOWER, CHICAHO

4.4 VERTICAL COURTYARD APARTMENTS, HANGZHOU, CHINA

The traditional Chinese courtyard in China has been the most influential in courtyard design and planning. The traditional courtyard has a lot of values and meanings behind it but all these have been reinterpreted differently in the modern courtyard design.

The traditional courtyard in China is identified by its layout of having 4 buildings surrounding a central courtyard. It also uses the concept of Yin and Yang in the arrangement of layout of the courtyard as well as to give positive energy and the emphasis between heaven, earth and other people.

In the modern century, issues like increase of land value and limited space causes the floor plan design to be more compact and less empty space. Therefore, modem design could not afford to waste a big piece of land just for courtyard purposes. Efforts made to replace n reinterpret the traditional courtyard is the vertical garden and roof garden. The elements of Feng Shui were interpreted differently in the modem design. While traditional courtyard uses natural elements to represent the five elements of Feng-shui (Wood, Fire, Earth, Metal, Water), the modern courtyard uses decorative elements to represent them. While the traditional courtyard focuses on the harmonious living between heaven, earth and people, the modern courtyard placed its focus on the sustainable living by having the vertical garden to provide better air quality as well as Feng Shui elements to provide positive energy for wealth,

Architect-Wang Shu

PERIOD OF COMPLETION-2002-2007

- The apartment uses vertical courtyard to replace the traditional courtyard giving each residence will have their own courtyard in their unit.
- The vertical courtyard garden helps to improves the air around and provide greenery.
- It also insulates heat and cool building.
- The Vertical garden also enhances visual appearances
- There are also Feng shui elements being used in the development of the vertical courtyard in this apartment.
- The orientation of the vertical courtyard also faces north and south to provide positive Qi flow of good wealth and career as well as good health and family relationship.

4.5 WALDEN 7, BARCELONA, SPAIN

Walden 7s a project addressing most of the modern city's life. The housing structure benefits from Boffil's earlier research and the idea of providing public spaces and gardens for residents to enjoy an enhanced quality of living. At several levels there is a complex system of bridges and balconies for access, producing a fantastic variety of vistas and enclosures. The courtyards have a lively treatment because of the intense blue, violet and yellow colored facades. The min courtyard, located at the building's entrance, is an extension of the street and the plaza for the use of the inhabitants.

Architect-Ricardo Boffil Taller De Arquitectura

FIG.15 – VERTICAL COURTYARD APARTMENTS, CHINA

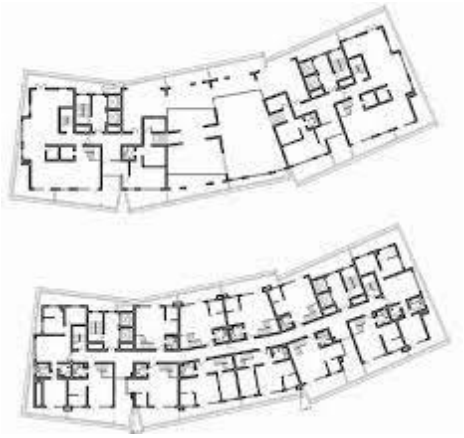

FIG.16 - PLAN OF VERTICAL COURTYARD APARTMENTS, CHINA

PERIOD OF COMPLETION-1972-1974

- The building, also called as "City in Space", is composed of 18 towers displaced from their base, forming a curve and coming into contact with the neighboring towers.
- The result is a vertical labyrinth with seven interconnecting interior courtyards.
- The 31,140 square meters complex includes 446 dwellings, public spaces, meeting rooms, games rooms, bars, and shops on the ground floor, and two swimming pools on the roofs.
- The apartments are formed on the basis of one or more 30 square meters modules creating, on different levels that range from a studio consisting of a single module to a large, four-module apartment.

FIG.17 - WALDEN 7, SPAIN

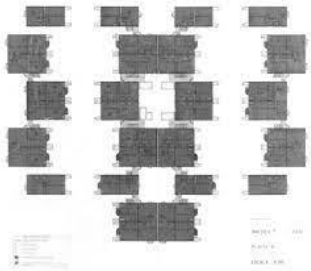

FIG.18 - PLAN OF WALDEN 7, SPAIN

4.6 KANCHANJUNGA APARTMENTS, MUMBAI, INDIA

In the past 2 decades, Mumbai has become India's New York. Land value have increased dramatically, and the high-rise solution to housing the developer's choice. In 1970, when Charles Correa received this commission to build high income flats, he wondered whether he could use the principles of climate control, zoning of spaces, views, etc., that he had used in housing elsewhere.

The climate and the location of Mumbai, presented a contradictory situation: the east- west axis affords the best views (Arabian Sea to the west and the harbor to the east) and catches all the sea breezes, but also brings into the building the hot afternoon sun and hard monsoon rains. Correa decided to use the concept of a bungalow of wrapping around the main living spaces bra protective verandah. He proposed a new concept of middle zone that is to create a zone with protective effect between indoor and outdoor, so as to achieve the effect of sheltering hot afternoon's sunshine, stopping monsoons' impact, and regulating micro-climate. It consists of two layers of garden platform that form the air courtyard space. Thus, combining climatic consideration with that of views heat settled upon a configuration of interlocking units which faces in east-west.

Architect-Charles Correa (Principal Architect), Pravina Mehta (Associate Architect)

PERIOD OF COMPLETION-1970-1983

- Kanchanjunga Apartments is a complex of 32 luxury apartments of three to six bedroom each.
- The building is 28 storeys (85 meters) high and square in plan: 21 meters X 21 meters.
- The basic interlock is that of a three- and four-bedroom apartments with the larger flats formed by the addition of another half level.
- The structure is built around a central service core.
- Each of the flats have large usable garden-roofs which have dramatic city views.
- The building is distinctive in Mumbai's urban landscape. The apartments are well ventilated and appear to suit the contemporary life-style of city's wellbeing.
- The highly articulated and complex interiors do not follow the geometric rhythms of exterior.
- The two-floor height roof-garden are enlivened through the use of colored tiles walls and brightly painted ceilings.
- From within the flats themselves, there are views out from the living and bedrooms and from the terraces the city is overlooked.

FIG.19-KANCHANJUNGA APARTMENTS, INDIA

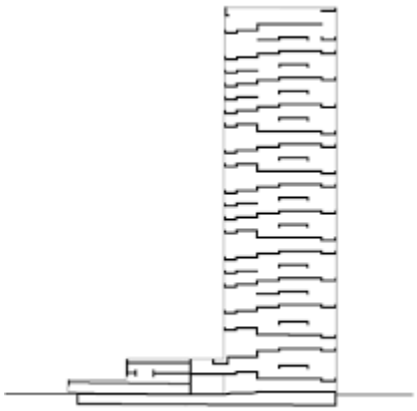

FIG.20 - SECTION OF KANCHANJUNGA APARTMENTS, INDIA

5.INFERANCE

The objective of the first example of courtyards, which originated from cave shelters and nomadic encampments, was to naturally ventilate the rooms around it.

Later, the Greeks and Romans transformed the courtyard into communal gathering areas and began collecting rainwater there. The courtyards (garden courts) were surrounded by columns and exposed to the sky (per-style).

In the 19th century, courtyards started to be employed in commercial structures because to the introduction of glass and iron. The former courtyards were replaced by arcades (now inside spaces) and glass atriums. In the 20th century, the idea of arcades and glass atriums was developed to demonstrate the advancement of technologies via the treatment of building elevation.

From an economic standpoint, building courtyards is no longer justifiable. Traditional and climate-appropriate planning ideas have been suppressed as a result of the impact of other cultures, their building techniques, and the contemporary movement. A contemporary look was also given to structures as a result of technological breakthroughs, the introduction of new materials, and a shift in lifestyle, all while disregarding the effects on the environment. Reinterpreting regional and traditional characteristics so that they fit comfortably within the constraints of the modern world is what is needed.

By fusing the benefits of individual homes with high-density living, The Vertical Courtyard towers provide an alternate answer. Their introverted character permits dense clustering while keeping a private open area. In order to improve the potential density of this conventionally horizontal collection of homes, the design goes one step further. The proposed vertical courtyard tower preserves access to light and air, seclusion from sight and sound, construction efficiency, and a regeneration of open space and street life.

6.CONCLUSION

Based on the above study, it is evident that adding only one type of void—a courtyard—helps in a number of ways, including ventilation, climatic control, private outdoor space, aesthetic value, and transforming the area into a more habitable one. Consider adding more voids to the built environment to help create spaces where human-nature interaction in our rapidly modernizing world. This link between humans and nature is particularly important in contemporary living styles for increasing artistic emotions, which are facing a massive decline. The main drawback here is related to land value and building costs, but when compared against its benefits, it is negligible.

REFRENCES

http://archimemeplex blogspot.in/2009/12/punch-hole-building-new-vertical.html

http://www.websterdictionary.org/definition/courtyard

http://www.dongyuezhang com/project-5/fvbkmi9pfdgb6lnjp54b6gv0hdhoxe

http://www.metalocus.es/content/en/blog/pritzker-architecture-prize 2012- wang-shu-li

http://zhouwy1221 wap blog 163 com/w2/blogDetail.do;jsessionid=D2BD854352 15E23385E86FESDAEB3EDB blogp16v18010?blogid=1229270427&hostID=zhouw y1221

http://joshnieves.com/elementower php

http://www.archdaily com/332142/ad-classics-walden-7-ricardo-bofill