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Proposed Fitness Center With Focus on the Principles of Organic Architecture in Katsina

Sodangi Buhari Sadah
Department of Architecture
Ahmadu Bello University
Zaria-Nigeria

Abstract- **The fitness world is expanding every day. From having a muscle-bound body for the men, to a slim and trim look for the ladies, everybody is on a continuous battle for achieving that "perfect" body. Thus the need for an establishment to cater for this need cannot be over-emphasised. Katsina state is rich in commerce and culture but does not have a well equipped fitness centre in its capital city. A fitness centre is a place of healing and it is believed that the natural environment helps to enhance a speedy recovery. Organic architecture is the philosophy of designing a building that is in harmony with the natural features and resources surrounding the site. It is characterised by visual poetry and reinterpretation of nature's principles and in tune, it embodies a harmony of person, place, and materials. The aim of this design proposal is to provide a centre that is organically sound by integrating the principles of organic architecture to create a new harmonious relationship between man and his surroundings. With the use of organic architecture the design was woven together to assemble functions into a coherent whole that is dynamic, organic and monumental. The city has no facility that is considered organic where one can keep fit in a friendly, conducive and adequate setting. A fitness centre will be an added advantage to this fast growing centre of hospitality.**

Keywords: Organic architecture; fitness center; natural features; harmonious environment; physical exercise

I. INTRODUCTION

Nigerians are becoming more aware of the consequences of not keeping fit and healthy. Statistics have shown that at least 55% of Nigerians are overweight due to physical inactivity and inadequate nutritional habit. 30% to 35% are hypertensive out of which 20% is due to overweight (World Health Organisation, WHO, 2008). Those that are not physically active are more likely to suffer from illnesses and diseases such as depression, obesity, diabetes, hypertension and other heart related problems.

A fitness centre is the ideal prescription for a healthy mind, body and soul. The need for such institutions cannot be over emphasised. The object of any programme of physical fitness is to maximize an individual's health, strength, endurance, and skill relative to age, sex, body build, and physiology. These ends can only be realized through conscientious regulation of exercise, rest, diet, and periodic medical and dental examinations. The increased pace of life and concurrent stresses experienced by vast numbers of people worldwide have generated both a need and a desire for effective relaxation to counter these daily pressures. With less time available for rest and regeneration, people are seeking places to revive themselves, to gain relief from overindulgence and overwork. Places where they can even achieve some kind of personal metamorphosis. With the aim of most spas being to treat mind, body and soul, individuals can find that they are able to experience a form of mental and spiritual harmony during their spa stay that they can take back with them into their daily lives.

Organic architecture is said to be rooted in a passion for life, nature, and natural forms. It emphasizes beauty and harmony, its free-flowing curves and expressive forms are sympathetic to the human body, mind, and spirit. Using the freedom of organic architecture the design will be woven together to integrate spaces into a coherent whole that is new, daring and interesting. The purpose of a fitness centre is to provide individuals with the most natural means of staying fit. Providing such environment in Katsina that is intertwined with nature will enhance the purpose. This can be achieved by the use of organic elements, natural forms and the principles of organic architecture.

II. ORGANIC ARCHITECTURE OVERVIEW

Organic architecture is a philosophy of architecture which promotes harmony between human habitation and the natural world through design approaches so sympathetic and well integrated with its site that the buildings, furnishings, and surroundings become part of a unified, interrelated composition. (Wikipedia, 2008)

Inspired by the non-linearity and creative forces of nature and biological organisms, organic architecture is visually poetic, radical, idiosyncratic and environmentally aware; it embodies harmony of a place, person and materials. Organic architecture is multi-faceted, free and surprising. Yet its myriad images, ever changeable and overlapping, all grow and flower form the same seed--the inspiration of nature. (Ref. 11)

Although the word "organic" is now used as a buzzword for something that occurs naturally, when connected to architecture, it takes on a new meaning. Organic Architecture is not a style of imitation, but rather, a reinterpretation of nature's principles to build forms more natural than nature itself. Just as in nature, organic architecture involves a respect for natural materials (wood should look like wood), blending into the surroundings (a house should be of the hill, not on it), and an honest expression of the function of the building (don't make a bank look like a temple) (14). Organic architecture involves a respect for the harmonious relationship between the form/design and the function of the

building (for example, Wright rejected the idea of making a bank look like a Greek temple). It is also an attempt to integrate the spaces into a coherent whole: a marriage between the site and the structure and a union between the context and the structure.

The term "Organic Architecture" was invented by the great architect, Frank Lloyd Wright (1867-1959).

"So here I stand before you preaching organic architecture: declaring organic architecture to be the modern ideal and the teaching so much needed if we are to see the whole of life, and to now serve the whole of life, holding no traditions essential to the great tradition. Nor cherishing any preconceived form fixing upon us either past, present or future, but instead exalting the simple laws of common sense or of super-sense if you prefer determining form by way of the nature of materials(13)"

Frank Lloyd Wright used the word "organic" to describe his philosophy of architecture. It was an extension of the teachings of his mentor, Louis Sullivan, whose slogan "form follows function" became the mantra of modern architecture. Wright changed this phrase to "form and function are one," claiming nature as the ultimate model, (5). Although the word 'organic' in common usage refers to something which has the characteristics of animals or plants, Frank Lloyd Wright's organic architecture takes on a new meaning. It is not a style of imitation, because he did not claim to be building forms which were representative of nature. Instead, organic architecture is a reinterpretation of nature's principles as they had been filtered through the intelligent minds of men and women who could then build forms which are more natural than nature itself (13).

A. Principles of Organic Architecture

Organic Architecture does not have a fixed style. It is based on a philosophy, not a canon of rules.

Bruce Brooks Pfeiffer has made the following observations about Organic Architecture (quoted in Rattenbury 12, 1960): "Organic architecture is architecture appropriate to time, appropriate to place, and appropriate to man."

- Architecture is appropriate to time: A building should belong to the era in which it is created.
- Architecture is appropriate to place: A building should be in harmony with its natural environment, wherever possible taking best advantage of the natural features of the landscape.
- Architecture is appropriate to man: A building's first mission is to serve people, with the human as the unit of measure.

B. Traits of Organic Architecture

0rganic architecture has the following traits:

- Honestly Express the Function of The Building: An organic building should clearly represent what it is meant for, that is, looking at it tells what it is used for. For example a bank should not look like a Greek Temple
- Respect the Nature of Materials: Use the inherent properties of building materials. This simply means that materials should be used for what they are. Wood or stone (or glass or steel) are not to be disguised as something else.
- Integrate a Building With its Site: A building should blend with its site. It should appear as if its part and parcel of the site. "A house should be of the hill, not on it."(14).
- Uses Natural Colours, Landscape Elements and Open Space: A building should be free flowing with open spaces. It should be well landscaped to enhance its quality and the colours used should be in harmony with its surroundings. "Go into the woods and field for colour schemes". (13).
- Function Like a Cohesive Organism: Each part of the design should relate to the whole, with a natural integration of exterior and interior spaces.
- Inspired by Nature: A building should resemble a living organism in organization or development. It should grow mirroring the beauty and complexity of nature.

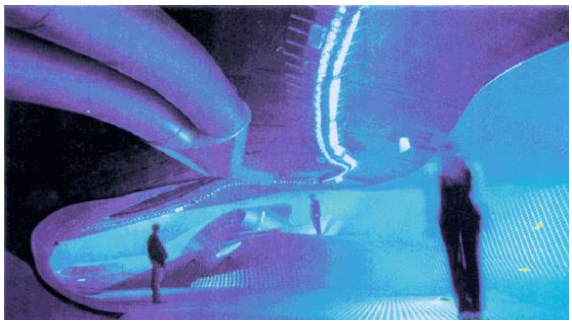
C. Characteristics of Organic Architecture

Theorist David Pearson (11) proposed a list of rules towards the design of an organic architecture. It is known as the ***Gaia Charter*** for organic architecture and design. It reads: "Let the design:

- Be inspired by nature and be sustainable, healthy, conserving, and diverse.
- Unfold, like an organism, from the seed within.
- Exist in the 'continuous present' and 'begin again and again'.
- Follow the flows and be flexible and adaptable.
- Satisfy social, physical, and spiritual needs.
- Grow out of the site and be unique.
- Celebrate the spirit of youth, play and surprise.
- Express the rhythm of music and the power of dance.

D. Examples showing the characteristics of organic architecture

- Use of nature's forms: Architects are now using natural forms from observing living structures: trees, bones, shells, wings, webs, eyes, petals, scales, and microscopic creatures Nature grows from the idea of a seed and reaches out to its surroundings. A building thus, is akin to an organism and mirrors the beauty and complexity of nature. "Each building must respond to Nature, and every building must have its own nature" (14)



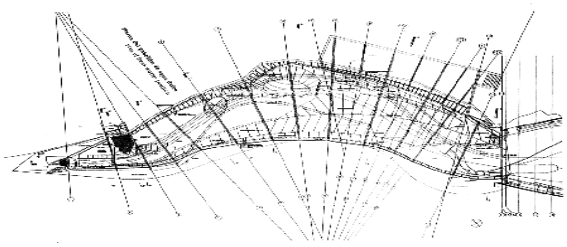


PLATE 1: H2O Pavilion Rotterdam

- Use of geometry: Organic architecture preaches the use of non rectilinear organic forms. Modern technology has led to the creation of structures that span wider spaces with less material which led to a light, "floating" architecture that uses thin shell, frame, and tent constructions of audacious three-dimensional shapes using parabolic and hyperbolic curves, barrel vaults, folded slabs, and geodesic domes

PLATE 2: Sydney Opera House, Australia

- Use of spirals: Patterns and forms in nature are products of internal laws of growth, such as the spiral and fractal, and external forces acting on them, such as sun, wind, and water. It also describes spiral growth patterns of objects as diverse as pine-apples, sunflowers, pine cones, seeds, tendrils of climbing plants, animal horns, and numerous shells, the most often cited being the nautilus. Spirals give a feeling of continuous flow and fluid movement.

PLATE 3: Namba Park, Osaka

- Use of organic materials: Organic architecture encourages the direct use of materials that are found within the immediate environment to ensure that the structure is in harmony with its surroundings. These materials include stones, earth, thatch and wood.

PLATE 4: KendickBange's woodhouse

- Use of curves: Curvilinear buildings work with nature and allow optimum shapes and forms to be developed which are more efficient, economic, and appropriate to local climate and environmental conditions. Curves may be gentle and graceful like the swan-neck or S-curve of life or they may be tense and explosive like a coiled spring. They may also be sleek and streamlined to respond to the energy and force of wind and water, or sensual and erotic in suggesting the beauty of living forms. Curves are very strong and can reach optimum structural shapes as parabolic and hyperbolic arches and shells.

PLATE 5: Cathedral of Christ, California

- Use of greenery: Green building design and construction provide an opportunity to use resources more efficiently, while creating healthier and more energy-efficient homes and commercial buildings.

Successful green buildings leave a lighter footprint on the environment through conservation of resources, while at the same time balancing energy-efficient, cost-effective, low-maintenance products for construction needs. In other words, green-building design involves finding the delicate balance between homebuilding and a sustainable environment.

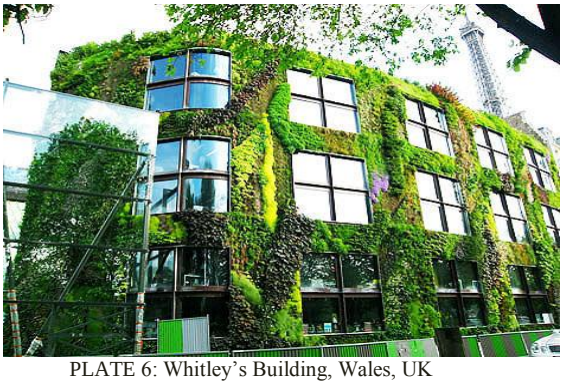


PLATE 6: Whitley's Building, Wales, UK

- Environmentally friendly: A building should blend in with the environment. It shouldn't just stand like a giant monstrosity, but it should become part of it, forming a harmonious entity. A good building is not one that hurts the landscape, but one which makes the landscape more beautiful than it was before the building was built.

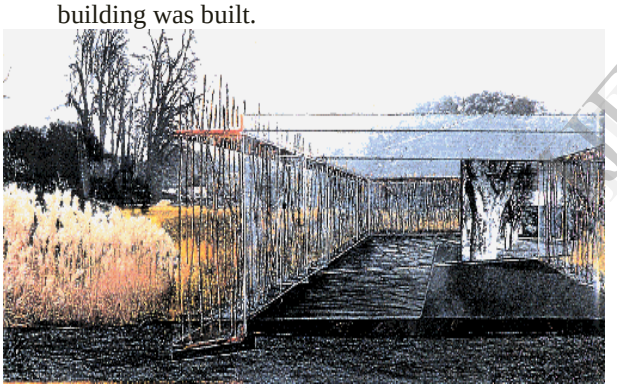


PLATE 7: Conference centre, Aix-en Province

- Use of irregular shapes: Organic architecture mostly boasts of structures designed usually in an outrageous manner that catches the eye and generates a spontaneous reaction from its viewer. It aims to satisfy social, physical and spiritual needs.

PLATE 8: Pedrigal Shopping Centre

- Grow out of the site: The building should not only blend with the environment but it should unfold like an organism. It should appear as if it is growing out of the site. It should appear as if it was born by the site.

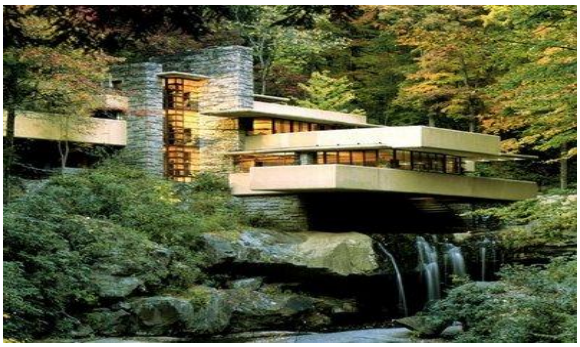


PLATE 9: Falling Waters, Pennsylvania

III. MATERIALS AND METHOD

This research delves into an extensive study of organic architecture. A full understanding of what makes a building "organic" will assist in the design. In a well-designed "organic" building, we feel better and freer. A fitness centre is a place of healing of the mind body and soul. Organic materials will be applied to ensure that there is a marriage between the site and the structure and a union between the context and the structure. By providing a centre with an organic setup, the function of the fitness centre will be enhanced and optimum benefits will be attained.

Another aspect this research looks into is the complete segregation of the sexes. Due to the limitations imposed by culture and religion of the people in the state separate facilities that are independent of one another will be provided for the men and women.

The proposal will also provide a day care centre for under aged children so as to encourage mothers to visit the centre. Facilities will be provided to cater for them so that mothers can enjoy their activities with peace of mind.

A. The Study Area

Presently Katsina state is experiencing rapid growth in agriculture, tourism and commerce. However, little attention has been paid to the provision of leisure facilities to satisfy its growing population. The capital city is lacking a fully equipped fitness centre. With the growing awareness of the importance of keeping fit, the need for such a facility cannot be overemphasized.

A fitness centre is a recreational building that requires the attention of the general public. Thus the selection of a site for such a building must be located where there are amenities such as accessibility, water and power supply, security, good landscape and a quiet environment.

B. The Proposed Site

The proposed site for this project is located in Katsina Capital Township. It is found in G.R.A, in the midst of the elite members of the society along Kabir Usman Road in the north

eastern part of the town. It is also very proximal to Maryam Park and Katsina Motel.

The site is a forest reserve beside a water channel owned by the state government. The forest started with a small dum pahn palm tree plantation to prevent soil erosion caused by the drainage and later expanded by planting over 1000 date plam trees.The site is generally serene, sometimes with couple of people found during the hot-dry season enjoying the cool and calmness of the garden and been inspired by the sounds of the water and birds.

It is flanked on western side by a water channel; on the far eastern side are 500 housing units of Goruba housing estate; on the southern side is the popular Goruba Road while it extends to Kofar Sauri on its northern boundary.

Plate 10: Overview of the site (Source: Authour's field work)

Plate 11: Stream passing alongside the site (Source: Authour's field work)

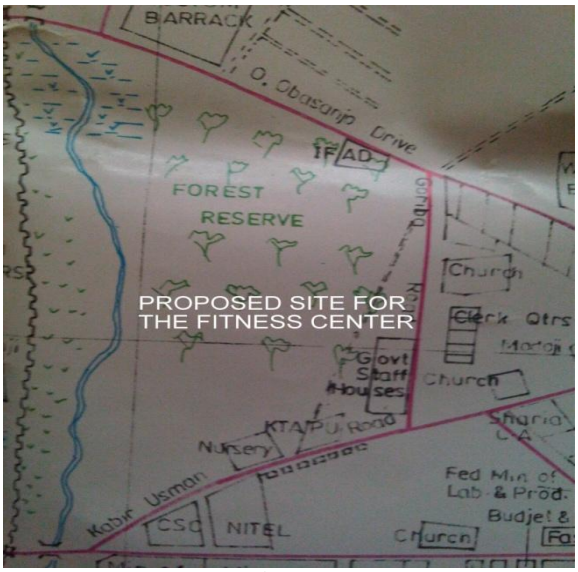


FIG 1: Map showing location of site in Katsina Township (Max Lock Group Nigeria Limited, 1980)

The site was selected due to its following qualities:

- Easy accessibility.
- Minimal topographic restrictions.
- Presence of utilities such as public water supply, electricity and communication masts.
- Neighbourhood security
- The site is located opposite a motel, park and a club.
- The site is located in G.R.A where the upper class citizens are found.
- It is wide enough to accommodate the proposed fitness centre.
- The vegetation cover would be high benefit as it would serve as landscape element at the same time shield against the intent rays of the sun.
- The topography of the site will add more aesthetical value of the overall design.

C. Planning Principles and Consideration

- Site Planning

From site analysis conducted it is expected that in the proposed design the fitness centre will be based on certain guiding principles and considerations such as.

- Climatic Conditions

Orientation: The centre is to be oriented to minimize heat gain due to sunrise and sunset path way, thereby exposing the shorter axis of the building to the sun path

Effects of the North East Trade Wind and South West Trade Wind would be considered in positioning windows that will allow in flow of cool breeze. Structures on the site should be positioned at an angle with the sides that have fenestrations facing away from the northeast and southwest direction.

- Traffic And Circulation

As a recreational building, where not just fitness exercising is done, but other sports events would be hosted, there is need to provide adequate vehicular circulation route and parking taking advantage of the adjourning roads.

- Noise Control

This should be reduced in the design as it will originate from the vehicular circulations by planting trees which will serve as sound barrier as well as consider taking noise control measures within the building structure.

- Vegetation (Tree Planting) and Artificial Ponds

Tree planting and the creation of artificial ponds will not only improve the aesthetic quality of the site but it will create a clean healthy, green environment that is a tribute to organic architecture.

A. DESIGN CONCEPT

Concept is an idea underlying a design that is the general notion behind the design. The design concept is governed by the impression that is intended to be created in the mind of the public to draw them to the fitness centre.

In picking out a concept for this design, an actualization of the functionality of the design has to be considered.

The design concept is based on three types of design approaches.

- Canonic Approach:

This method belongs to the class of form follows function. This method was utilized in the planning of the individual

units that form the fitness centre. It will involve careful allocation of spaces for efficient circulation and utilization.

- Analogical Approach:

This method follows the expression form before function. This was adopted in the creation of elevations of the buildings and the outline of the floor plans.

- Flowing Waves of Water*:*

Since ancient times, man has given water magical virtues and considered it a gift from God. There are many myths and legends about miraculous waters that heal the body and soul. Today the flowing waves of water are used in therapeutic practices.

A fitness centre is also a place of healing. Secondly the focus of this thesis is to introduce organic architecture into the design. The curvaceous lines of the flowing waves are an element of organic architecture and at the same time water is an essential component of a fitness centre. The flow of the waves was used to develop the outline of the structures and there was the use of curves in the elevations to imitate the flow of the water.

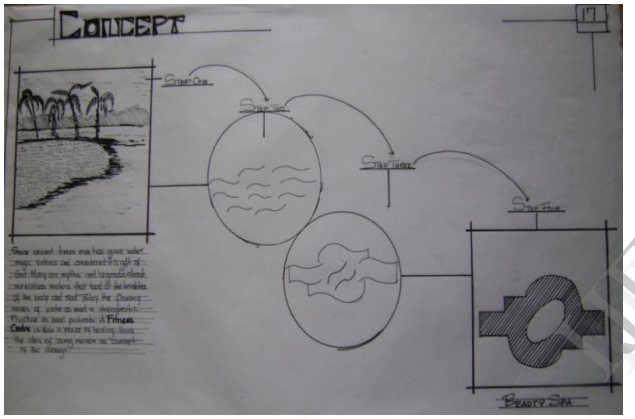


FIG 2: Picture showing the concept of the design. (Source: Authour's sketch)

IV. RESULTS AND DISCUSSIONS OF RESULTS

During research it was discovered that curvilinear buildings are more organic than rectilinear ones. While buildings are mostly still linear, the physical laws governing the dynamics of fluids, heat, light, sound, and force are mostly non-linear. The processes of growth and decay occur, not in straight lines, but in curves and cycles. Rectilinear structures constrain and block natural energy flows. Curvilinear buildings, on the other hand, work with nature and allow optimum shapes and forms to be developed that are more efficient, economic, and appropriate to local climate and environmental conditions thus making them ideal organic structures.

It is well known that wind flows, for instance, are best responded to with curved aerodynamic forms that reduce drag as seen in the smooth curving profiles of modern cars and planes. Passive ventilation, to avoid or reduce energy-hungry air-conditioning, is also enhanced by aerodynamic shapes.

The sun moves in a semicircular path across the sky and yet most buildings are rectangular: their orientation, layout, and straight façades limiting the full benefits of natural lighting and passive solar gain. For cooler climates, however, a curving sun-facing façade, which catches the sun throughout the day and the seasons, is the obvious solution. If feasible, it would be even better if rooms, or even entire buildings, could slowly revolve, ecologically powered, like a garden summerhouse, to track the sun or shade according to the climate or season.

Temperature flows also behave better in curvilinear interiors. Heat is more evenly distributed avoiding corner hot and cold spots. Heat is most efficiently conserved within a compact form, the sphere being the most efficient. Ventilation flows are more easily controlled bringing an altogether more equitable and comfortable indoor climate. In harsh climates, semi-underground earth-sheltered structures can produce zero-energy buildings--ideally suited to organic design.

V. CONCLUSIONS

Fitness is the ability to function efficiently and effectively, to enjoy leisure, to be healthy, to resist disease, and to cope with emergency situations. Being fit is a lifelong service that, if taken seriously, will help one to lead a longer, happier life. The proposal of a fitness centre in Katsina will not only provide a place for leisure and recreation, but it will establish a culture of staying fit.

Technology today has brought about the flexibility, efficiency and precision in design approach and execution of the design. This development has made possible the designing of a centre with the use of contemporary building materials covered with traditional and organic finishes to give it a natural outlook but with the sturdiness of a modern structure. The design (plans and elevations) of the centre are composed of graceful flowing curves that are derived from the continuous fluid movement of water. The design produced interiors that are organic and roofs that host a series of roof gardens. The fitness centre has been integrated with its surroundings such that it appears as if it was born on the site. This link that has been forged between the design and its surroundings will create an atmosphere that will be appreciated by clients and at the same time attract others to the building.

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