Erosion and Resurgence of Biohiphilia in the Evolution of Yoruba Architecture

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Abstract:
The concept of biophilia in architecture promotes features such as plants, water, light, and materials to increase occupant health and well-being while also fostering a connection with nature. In traditional Yoruba architecture, the buildings and cities were a continuum with the environment and all the construction materials completely sourced from the immediate environment. The evolution of Yoruba architecture into more attritive forms and spaces arising from acculturation of foreign architectures gave rise to less biophilic features. This presentation explores the extent to which the indigenous traditions have yielded towards absolute social-cultural functionalism to the detriment of conservation and bio-sustainability in modern environmental development in primarily Yoruba-speaking areas of southwest Nigeria. Information and data for the investigation were obtained from literature on biophilic designs and indigenous Yoruba architecture. The findings from the research indicate that there were no inclinations in the contemporary indigenous architecture of the Yoruba to bring back the elements of the environment into its building forms until the proponents of sustainability and greening gained prominence. The urban forms fare better due to the efforts of landscape and urban designers. The paper concludes that the proponents of indigenous architecture who are presently premising their advocacy on heritage preservation and urban tourism should include the advantages of biophilic architecture which was present in the Yoruba traditional architecture in their discourses.

Keywords: bioclimatic designs; physiological well-being; psychological well-being; sustainability; traditional architecture.

Introduction
The concept of "biophilia" gained popularity through the efforts of psychoanalyst Erich Fromm during the 1960s. Fromm utilized the term, derived from the combination of "bio-" meaning "life" and "-philia" meaning "friendly feeling toward," to explain the innate biological inclination towards self-preservation (Joye, 2007; Zhong et al., 2022). Later on, in the late 1970s, American biologist Edward O. Wilson expanded the definition of "biophilia," perceiving it as the ideal expression for the profound satisfaction derived from being surrounded by living organisms (Young, 2016). In architecture, a biophilic design promotes a connection between individuals and the natural world through the integration of natural elements into the built environment. This design philosophy aims to enhance well-being, productivity, and sustainability by incorporating principles of life and nature into architecture and landscaping (Zare et al., 2021; Zhong et al., 2022). The interest in and fascination with the concept of 'nature' must be viewed in light of the environmental crises caused by human activities.
and the rise of environmental movements. Before the 1990s, 'nature' was closely linked to various environmental issues of that time period like the “El Nino” being linked with the global warming issues. New concerns like ozone depletion, loss of biodiversity and climate change have since emerged leading to the promotion of sustainable development as a solution (Mazor et al., 2018; Sarvajayakesavalu, 2015). The idea of sustainable development gained public attention in 1987 with the Brundtland Report and was further developed through Agenda 21 and the 17 Sustainable Development Goals (SDGs). Despite these efforts, air pollution, climate problems, loss of biodiversity, and other challenges persist today. To tackle these issues in a sustainable way, the European Commission introduced 'nature-based solutions' that utilize natural features and processes in urban areas efficiently. Various technologies were assessed, and the benefits of these strategies were evaluated in terms of thermal performance, air quality, noise reduction, stormwater management, and biodiversity (Maes & Jacobs, 2017). However, the current emphasis is mainly on urban environments, and research on the impact of nature-based design in architecture remains limited. The building sector plays a crucial role in sustainable development, accounting for almost 40% of energy consumption and related carbon dioxide emissions (Allouhi et al., 2015). Buildings also significantly affect human health and well-being, given that we spend about 90% of our time indoors (Chenari et al., 2016). Reconnecting with 'nature' is recognized as one of the most pressing challenges in today's world.

Before the influences of foreign cultures, Yoruba towns and buildings were direct extensions of the forest environment (Adenaike & Kosoko, 2024). This was strictly traditional architecture. The advent of vernacular culture brought about improvements in craftsmanship and thus the requisite technology to model buildings and cities towards the west European ideals which promoted industrialization with cities that were less bio-friendly. There has been no recourse from the progression until the proponents of sustainable architecture and environmental conservation started making inroads into the building and urban design policies in the area.

There are vestiges of Yoruba traditional architecture which remain part of the urban fabric in southwest Nigerian towns. These enclaves can and should be preserved further to ensure that there is a positive step towards heritage preservation of the old with the patronimial stock of buildings, in the physical form, for legacy theoretical interpretation of Yoruba architecture. Also as a development model, this integration approach has considerable relevance to other aspects of Nigerian urban life where there is the need for the accommodation of various cultures and social backgrounds. There is also the argument for a re-ordering of architectural design and urban planning in southwest Nigeria to better accommodate the more traditional or cultural features of indigenous architecture (Adenaike et al., 2022). The development of its housing fabric has varied distinctly from that of northern Nigeria which have had the influence of Islamic architecture and south-eastern Nigeria where development was largely organic, without the Brazilian dimension in the vernacularisation processes. The influence of the international style is also very prominent in the southwest.

**Chronology of Yoruba Architectural Evolution**

The Yoruba history is characterized by adaptation and acculturation. Because there were no strong inclinations towards a city-state, less emphasis was placed on architectural structures in the early stages, with the exception of monumental buildings. The idea of a permanent residence was not firmly established. Traditional
houses were frequently reconstructed or refurbished, and relocation to different areas for improved farmland or due to social unrest was prevalent. In the past, interior spaces were closely linked to the outdoors. Traditional construction was influenced more by social needs and functional space utilization rather than technology and aesthetics (Okeyinka & Odetoye, 2015).

Literature suggests that the initial Yoruba endeavor in constructing permanent buildings involved farm settlements featuring housing clusters situated on elevated terrains. There is no proof indicating that the architectural designs of these structures differed from the bush house style and its variations. This fact is clearly depicted in the early photographs and paintings created by artists who explored the region during the 19th and 20th centuries. The bush house and its variations were prevalent throughout the entirety of sub-Saharan Africa. The Yoruba people, as well as the entire Southwest region of Nigeria, were primarily engaged in farming activities. They had a unique tradition of maintaining two residences - one in the town and another on the farm (Sabri & Olagoke, 2019). The architectural designs of their buildings exhibit similarities in terms of their shapes, components, and overall structure. The farmhouse, commonly known as the "bush house", closely resembles the city or suburban houses but on a smaller scale.

The urban dwelling units are typically formed by combining basic two-room bush house configurations, with the patterns largely influenced by environmental and socio-cultural factors. Financial constraints and technological limitations restricted the scale and development of these aggregations. In some cases, the socio-spatial needs of extended families may necessitate the combination of at least four basic units to create a single urban dwelling. Monumental structures like those belonging to chiefs and kings could consist of over twenty units, with the possibility of further extensions. An inherent sense of introversion existed in the family-centric design in early Yoruba buildings, characterized by courtyards as central hubs for family activities (Adenaike & Opoko 2020). Courtyards served as spaces for social gatherings and religious ceremonies, varying in size and number based on hierarchy and accessibility within palaces and affluent homes. The courtyards were open to the sky. Urban dwellings typically featured courtyards with impluvia for rainwater collection, forming the core of family or institutional compounds. Apart from the sleeping and other private spaces, all other spaces for activities like cooking and carrying out vocations like cloth-dyeing or weaving were simply erected with thatched roofs on stilts. They were not walled.

The advancement of technology and enhanced craftsmanship led to a shift from the simplistic architectural designs focused on functionality and security towards a preference for more durable materials. The architectural landscape saw a transition to more intricate finishes and larger building structures taking the forefront. The basic architectural forms began to exhibit a sense of grandeur in structures belonging to the wealthier members of society and public spaces such as shrines. The traditional bush house design and its variations evolved into more sophisticated structures with improved and long-lasting finishes (Umoru-Oke, 2010). There was a noticeable shift towards outward-facing buildings. The extroversion of buildings also kept the environmental elements that were integral to the structures like rainwater and plants out of the buildings. They were however
contiguous to the buildings at this stage of building and urban design evolution. The impact of colonization brought about alterations in city layouts and building plans (Ajiola, 2022). The transformation of open courtyards into expansive central corridors with rooms on either side was a result of acculturation on the foreign architectural styles which were making inroads into the area. The integration of modernization and the assimilation of diverse cultures due to increased migration within the country further influenced changes in architectural patterns. While the socio-cultural requirements of spaces did not immediately change, they adapted to accommodate the new architectural forms (Olotuah et al., 2018). Technological advancements also introduced the use of various finishes in buildings, such as plaster for walls and floors, wooden windows and doors, and metal roofing sheets. By the late 1800s, the practice of decking buildings, which originated in Badagry in the 1840s by colonialists, had spread to other regions of Southwest Nigeria. The early 1900s witnessed the popularization of this practice with the return of freed slave generations who brought back the Brazilian architectural style. Initially, the Brazilian style was predominantly used in monumental buildings. The intricate finishes and decorations required specialized skills, leading to a division of labor and increased costs. The elaborate decorations around openings and corners made this architectural style financially inaccessible to the majority of the population. These vernacularization processes further increased the private space of the buildings by creating paved areas that abutted the buildings for walkways and colonnades further pushing back the elements of nature from the living areas.

The architectural style known as the "international style" originated in Central Europe during the 1920s. It marked a shift away from the diverse architectural styles of the past, drawing influences from around the world and solidifying its form by the early 1950s. This style is characterized by open floor plans, geometric shapes, flat roofs with parapet walls, and a lack of decorative elements. This style was not well-suited for the Nigerian climate and culture. Despite this, the international style made its way into Nigeria during the period leading up to independence, with high-rise buildings in Yoruba towns showcasing its influence. By the 1980s, the international style had become a prevalent architectural choice in Nigeria, incorporating local elements into its design. Glass and reinforced concrete were commonly used in these buildings, although the exposed flat roofs and parapet walls posed challenges in managing the local climate. As a result, pitched roofs with eaves were eventually adopted to provide a more suitable solution. This adaptation allowed for the continuation of the international style in Yoruba architecture, with buildings in the region reflecting this unique blend of global and local influences. The much larger structures and plain finishes made a lot of demands on interior thermal comfort and lighting. Rather than opt for passive environmental controls and natural lighting as solutions the residents went along with the global trends of the time by encouraging mechanical solutions which consumed more energy and were less sustainable.

Postmodern architecture made its way into southwest Nigeria during the 1980s, blending with Yoruba architecture through the incorporation of neo-classical design elements. This postmodern influence paved the way for the development of contemporary architectural styles in the region, which are still evolving and awaiting clear definition. Yoruba indigenous architecture, with its unique morphology, has historically adapted imported architectural patterns through vernacularization and ethno-acculturation. Over time, it has shown dynamism by integrating various architectural styles that have influenced the Nigerian architectural landscape.

On the urban scale, Yoruba urban form within the enclaves where patrimonial stock of buildings exist in large clusters tend to be organic. Spatial organization of the urban setting in the city cores are loosely defined. The old family compounds that have evolved around the city centres are congested with narrow spaces among the buildings in a fractionalized setting. The amorphous setting and the quest to retain
land in the historic centre has made the erection of buildings and urban in-fills to occupy every available space. Beyond the confines of the city centers, development control and conscious urban planning give way to better urban forms in Yoruba cities. While the city centres are populated with vernacular and post vernacular structures, the outer parts of the city are more likely to be dominated with contemporary styles.

![Figure 2. Typical Yoruba Historic City Centre](image)

Biophilic Designs in Architecture

The focus of biophilia theory has evolved over time, shifting from a primary emphasis on life and living organisms to exploring the connection between humans and the natural environment. In the early 2000s, the concept of biophilia was further developed and applied in the field of architecture, highlighting the emotional aspect of human needs for interaction with nature within built environments (Africa et al., 2019). Biophilic design emerged as a proposed approach to address this innate longing for a connection with nature in architectural design. Various researchers and experts have contributed to the understanding and promotion of biophilic design, recognizing its potential to enhance the nature-connectedness of buildings (Peters & D’Penn, 2020). Numerous theories in environmental psychology suggest that humans have an inherent inclination towards natural elements, which stems from their need for 'nature'. These theories elucidate how interactions with 'nature' can influence both physical and mental well-being (Joye, 2007; Peters and D’Penn, 2020; Ryan et al., 2014; Soderlund and Newman, 2015). They serve as the basis for the conceptual framework of biophilic design. The connection to nature offers numerous advantages across various aspects of life such as living, working, learning, entertainment, and healthcare settings (Downton et al., 2016, 2017; Kayihan, 2018; Sharifi & Sabernejad, 2016; Yassein & Ebrahiem, 2018). This is why biophilic architecture is believed to play a role in promoting sustainability, addressing the disconnect from nature, and efficiently managing natural resources (Xue et al., 2019). In essence, there are two primary motivations for exploring biophilic design. Firstly, the desire for a connection to 'nature' is widely acknowledged in today's built environment, underscoring the need for frameworks to comprehend 'nature' in architecture. Secondly, many design approaches linked to 'nature' are criticized as 'green-washing' or 'placebo' tactics (Tahoun, 2019). Therefore, further research is necessary to assess their impacts and influence on sustainable architecture. Biophilic design on an urban scale is important as a means for cities to effectively respond to climate change and other environmental challenges (Downton et al., 2016; Milliken et al., 2023). Timothy Beatley developed a biophilic cities framework that outlines pathways for enhancing the resilience and sustainability of urban areas (Mooney, 2018). This framework consists of three key sections: Biophilic Urbanism, which focuses on physical green measures to boost city resilience; Adaptive Capacity, which addresses how community behaviors can adapt to these changes; and Resilient Outcomes, which highlights the positive results that can be achieved through the implementation of both strategies. Biophilism in environmental studies should be integrated as a necessary accretion to the more global drive for conservation and sustainability.
Biophilism and Bioclimatism in Design

While biophilism encourages the use of biospheric elements like plants and water as part of the integral components of the designed spaces, bioclimatism is more in tandem with the use of the microclimatic conditions around designed spaces to achieve better user experiences (Desogus et al., 2016; Manzano-Agugliaro et al., 2015). To meet the demands of modern times, the built environment must maintain an appropriate temperature range, optimal humidity levels, sufficient air circulation, and effective acoustic properties. Moreover, it should incorporate well-planned lighting that meets visual comfort standards. Despite challenges related to lighting and indoor climate requirements, conventional buildings often rely on air conditioning systems for regulating temperature and humidity. Conversely, bioclimatic spaces prioritize the use of renewable materials and energy sources, resulting in reduced dependence on air conditioning systems. A key element of successful bioclimatic design involves maximizing natural lighting to ensure adequate interior illumination. By minimizing the need for artificial lighting, significant cost savings can be achieved for consumers and the environment (Couvelas, 2020). When implemented correctly, natural lighting greatly enhances user comfort. Appropriate natural lighting significantly impacts human perception of the built environment, a factor that should not be overlooked. Achieving thermal comfort in bioclimatic buildings can be done through various methods. Radiating floors and ceilings are very effective. Unlike high-tech buildings that thrived in the past, bioclimatic structures offer individual adjustments and more customization of thermal settings. Maintaining adequate oxygen levels is crucial for comfortable indoor conditions. Lack of oxygen can affect brain functions and cause drowsiness (Watts et al., 2018). Proper ventilation and the presence of green plants can help increase oxygen levels in building interiors.

Passive techniques in traditional and vernacular dwellings offer valuable insights into the integration of architectural elements and the lifestyle of the inhabitants (Latha et al., 2015). In hot climates, efficient cooling is crucial, often achieved through natural ventilation and the use of water. Features like overhanging roofs, louvers, shading elements, and trees help reduce the thermal load on the building’s facade. Additionally, thermal massing and insulation systems are employed in hot regions to prevent overheating during the day and gradually release stored heat at night. Three primary methods of passive cooling based on natural ventilation are commonly used worldwide; Chimney ventilation, capitalizing on the stack effect caused by rising hot air; Cross ventilation, utilizing the pressure difference across the building; Wind towers and wind catchers, leveraging overpressure and underpressure. These three passive thermal control measures are often combined with local conditions for better efficacy.

Biophilic Aspects of Indigenous Yoruba Architectural Evolution

Through the stages of the yoruba architectural evolution, the biophilic integration into the designs can be identified at the different thresholds for discussion. Having the consciousness to appreciate biophilia in the organisation and composition of their spaces could not have been a strong point in the thought processes that informed the architecture. The reasons being that the climate within which the architecture was evolving was not totally inclement. The assumed extremes of weather were the direct impact of the afternoon sun and the heavy precipitation. The structures and spatial designs needed to give shading which could be supported by the trees and offer some respite from the rains which the basic roofing could achieve. If biophilic elements are identified in the architecture, they largely exist as a continuum with the social culture and architectonic responses to the social problems that faced the people as the architecture evolved. For the purpose of this discussion, Yoruba architectural evolution will be assessed for biophilic components based on the established thresholds from literature. These thresholds are;
traditional; vernacular; brazilian; vernacularized international; adapted postmodern and contemporary. These six epochs in the evolution of Yoruba architecture represent the more current delineation of Yoruba architectural evolution. Most of the literature on Yoruba architecture stopped at the vernacular exposition without recourse to the continuity that is evident as acculturation assimilated new trends into the social-culture of the Yoruba (Adenaike, 2023).

The social culture is also evolving to accommodate global trends as the world continues in its quest to integrate all cultures via attrition to become a global village. With the five identified thresholds as guides to decipher the content and outlook of Yoruba architecture at different times, their biophiloic aspects can be identified from descriptive literature of authors of Yoruba architecture.

### Table 1 Biophilic Trends in Yoruba Architectural Evolution

<table>
<thead>
<tr>
<th>SN</th>
<th>Stages in Yoruba architecture</th>
<th>Period of existence</th>
<th>Features in buildings and urban designs</th>
<th>Biophilic content appraisal</th>
<th>References</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Traditional</td>
<td>Up to 1960s</td>
<td>Use of forest materials, courtyard system; small rooms; small openings; clustered arrangement of buildings radiating from center of city; communal outdoor spaces not spatially defined</td>
<td>Buildings were continuous with the environment; trees were integral parts of compounds and the city; many outdoor activities like trading were under trees; soil was exposed</td>
<td>(Asomani-boateng, 2011; Obiadi, 2015; Vlach, 1984)</td>
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<tr>
<td>2</td>
<td>Vernacular</td>
<td>1800s - 1960s</td>
<td>Use of more weather resistant materials to complement forest materials; better workmanship; courtyard system; wider openings; narrow streets among compounds; communal outdoor spaces not spatially defined</td>
<td>Replacement of trees as sun shading for communal outdoor activities; family compounds had trees; only indoor spaces were screeded</td>
<td>(Auwalu, 2019; Moukhtar &amp; Sani, 2019; Osasona, 2007)</td>
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<td>3</td>
<td>Brazilian</td>
<td>1890s – 1970s</td>
<td>More resistant materials and concrete became popular; better craftsmanship; artistic expression on buildings; courtyard system; covered verandas and colonnades as outdoor spaces within buildings encouraging extroversion; communal outdoor spaces with better definition</td>
<td>Extension of buildings for covered outdoor spaces reduced space for trees and exposed soil.</td>
<td>(Sabri &amp; Olagoke, 2019; Vlach, 1984)</td>
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<td>4</td>
<td>Vernacular international</td>
<td>1960s – 1980s</td>
<td>Use of modern materials like glass and steel; courtyards changed to corridors within buildings; courtyards within family compounds lost prominence; plain facades; buildings achieved complete extroversion and faced the streets; wider streets became neighbourhood focus rather than courtyards; communal outdoor spaces like town squares were replaced with buildings</td>
<td>Loss of courtyards led to loss of space for trees and exposed soil; urban design retained trees lining the streets. Trees used to define communal spaces changed to built-up structures.</td>
<td>(Adenaike and Opoko, 2020; Nia &amp; Rahbarianyazd, 2020)</td>
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<tr>
<td>5</td>
<td>Adapted postmodern</td>
<td>1980s – 1990s</td>
<td>Use of longer lasting materials like aluminium and plastics. Larger and more complex forms became popular; internal circulation used lobbies instead of corridors; family compounds de-</td>
<td>Excessive use of concrete as paving for open areas greatly reduced the flora around buildings and the streets</td>
<td>(Adenaike, 2023; Adenaike &amp; Opoko, 2024)</td>
</tr>
<tr>
<td>6</td>
<td>Contemporary</td>
<td>From 1990s</td>
<td>Use of vernacular roof forms with modern materials; introversion of buildings for security and new culture of nuclear family promotion; multiple floors with multiple family units within same building without common areas; promotion of soft landscaping along streets and around buildings; promotion of greening of buildings in new trends of sustainability.</td>
<td>Sustainability consciousness encouraged the use of trees, potted plants and soft landscaping in buildings and the cities as a whole; ponds and pools around buildings are encouraged. (F. Adenaike et al., 2022; Jiboye &amp; Ogunshakin, 2010; Pushpita et al., 2015)</td>
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</tbody>
</table>

From the table it is evident that Yoruba architecture started from strongly biophilic beginnings in the traditional era. Settling down to build houses after wandering the forests naturally guided the first builders to erect structures that formed a strong continuity with the environment. Although the use of water within the structures and the contiguous environment was not explored, the fact that the settlements were integral parts of the environment qualified the initial architecture as strongly biophilic. The biophilic disposition of the architecture was reduced during the vernacular era through the introduction of more roofing elements in the outdoor spaces rather than carry out their activities under trees. The technology to erect free standing canopies enabled them to do away with tree shades. The old markets were established under large trees and such areas were named after the trees. Examples are Idi-Iroko, Idi-Oro, Idi-Ayunre, Idi-Araba, Idi-Ape and Idi-Arere scattered all over southwest Nigeria. “Idi” simply represents below or under in Yoruba parlance. All the areas mentioned are now neighbourhoods that started out as single tree market stands that have evolved to become established neighbourhoods. Most outdoor activities were conducted in the open within the surrounding forest. The vernacular era also witnessed the use of screeding materials for the floors in the building interiors. Although, mud plaster was initially used, cement and sand screed eventually became common as the biophilic effects of the fresh top soil was limited to outdoor areas. The era of Brazilian style of vernacular architecture in Yoruba history witnessed the further alienation of the biophilic elements from the buildings. There was however a bit of promotion of natural elements in the urban design as the use of trees and ornamental plants for open areas and streets became popular especially in the colonial settings. It must be noted that the indigenes did not fully assimilate this aspect into their architecture. The coming of the international style with its acculturation using vernacular forms and practices had the greatest separation of the elements of nature from the buildings and urban forms in the area. There was utter disregard for biophilic designs as the buildings and compounds lost their courtyards. Outdoor spaces were paved giving the plants very little access into the city. The retention of old trees that lined the avenues during this era may be attributed more to heritage preservation than biophilic intentions. The era of postmodern architecture took out the little that was left of biophilia as buildings became much larger and streets widened. Ironically it was during this same period that the loud voices of sustainability were resounding around the world. The current phase of the architecture which is adapted contemporary designs is promoting sustainable and green architecture. Though the ideals are accepted, implementation is still lagging behind due to economic and socio-cultural constraints.
The structures also retain some aspects of vernacular architecture using modern materials and trending decorative forms that still represent Yoruba indigenous architecture. The presence or absence of biophilia within the indigenous architecture has not been premeditated. Its occurrences which are being identified with certain epochs of the architecture were either responses to the environmental challenges in the development of the architecture or solutions to other socio-environmental challenges like those posed by the need to evolve sustainable designs in recent times.

In the main biophilic design discourse, a point of conjecture has been reached which berates modern designs of disconnect with nature (Kayihan, 2018). Literature supports the organically evolved architecture of the traditional style which it believes is more in tandem in spatial organization and material assignment with nature (Beccali et al., 2018). In traditional architecture, integration of plants into living quarters especially courtyards was a common practice that offered food and aesthetic benefits. However, contemporary designs have shifted away from this approach. Urbanization and technological advancements have instituted mechanization and sterilization of buildings, influencing human attitudes towards nature. Apart from being biological, humans are also psychological beings. The disconnection with nature de-emphasises the psychological and spiritual aspects of the human race. This has created a society where individuals exist as passive observers in a sterile and non-interactive world. The fear of nature, driven by concerns of waterborne diseases and parasites, has further contributed to the development of very sterile urban environments in contemporary designs. Biophilic design literature argues that contemporary cities are not conducive to mental health and well-being (Tahoun, 2019; Xue et al., 2019). They believe that modern cities lack a crucial element of man’s evolutionary past, which is the innate connection to nature in daily living. There is need for a regular dose of nature, which means incorporating nature into all aspects of buildings instead of separating people from the natural environment. As biological beings, humans have not emotionally or psychologically adapted to the sterile and technologically advanced urban environment. This disconnect between man’s evolved nature and the built environment may be a significant factor contributing to modern stress and mental health issues. The ability of architectural design to influence individuals’ physiological and psychological states is an extension of the biophilic connection to nature. Throughout history, architecture has unconsciously or consciously expressed this connection, demonstrating its inherent quality in humans. By incorporating patterns, forms, materials, symbols, and spaces that mimic nature and evoke similar responses, nature is being emulated. Human aesthetic reactions to landscape and architecture are involuntary and subconscious. Straying away from this acquired aesthetic experience should therefore not be encouraged. Rather, man must seek to recreate something of the primitive connection with nature to maintain an experience of wellbeing. There is an innate sense of wellbeing and enhancement when people exist alongside the natural environment.

The more reported aspects of biophilic designs are; incorporation of water, animals and plants into the built environment; use of analogues of nature especially with movement; use of patterns derived from nature; visual connection with a contiguous natural environment; acoustic connection with nature in the environment; extra-sensory and other indirect experiences with the natural environment like chemical exchanges and microbial interactions; connection with natural systems like the seasons, sunlight, animal migration, large water bodies and precipitation. These elements have been found to affect the mental, physiological and psychological wellbeing of people exposed to them positively in well documented quantitative and qualitative investigations. Biophilic living environments have also been found to support recovery of people who suffer from different ailments. “Restorative environments” are encouraged especially for patients who suffer from highly intransigent conditions like mental
illness. The standard convention for hospital designs encourages greenery. The same goes for recovery and rehabilitation centres. Different sensory stimuli, including different sounds, colors, and light, have the potential to elicit similar pleasurable physiological reactions. Similarly, the movement of waving grasses, particularly when observed in the peripheral vision, can also evoke such responses. Consequently, there exists compelling evidence supporting the notion of an inherent human affinity towards nature. Recent advancements in psychological and physiological research further indicate that there is a scientific foundation for biophilic design (Soderlund & Newman, 2015; Tahoun, 2019). If this hypothesis holds true, it follows that there would be significant economic, environmental, and social benefits associated with implementing such design principles.

While architects and other designers of Yoruba structures are yet to become conscious of the concept of biophilia, the environmental conservation and greening that is being promoted in recent times especially in landscaping is closely related to biophilia. Proponents of the preservation of Yoruba architectural heritage are more concerned with the vernacular architectural culture. The vernacular and Brazilian styles are the largely recognized forms of the typical Yoruba architecture in literature. The indigenization of more recent architectural expositions are being incorporated into the body of Yoruba architecture in more recent literature for a more robust inclusion into the continuum. The contemporary forms which are being evaluated as Yoruba architecture for biophilic evaluation are not compliant in the building interiors. The contiguous environment is however receiving more attention through landscaping to have more greenery. The concept of greening within the environment is taken for granted since the people live in the evergreen forest and trees grow on any land that is not covered. Without a very strong consciousness about the concept and principles of biophilia, the level of compliance within Yoruba architectural space will continue to be minimal.

Conclusion

Till present, the existence of the concept of biophilia continues to be an accretion in Yoruba architecture. All the identified forms and elements that have been mentioned in this investigations were not biophilic intents. The unintentional occurrences of biophilic elements in the buildings and urban settings are however of immense benefit for the physiological, psychological and mental wellbeing of the people as reported in other researches and should be encouraged. Having the Yoruba experience commence from a strong level of biophilic inclusion only to wane as the architecture evolved is undesirable if consideration is given to the immense benefits of biophilia. The apparent reappearance of elements of biophilia in the contemporary structures should be encouraged. The dividing line between evolving structures that include biophilia and progressing along the line of acculturation of emerging architectures with the protection of the interests of current global phenomena like conservation and sustainability is awareness. Awareness comes from education and access to information. It is desirable to encourage more research and reportage on the topic within the Nigerian context to build more awareness on the subject and different modes of implementation. The current efforts to build awareness on the progression of Yoruba architecture beyond the older styles can be boosted with ancillary concepts like biophilia.

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