African Journal of Social Sciences and Humanities Research
ISSN: 2689-5129
Volume 4, Issue 3, 2021 (pp. 33-43)
www.abjournals.org

INTRODUCTION OF GLASS AS FENESTRATION IN 19TH CENTURY LAGOS, NIGERIA: A BRIEF HISTORY

Akande Adeyemi

Department of Architecture, University of Lagos.

Email: adeakande@unilag.edu.ng

Cite this article:

Akande Adeyemi (2021), Introduction of Glass as Fenestration in 19th Century Lagos, Nigeria: A Brief History. African Journal of Social Sciences and Humanities Research 4(3), 33-43. DOI: 10.52589/AJSSHR-P8HRBCIJ.

Manuscript History

Received: 5 May 2021

Accepted: 28 May 2021

Published: 12 June 2021

ABSTRACT: *While glass as a material has been known to the people of western Nigerian for hundreds of years, it was only in the late 19th century that it became integrated into building and construction practice in Lagos. For the most part, early local architecture made little effort, if any at all, at covering window spaces with any material of permanence as the primary purpose of these orifices was more to let air in rather than light. Early European missionaries and colonial agents saw the situation differently. Their horrid fear for tropical bugs and matters of security and privacy necessitated a response and modification to the philosophy of tropical architecture. Using qualitative methods and visual analysis of archival images, this study takes a historical look at the beginnings of the integration and use of glass as fenestration and argues that so significant was the introduction in the late 19th and early 20th century in Lagos, that the innovation re-engineered the culture of architecture and living as we know it. The study identified the first building in Lagos to use glass as fenestration and discusses the role of missionaries in the development of innovation. It argues that missionary activity in the coastal city of Lagos, created a broad new industry and trade opportunities and concludes that the introduction of glass as a building material in 19th century Lagos, was not a mere development, but a significant innovation, both in construction and creativity.*

KEYWORDS: Glass, Window, Lagos, 19th century, Construction

Article DOI: 10.52589/AJSSHR-P8HRBCIJ
DOI URL: https://doi.org/10.52589/AJSSHR-P8HRBCIJ

African Journal of Social Sciences and Humanities Research
ISSN: 2689-5129
Volume 4, Issue 3, 2021 (pp. 33-43)

www.abjournals.org

INTRODUCTION

It will be safe to propose ab initio, that the idea of integrating glass into building construction, particularly as fenestration, was introduced to Western Nigeria by colonial permeation. While translucent or transparent glass sheets, to the people of the 19th century Niger area, may be a queer thing to behold, glass, as a material in itself, is not new to the aforementioned people. Several scholars have examined the history and technology of glass in West Africa, and their studies have shed a fair amount of light on aspects relating to the manufacturing, trading and use of glass (beads) for almost a thousand years (Fage, 1962; Davison, Giauque, & Clark, 1971; Freestone, 2006; Babalola, 2017). In particular, certain towns in Nigeria play a key role in the collective history of glass production in the sub-region and prominent amongst them are Ife and Bida in the Nupe regions.[1] This paper will not belabour matters which concern glass as a cultural accessory. This aspect of the materiality of glass has enjoyed ample attention from the scholarship. This work will discuss instead, the introduction and integration of glass into building construction and present the novelty of the practice in the context of 19th century Lagos. Though historical, this work approaches the matter of glass only in a manner--and to such extent--that helps articulate the central importance of innovation as a veritable philosophy for tackling the many emerging urban problems the globe currently faces. The central question this study will attempt is; what significant impact and the innovative edge did the integration of glass into building construction in colonial Lagos have on the *utilitas*, *venustas* and comfortability of local living in the area? It will also address the historical question - which building is the first to use glass windows in Lagos?

Critical to this study's qualitative approach is the use of archival photographs and varied secondary data gathered from published and archived materials on the urban history of Lagos. Thorough visual analysis and examination were carried out on several late 19th and early 20th century architectural and urban cityscape photographs and sketches of Lagos. The photographs and sketches were accessed mainly from the online archive collection of the Church Mission Society, Basel Mission and Colonial Office. These materials presented this study with ample visual reference and evidence pointing to the manner and extent of the use of glass on buildings in colonial Lagos. Alongside the visual analysis, rigorous investigations and consultations were made into secondary materials on the history of the Atlantic trade and interactions as well as the history of construction activities under the patronage of the different religious movements, the *Saro* elites and Afro-Brazilian craftsmen.

[1] See Nadel S. F. (1940). Glass making in Nupe. Man, 40, 85-86. Adeduntan, J. (1985). Early glass bead technology of Ile-Ife. West African Journal of Archaeology, 15, 165-171. Babalola, A. B., Rehren, T. (2016). The 11th-15th century AD glass crucibles from Ile-Ife, Southwest Nigeria. Paper presented at the 23rd bi-annual Society of Africanist Archaeologist (SAFA) conference, Toulouse, France.

Article DOI: 10.52589/AJSSHR-P8HRBCIJ
DOI URL: https://doi.org/10.52589/AJSSHR-P8HRBCIJ

African Journal of Social Sciences and Humanities Research
ISSN: 2689-5129
Volume 4, Issue 3, 2021 (pp. 33-43)
www.abjournals.org

LITERATURE: EARLY USE OF GLASS IN ARCHITECTURE.

The craft of glassmaking is an old and complex one. The Roman historian Pliny has suggested that the earliest glass made by man dates back to 5000 BC amongst the Phoenicians, but presents no evidence to support this claim. Another claim for the oldest known man-made glass however has been traced to ancient Mesopotamia and dates back to 3500 BC (Barag, 1970). As one might expect, the initial use for glass was experimental - mainly for decorative purposes. The early glass was used as glazed ornamentation on stone and for ritual, very much like the naturally occurring glass material called obsidian (volcanic glass) known to prehistoric people. It is the Romans in Alexandria (Egypt) however who are credited with being the first to use glass as part of the architecture. Glass was incorporated into the cut-out openings on buildings as early as the first century AD, though the glass was not clear and the technology was remarkably underdeveloped (Bayley, Freestone, & Jackson, 2015). Before the advent of the Roman glass windows, earlier attempts at covering fenestration had been made by using flattened animal horns, mattings, oiled cloth or roughly cut wood to cover the small orifices on walls designed to circulate air and let in meagre light (Langley, 2011). By the 6th century, some Turkish cathedrals of Byzantine origin featured glazed windows and ample use of coloured glass and marble. Early Islamic architecture also featured similar material for window treatment. These modest early days of expressive glazing were however distant, in awe and enigma, from the later achievements of Western Europe's spectacular medieval stained-glass cathedrals.

The medieval gothic period is one to look to for the finer examples of the integration of glass into construction. Though this period is not without its own issues when seen from a history of window-glass perspective. In fact, they leave much to be desired in providing a clear glass as most of the glass manufactured in the early part of the gothic era were dull and never smooth enough. What the medieval glass lacked in clearness, however, it mastered in pigmentation. The epitomic coloured glass admitted light into interiors as diffused ethereal vibrant beams of illumination that touched the interior of the hitherto dark worship spaces ever so softly. Medieval cathedral windows made no efforts to offer a view of the outside world. What they did so beautifully was to offer illuminated bible stories to the faithful who, for the most part, were non-literate (Lienhard, 1997). In Lienhard (1997) short texts, he presents a notion that the medieval artisan proposed on and favoured coloured glass production as against the simple but functional offerings of clear glass. This notion must not be construed to mean that the process of making coloured glass is any easier. Reynolds (2012) discusses the delicate process of making coloured glass. She states - to produce a stained glass window, an artisan would combine sand and potash at temperatures of nearly 3000 degrees. While the glass is still in a molten state, the artisan colours it by adding small amounts of metallic oxide powders. Copper oxides were used to produce shades of green or blue-green; cobalt would create a deep blue, and gold could be used to produce a wine-red or violet-coloured glass. From her account, one must conclude that the medieval artisans must hold an appreciable amount of skill and knowledge of chemistry and glass craftsmanship to achieve their goal, hence null must it be, whatever suggests low skill of these artisans, however passive.

Thomas Fuller, the 17th-century theologian and historian is credited with the quote 'Light, God's eldest daughter, is a principal beauty in a building'. Though without the mention of glass, Fuller's words invariably celebrate the transparent and illuminating power of glass as a building component. The reality of the 'beauty of light' in buildings is perhaps most apparent in the

Article DOI: 10.52589/AJSSHR-P8HRBCIJ
DOI URL: https://doi.org/10.52589/AJSSHR-P8HRBCIJ

gothic cathedrals all over Western Europe, and it is particularly in France that a noticeable impact of the integration of glass and architecture is most pronounced. The full radiance of the 13th century coloured glass walls that cover both sides of Saint Chappelle is a striking example of the wealth of French glassmaking artistry and manufacturing prowess. The Rayonnant style chapel completed in 1248 after only two years of construction is also a sublime display of structural weightlessness and the grandiloquence of the integration of glass into architecture, particularly in the French Gothic style. Saint Chappelle retains one of the most intact in-situ collections of 13th century stained glass, which includes an area of over 6,400 square feet causing the walls of the chapel to become little more than a delicate framework to the numerous windows of the upper chapel (Reynolds, 2012).

France was well ahead in the technique of making usable glass for all purposes. Their notable crown glass from Rouen was a spectacle in all of Europe and the product price was equally a thing of much amazement. The French largely kept their processes secret to control the market and in particular is their Normandy glass which was widely exported for most of the 1600s and thought to be the best glass on the market (Louw & Crayford, 1999). Like France, England made every effort in the late 17th century to come to speed with production efficiency and cost despite its former lag. By the end of the 17th century, there was no shortage of good window glass of all price ranges in most places in England. Out of about 90 glass houses operating in the country and Wales, 24 concentrated almost exclusively on window and plate glass (Louw, 1991). Clearly, this availability of the material further encouraged the use in architecture and as we will see later in this study, cost and availability directly fuel innovation. An innovative idea may suffer if the required components that will make for conducive assimilation of the idea are missing. The British will continue to make huge strides--even more than the French and Venetians, some will argue--in the production and eventual exports of their glass plates well into the following centuries (Willis & Clark, 1886). This invariably positioned them as a key player, not only in production but in the use of glass in architecture. Nowhere more explicit is this claim articulated than in the copious celebration of the British mastery of glass architecture - Crystal Palace building.

Crystal Palace is the production of ingenuity and innovation. It is one of the best-known icons of 19th-century architecture and often hailed as the building that initiated the move away from traditional materials and methods, opening the way in Europe and other parts to the growth of the high-rise buildings (Addis, 2006). To see such a colossal mass of glazed panels and iron frames in the 19th century will have come with such bemusement and awe to the people who trouped to Hyde Park where it was first erected. A 1986 watercolour painting titled "*Looking over the Dam – The Crystal Palace*" by Patrick Beaver captures the stateliness of the structure and the delight of the people. In 1849, Prince Albert suggested the idea of having a great international exhibition that will be hosted in England. Part of his projections for the exhibition is what has now been termed the largest building of its time which must be cheaper than the prevailing cost of buildings at that time since it was going to be a temporary structure. A Royal Commission was created to handle the project and an announcement made for a design competition. Joseph Paxton, who was the estate manager to the estates of the Duke of Devonshire and at the point also a director of the London Midland Railway, took interest in the competition. Paxton, a trained landscape gardener with some experience in the construction of small glass conservatories, alongside William Barlow, a Building Engineer at the London Midlands Railway, submitted a winning design that was put up in 17weeks from the time it was commissioned (Addis, 2006).

Article DOI: 10.52589/AJSSHR-P8HRBCIJ
DOI URL: https://doi.org/10.52589/AJSSHR-P8HRBCIJ

African Journal of Social Sciences and Humanities Research
ISSN: 2689-5129
Volume 4, Issue 3, 2021 (pp. 33-43)
www.abjournals.org

Completed in 1851, the structure was mainly of prefabricated iron frames and glass. The building covered a ground space of about 70, 000 square metres. Crystal Palace marked the beginning of the definitive use of glass as a building material. While Londoners are no strangers to the gargantuan architecture of stone, marble and mortar as expressed in many of the great and historic cathedrals in the city, to see the same scale in glass was another matter altogether. Addis (2016) quotes Henry Cole, the overall coordinator of the exhibition,

> "the one object with which the world first became acquainted for the first time…was the building itself which Paxton suggested. The exhibition has taught the world how to build with iron and glass in a way never done before…Nothing very novel in iron columns resting on concrete foundations; nothing novel in Paxton's gutters, which half a dozen persons claim to have invented, but something very novel in covering twenty acres with glass as an exhibition room." Cole, Memoirs.

The key to the success of the Crystal Palace rests on several variables but the most critical is the celebration of ideas in a manner that encouraged innovation all through the process of construction. One must not construe the lavish character of glass in the design of Crystal Palace to mean the abundance of window glass in Britain. In the 19th century, glass for architectural purposes could be said to be available but not abundant. At that time, some parts of Britain still fell sinuously behind in the trend of glass architecture. In some areas, such as Manchester, the use of plate glass as windows on ordinary buildings was still so rare that an account records a significant sensation caused by the installation of two plates of approximately two feet by one-half feet in a window shop market street in the city ca. The 1830s (Slugg, 1902).

Altogether, the crude and tedious process of manufacturing glass around Europe improved in the 18th century through experimentations and technical advancements in the field of industrial chemistry as the market for window glass increased. Industrial growth also contributed to increased construction activities as new building types emerged: shops, factories, warehouses and greenhouses – all these consequently increased the demand for glass in construction over and above the traditional usage (Louw, 1991). The technology of the steam engine provided mechanisation that aided the manufacturing process, making the production of many things easier. By the late 18th century and well into the 19th, larger size glass panes were now available, though relatively still expensive to produce but more affordable owing to greater efficiency in the production process. Noticeable advancements were made in the quality, quantity and variety of glass products and this changed the material and cultural tapestry of the times. In Louw's (1991) words, the progressive attenuation of glazing bars and a parallel increase in the size of glass panes of good quality available on the market had a dramatic impact on architectural thinking.

Article DOI: 10.52589/AJSSHR-P8HRBCIJ
DOI URL: https://doi.org/10.52589/AJSSHR-P8HRBCIJ

African Journal of Social Sciences and Humanities Research
ISSN: 2689-5129
Volume 4, Issue 3, 2021 (pp. 33-43)
www.abjournals.org

FINDINGS: MISSIONS AND THE INTRODUCTION OF GLASS TO LAGOS

How and when did window glass panes come to Lagos? Trade is the simple answer to the first part of that question, though not the accurate one. A more accurate answer central to the introduction of glass panes to Lagos is missionary activity. In fact, the latter may have had a more significant impact on the introduction of glass into the building culture of Lagos than trade itself. It will appear that trade only responded to the need created by missionary activity in the coastal city. Perhaps, to adequately discuss how glass panes came into Lagos, one must first tackle when it came. The circumstance under which glass was first used as a window in Lagos will invariably give insight into how the material came to Lagos.

Akinsemoyin and Vaughan-Richards (1976) noted that the earliest buildings were made of mud, small and oblong and were without windows. The only openings in the early houses were door openings; I say door opening as a matter of description because these entrances had no doors in the early times. This supports the notes of the Sardinian Consul to Lagos, Giambattista Scala. Scala writes in his *memoir of Lagos* that the 19th century houses in Lagos were generally small, built-in earth which had been baked in the sun supported by poles. They are covered with a roof of plaited straw… The houses, he continues, were architecturally alike apart from the king's house which was covered with tiles. This crude state of architecture in Lagos and most parts of the western interior was to remain largely the same as far as the populace is concerned. In 1932, the colonial report stated that the native type of architecture was giving way to the European style in the southern provinces. It however adds that doors and windows were made of wood and that "glass was rarely seen" (colonial Report, 1932). In many civilisations, the fullness of the cultural and philosophical expressions of local art in architecture is often, if not exclusively, seen first on the royal palace architecture. Likewise, in this case, it is the Oba's (king) palace we must turn to, to investigate the earliest signs of fenestration in early Lagos. Godwin and Hopewood (2012) noted the superior quality of the king of Lagos' palace and stated the involvement of the Portuguese in the provision of materials used for the building – particularly roofing tiles and wrought iron infills. Also, there is to be no doubt about the influence of the Portuguese in the architecture of the structure for as Akinsemoyin & Vaughn-Richards (1976) put it, the palace of the Oba (King) which replaced the initial crude structure of the early times, was a sprawling building with Roman arches and Portuguese supporting pillars and baked tiles roof covering.

What is instructive here is that while we see a clear European influence in the architecture of the Oba of Lagos' palace, the windows remain wooden shutters as early sketch details show. The preliminary projections of this study marked the Oba's palace as one of the possible buildings where the glass was first used in Lagos but after secondary data analysis, this proved not to be the case. A detailed section of the early Lagos palace as gifted by the Portuguese is documented in Akinsemoyin & Vaughn-Richards (1976) and the diagram clearly shows that while roofing tiles were used, the material for fenestration remained wooden shutters. Well into the 19th and early 20th century, many houses in Lagos remained with wooden shutter fenestration and later wooden panel windows which were popular in the interiors of the Yoruba country.

This study turns to colonial records on the activities of the Rev. Charles Gollmer in Sierra Leone for clues as to which building first used glass as fenestration in 19th century Lagos. In 1834, the Rev. Gollmer who was stationed at Bathurst, Sierra Leone for over three years was

Article DOI: 10.52589/AJSSHR-P8HRBCIJ
DOI URL: https://doi.org/10.52589/AJSSHR-P8HRBCIJ

at an instance assigned to accompany Rev. Townsend and Mr Crowther (later Rev. and then Bishop) to the Yoruba country in the hope of starting a Yoruba mission. Gollmer writes; The acquisition of the Yoruba language has taken up by far the greater portion of my time during the quarter…I have collected a good number of sentences, and translated the Lord's Prayer, Ten Commandments and the first two chapters of the Gospel. In the erection of the two houses for the new mission, which is being prepared under my superintendence, good progress is being made, and they will no doubt be finished, so far as they can be here before the time required. The houses Gollmer referred to are the subject of interest to this study. They are prefabricated houses that became popular around the 18th century. The need for a quick contraption that could be mantled into a decent accommodation became apparent in the early years of exploration and colonisation. British inventors of the 1830 and 40s who designed and fabricated these packed houses included Peter Thompson, Henry Manning and S. W. Brooke. Many others joined in the lucrative venture when in the mid-19th century, the need and use for these houses exponentially grew. Gollmer's party arrived at Badagry on January 17th, 1845. A few months later, Mrs Gollmer died from a protracted illness. The missionaries who had been occupied with taking the gospel to Abeokuta at all cost were tempered on account of this loss and a delay brought upon them by the death of Abeokuta warlord, Chief Sodeke. These and several other factors necessitated their prolonged stay in Badagry and the prefabricated house the Rev. Gollmer had brought, was consequently set up. The forty-four by twenty-six feet shingle roof wooden frame house proved a wonder to the indigenes of the country (Gollmer, 1889).

After several fratricidal wars in Badagry, and what appeared to be an arid and unyielding place for the gospel, a final decision was made to move the mission to Lagos on the reinstatement of Oba Akitoye in 1851. The Gollmer frame house will consequently be dismantled in Badagry and the chief parts of it brought to Lagos in the year 1852. It will take months later before work on a new building which was a replica of the Badagry house is complete. There is no reason to doubt that the key materials such as doors, frames, windows and panel boards from the Badagry house were used in the creation of the new replica in Lagos. On account of the date of creation and critical visual analysis of the sketch provided in Henry Vidal Gollmer's 1889 memoir and later photographs of the same building, this study asserts that Gollmer's Lagos frame house, which was later to be known as *Ile Alapako* on account of the material used to fabricate it, is the first building in Lagos to use glass windows. The early sketches of the building clearly show that the upper floor where the private rooms are located, had several six-panel windows with glass panes and this is in line with standard prefabricated houses from Britain in the 19th century. One must stress here that Gollmer's frame house is not the first of its kind in the lower region of what is now Nigeria, it is, however, the first in Lagos. A note must be made of the prefabricated duplex made for King Eyambo of the Calabar area by William Laycock of the UK. Records show that this metal prefabricated structure was made in the UK and shipped to Calabar in 1843, two years before Rev. Gollmer's houses arrived in Sierra Leone.

The direct impact of the missionary's use of glass, first on the missionary house *Ile Alapako* and later on church architecture was pivotal to the reconstruction of the local building culture. The ability to extend and allow the luminosity of the outside world into private spaces without necessarily admitting the elements and flying mischiefs presented a new living order and model of interacting with spaces. One must put into consideration that the Yoruba natives were a people who traditionally situated all social and commercial activities outside the confines of interior spaces and mostly engaging with all daily work in the open courtyard, irrespective of the elements, the idea that light can be introduced to daily activity while remaining in the

Article DOI: 10.52589/AJSSHR-P8HRBCIJ
DOI URL: https://doi.org/10.52589/AJSSHR-P8HRBCIJ

comfort of interior space was indeed a welcomed development, however curious it was. The symbolic malleability, and the novel possibility represented by light, gave the idea of glass as fenestration some acceptance in the minds of the emerging elites of Lagos who of course were the first to come in contact with the innovation in churches and administrative offices. Remember that these elites, mostly *Saro*, are those who have been under both western education and the philosophical indoctrination of Christianity in Sierra Leone. Deep in the centre of the constant doctrinal tutelage, is the idea that they are the new light of the heathen country. They are subliminally aware that the entrance of light is in all, a positive thing. There is no reason to doubt that this idealistic viewpoint, beyond even the simple beauty and functional superiority of glass panes as windows, may have subconsciously influenced acceptance even at such a high cost.

This adherence led to patronage by elites and closely followed by others as the material became more accessible and affordable. Conversely, as the doctrine of illuminated interiors permeated the financial classes within the church, trade-in glass panes, as it is in other building materials, took over as the main conduit for the provision of the material, thereby instituting the idea and practice amongst the populace. This study, therefore, shows that missionary activity and influence, rather than trade, initiated the innovation of glass as window panes in early Lagos through the iconic *Ile Alapako*. Trade was to cash in later by making the material available to 'others' of course only after the ideology had fully permeated the ranks of the early Lagos worshippers. The same hypothesis may be applied to other parts of Christian Nigeria with reasonable accuracy and one can very fairly theorize that glass as a building material was introduced to a location by missionary activity (particularly through church architecture and mission houses) and only after the local worshipper have seen the power of illuminated interiors and attached the ideological basis of the same to Christian doctrines, did they develop the lifestyle modification that led to the shift in local architectural practice. Trade was to follow later as a mechanism that sustained the ideology.

There is to be no doubt that by the 1880s, glass was available and very apparent on buildings in Lagos such as Glover Memorial Hall (1887), J. L. Payne's Orange House (1884), and Supreme Court (1887), though the situation then was not unlike 18th century Britain where the material was available but not abundant on account of production cost. Suffice to say that glass made an immediate impression on the people, particularly with the elites and its integration into the building culture of the town was indeed a noticeable innovation. It stealthily, but gradually took the place of the now obsolete wooden shutter window of the early days. During the later part of the 19th century, the colonial government imported large amounts of building materials like cement, nails, corrugated roofing sheets and of course plain glass for windows for government construction of administrative offices, staff quarters and some public works (Ekundare, 1973). Although plain glass for construction was rare, it was in high demand according to the Nigeria Handbook, 1923. The edition records that building materials such as galvanized corrugated iron, lower grades of iron sheeting, gutters, ridging, galvanized nails, washers, and sheet glass were (also) in very high demand.

Very much like eighteenth-century Britain, late-nineteenth-century Lagos saw a steady demand for window glass on account of the rapidly growing international trading activity on the Island which directly stimulated the local construction industry. Unlike Britain however, the growing demand was greatly underserved as the transportation of glass panes used for windows were limited and unprofitable, probably on account of the fragile nature of the material and the

Article DOI: 10.52589/AJSSHR-P8HRBCIJ
DOI URL: https://doi.org/10.52589/AJSSHR-P8HRBCIJ

consequent losses incurred by the shipping companies due to breakages. Though there were other forms of glass imported into the country, in the form of bottles, glassware, mirrors and so on, it would take several years more before the fragile but important material would become abundant and basic requisite material for a standard building in Lagos.

IMPLICATIONS TO RESEARCH: INNOVATION AND THE USE OF GLASS FOR CONSTRUCTION

Disciplinary thinkers owe a debt of responsibility to effectively reiterate productive philosophies that lead to advancement and progressive practises, which in turn assures the discipline a future of relevance. Construction and urban disciplines must continue to admit and support the culture that gives the courage to experiment with new ideas and materials in a manner that does not negatively affect or burden the financial character of construction ventures. This culture must lend itself to the idea of innovation. Innovation is central to sustained relevance in the future. It must be bold and daring but most importantly, it must be sensitive to local factors for it to have utmost compatibility and result-oriented productivity. It must also be targeted at solving a problem, however active or passive.

The integration of glass into construction in Lagos by the colonial populace significantly advanced the development and character of architecture in early Lagos. The original purpose of glass as a material for windows is simply, as Charles Tomlinson puts it, to introduce comfort into the meanest dwelling which previously did not belong to the richest. Through the contrivance, light is filtered from the wind, the rain, and the cold; we can enjoy the one without being inconvenienced by the others. Windows, either the wooden shutter or the glass louvres present an adequate innovation for the local weather. It precisely regulates the in-out flow of matters from either side. The shutter may allow light to the extent to which it has been swivelled and this not at the expense of the much-needed breeze for interior cooling – a thing that will be mimicked by glass louvres. Thus, one may then argue that glass windows presented a modern and pleasing visual aura and give a building presence while regulating wind and light but screening off the more hostile gust and rain which is rather plentiful in tropical environments.

Furthermore, the challenges that continue to stare the urban environment and human well-being in the face require no less courage and innovative tenacity irrespective of flaws. The issue of plastics is worthy of note. Plastic material is a current and growing threat and menace – through construction innovation, a resolution can be made to turn the threat around in favour of the built environment. The dynamics and success of the idea rest within the same philosophies that the construction practice must inculcate, which is innovation. The ideology behind innovation is built on the framework that enables us to try new ideas even without the necessary assurance of a favourable outcome. This study argues that the will to venture calculated innovation must be encouraged if the tide must turn for the better in the construction industry in Nigeria. A framework for research that facilitates the courage to test ideas, becomes pertinent if the industry is to be reckoned with in the coming years.

Article DOI: 10.52589/AJSSHR-P8HRBCIJ
DOI URL: https://doi.org/10.52589/AJSSHR-P8HRBCIJ

CONCLUSION

This study examined the subject of the integration of glass in architecture, particularly as fenestration. It points to early missionary activity as the main inspiration for the admittance of glass windows in Nigeria and posits that this foundation was leveraged upon by trade to make the material available for patronage. Further, this paper argues for courage in practical innovation as the vehicle that will help tackle the many challenges the urban environment discipline currently faces. We must break the shackles of the idealist approach in the building industry and make room for the novelty to be put to the test through a well-monitored structure and culture that encourages advancement. The bigger problem to be addressed here is the mindset and allowing ourselves to truly give room for new trials. Glass as material for a myriad of products is now part of a multibillion-dollar industry of exports. Glass and glassware exports by country totalled US$76.5 billion in 2019. That amount reflects a 12.2% gain for all products shipped over the five-year period starting in 2015 when shipments of these commodities were worth $68.3 billion (Workman, 2020).

REFERENCE

Addis, B. (2006). The Crystal Palace and its Place in Structural History. *International Journal of Space Structures*, 21(1), 3-19.

Adeduntan, J. (1985). Early glass bead technology of Ile-Ife. *West African Journal of Archaeology*, 15, 165-171.

Akinsemoyin, K. & Vaughan-Richards, A. (1976). *Building Lagos*. Lagos: F&A services.

Babalola, A. & Rehren, T. (2016). The 11th-15th century AD glass crucibles from Ile-Ife, Southwest Nigeria. Paper presented at the 23rd bi-annual Society of Africanist Archaeologist (SAFA) conference, Toulouse, France.

Babalola, A. (2017). Ancient History of Technology in West Africa: The Indigenous Glass/Glass Bead Industry and the Society in Early Ile-Ife, Southwest Nigeria. *Journal of Black Studies, 48*(5), 501-527.

Barag, D. (1970). *Mesopotamian core-formed glass vessels (1500-500 BC).* New York, NY: Corning Museum of Glass.

Bayley, J., Freestone, I., & Jackson, C. (2015). *Glass of the Roman World*. Oxford: Oxbow Books.

Colonial Report (1932) Colonial Office Publication.

Davison, C., Giauque, D., Clark, D. (1971). Two chemical groups of dichroic glass beads from West Africa. *Man*, 6, 645-659.

Ekundare, O. (1973), *An Economic History of Nigeria 1860-1960*. London: Methuen & Co Ltd., pp.96

Fage, J. D. (1962). Some remarks on beads and trade-in lower Guinea in the sixteenth and seventeenth centuries. *Journal of African History*, 3, 343-347.

Freestone, C. (2006). An indigenous technology? A commentary on Lankton et al. "Early primary glass production in southern Nigeria. *Journal of African Archaeology*, **4** (1): 139–141

Godwin, J. and Hopewood, G. (2012). *Sandbank City*. Lagos: Kachifo.

Gollmer, C.H.V. (1889). *Charles A. Gollmer; His Life and Missionary Labours in West Africa*. London: Hodder & Stoughton.

Article DOI: 10.52589/AJSSHR-P8HRBCIJ
DOI URL: https://doi.org/10.52589/AJSSHR-P8HRBCIJ

Langley, A. (2011). *Medieval Life. Eyewitness.* London: Dorling Kindersley. p.16.
Lienhard, H. (1997). *Window Glass*. https://www.uh.edu/engines/epi1282.htm (retrieved December 2020)
Louw, H. (1991). Window-Glass Making in Britain c.1660-c.1860 and its Architectural Impact. *Construction History*, 7, 47-68.
Louw, H., & Crayford, R. (1999). A Constructional History of the Sash-Window, c. 1670-c. 1725, *Architectural History*, 42, 173-239.
Nadel S. F. (1940). Glass making in Nupe. *Man*, 40, 85-86.
Reynolds, E. (2013). The Development of Stained Glass in Gothic Cathedrals, *JCCC Honors Journal*, 4(1), 3.
Slugg, J. (1881). *Reminiscences of Manchester Fifty Years Ago*, quoted in A book of Glass, (1902). Baxendale & Co.
Willis, R. & Clark, J. (1886) quoting Z.C. Von Uffenbach to Cambridge. The Architectural History of the University of Cambridge, (Cambridge, 1886), II p.614
Workman, D. (2020) *Top Glass and Glassware export by Country*. http://www.worldstopexports.com/top-glass-and-glassware-exports-by-country/ Retrieved March 2021

Article DOI: 10.52589/AJSSHR-P8HRBCIJ
DOI URL: https://doi.org/10.52589/AJSSHR-P8HRBCIJ