



GLOBAL JOURNAL OF SCIENCE FRONTIER RESEARCH: H
ENVIRONMENT & EARTH SCIENCE

Volume 15 Issue 2 Version 1.0 Year 2015

Type : Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals Inc. (USA)

Online ISSN: 2249-4626 & Print ISSN: 0975-5896

The Effect of Modern Techonology on Traditonal Architectural Expression: Case of Old Calabar Architecture

By Mbina, Anthony Adomi, Edem, Ephraim E & Otto, Nnah Udosen

University of Uyo, Nigeria

Abstract- Recently, there has been serious concern expressed over the fact that traditional architecture's language, its system of representation and indeed, its technology are excluded from the industrial future and hence from training, due to modern technology. Consequent upon this, the immense capital know – how held by building – related craft-trades, is disparaged as a pre- industrial and historical phenomenon and, as such banned from technical training and economic practice and retained merely as a subject for archaeology and arts and craft history courses. Thus, we are faced with a scandalous reduction in the productive capacities of society as a whole and with the radical impoverishment of basic democratic choices relating to vocations and trades and, generally, with the means of human self –expression. This study, therefore, seeks to establish the authenticity or otherwise of these allegations against modern technology. In doing this, a careful study was made of the developments in architecture with respect to its historical antecedents, specifically from the pre- World War 2 to the modern architectural era, 1945 till date.

Keywords: *modern technology; art; traditional architecture; architectural expression; old calabar.*

GJSFR-H Classification : FOR Code: 310199



Strictly as per the compliance and regulations of :



The Effect of Modern Technology on Traditional Architectural Expression: Case of Old Calabar Architecture

Mbina, Anthony Adomi ^α, Edem, Ephraim E ^σ & Otto, Nnah Udosen ^ρ

Abstract- Recently, there has been serious concern expressed over the fact that traditional architecture's language, its system of representation and indeed, its technology are excluded from the industrial future and hence from training, due to modern technology. Consequent upon this, the immense capital know – how held by building – related craft-trades, is disparaged as a pre- industrial and historical phenomenon and, as such banned from technical training and economic practice and retained merely as a subject for archaeology and arts and craft history courses. Thus, we are faced with a scandalous reduction in the productive capacities of society as a whole and with the radical impoverishment of basic democratic choices relating to vocations and trades and, generally, with the means of human self –expression. This study, therefore, seeks to establish the authenticity or otherwise of these allegations against modern technology. In doing this, a careful study was made of the developments in architecture with respect to its historical antecedents, specifically from the pre- World War 2 to the modern architectural era, 1945 till date. Findings from the study, however, show that, to a reasonable extent, the allegations are true. Recommendations have, therefore, been made in order to ensure the enhancement of the future survival of traditional architecture and the crafts that gave birth to it.

Keywords: *modern technology; art; traditional architecture; architectural expression; old calabar.*

I. INTRODUCTION

Traditional architecture is not something that can be acquired once and for all. It is transmitted from individual to individual and its quality varies greatly with each generation. It can disintegrate suddenly after attaining great heights or it can flourish extraordinarily in a few years after a period of general decadence. Like all living organisms, it finds itself in a permanent process of reconstruction (Krier, 1998).

Its present penury is not fatal and does not justify universal refection. Its very decadence creates the conditions necessary to clarify its causes and to prepare for an improvement. However, architecture found its

highest expression in the Classical orders. A legion of geniuses could not improve them any more than they could improve the human body or its skeleton. Karl – Friedrich Schinkel drew the attention of his age to the fact that progress in architecture had been so great in the past that only the most trained eye could detect any improvement in the Classical orders.

Traditional architecture remains a living language, although many architects have lost the will to learn its grammar and use its vocabulary. Past and present crises have neither eroded nor polluted the traditional language; its rules, meanings, inventories and vocabularies are merely temporarily veiled in confusion. The transfer of its knowledge and its know – how has suffered a brutal interruption.

The resurgence of traditional architecture makes sense only in a broad context of planning and modernizing cities, villages and countryside. It has continued to serve in all ages and under different political regimes; there is no reason why this should not be the case in the future. Towns and buildings in this style can be adapted with imagination and elegance to the changing needs of advanced and democratic industrial societies – as was the case with nineteenth century railway stations.

There is no practical or philosophical reason for imposing modernist solutions when traditional methods have proved their superiority on a financial, technical, typological and aesthetic basis.

Traditional architecture produces objects of long-term use that differ from modernism's objects of immediate consumption. It is for this reason that traditional architecture's principles, its forms and techniques resist fashion for, to paraphrase Hannah Arendt, no public space or collective culture is possible without the potential immortality of our buildings and cities. There is no short – term wisdom. Without such material and moral immortality, architecture could not aspire to be a civic art, a tool of prime importance for civilization.

II. CONCEPT OF MODERNITY

Etymologically speaking, one can identify three basic levels of meaning accorded to the word “modern”. In the first and oldest sense it means present, or current,

Author α: Department of Architecture, Faculty of Environmental Studies, University of Uyo, Uyo, Nigeria.
e-mail: tonymbina@yahoo.com.

Author σ: Department of Architecture, Faculty of Environmental Studies, University of Uyo, Uyo, Nigeria.

Author ρ: Akwa Savings & Loans, Ltd. Uyo, Nigeria.

implying as its opposite the notion of earlier, of what is past. The term modern was employed in this sense as far back as the Middle Ages. A second meaning of the word is the new, as opposed to the old. Here the term modern is used to describe a present time that is experienced as a period, and which possesses certain specific features that distinguish it from previous periods.

It was this sense of the term that began to prevail in the seventeenth century. During the course of the nineteenth century yet a third level of meaning became important. The notion of modern then acquired the connotation of what is momentary, of the transient, with its opposite notion no longer being a clearly defined past but rather an indeterminate eternity.

The current, the new and the transient all three of these levels of meaning refer to peculiar importance that is ascribed to the present in the concept of modernity. Modernity is what gives the present the specific quality that makes it different from the past and points the way toward the future. Modernity is also described as being a break with tradition and as typifying everything that rejects the inheritance of the past.

Modernity is constantly in conflict with tradition, elevating the struggle for change to the status of purveyor of meaning par excellence (Krier, 1998). Already in the eighteenth century modernity was thus a condition that could not be pinned down to a fixed set of attributes. It was in the nineteenth century that modernization also gained ground in the economic and political fields. With industrialization, political upheavals, and increasing urbanization, modernity becomes far more than just an intellectual concept. In the urban environment, in changing living conditions, and in everyday reality, the break with the established values and certainties of the tradition could be both seen and felt. The modern became visible on very many different levels. In this respect distinctions should be drawn among modernization, modernity and modernism.

The term modernization is used to describe the process of social development, the main features of which are technological advances and industrialization, urbanization and population explosions, the rise of bureaucracy and increasingly powerful national states, an enormous expansion of mass communication systems, democratization and an expanding (capitalist) world market.

Modernity refers to the typical features of modern times and to the way that these are experienced by the individual. Modernity stands for attitude toward life that is associated with a continuous process of evolution and transformation, with an orientation toward a future that will be different from the past and from the present. The experience of modernity provokes response in the form of cultural tendencies and artistic

movements. Some of those that proclaim themselves as being in sympathy with the orientation towards the future and the desire for progress are specifically given the name modernism. In its broadest sense, according to Krier (1998), the word can be understood as the generic term for those theoretical and artistic ideas about modernity that aim to enable men and women to assume control over the changes that are taking place in a world by which they too are changed.

a) *Emergence of Modern Technology*

In the eighteenth century, modern technology, the practical incarnation of science, was born. First, in England and then across Europe, the Industrial Revolution took hold. The machine age began as man discovered his strength need no longer be that of his arm alone nor his speed that of feet. Factories and railways filled out the net of knowledge which science had cast over the landscape.

Rural areas became depopulated as the peasantry abandoned the land to become the urban proletariat. The idea of the machine, a mute, efficient man made realization of the external laws of science, became the dominant idea in the European mind. Machines promoted efficiency which created wealth in one vast impersonal mechanism known as technology, which became the ultimate, unarguable assertion of science's one big claim: "it works".

b) *Technology and Architectural Expressions*

The most important antagonism which exists in architecture today is not between tradition and modernism but between traditional culture and its caricature. The construction industry has almost universally replaced:

- (a) load-bearing building techniques by the separation of the load-bearing structure from the external facing;
- (b) natural building materials by artificial substitutes.

The reduction of external walls into simple screens, tiny but continuous differential movements between skeleton and skin, and the replacement of natural materials by materials of inferior quality have resulted not only in modernist – looking but also in traditional-looking buildings that are both fragile and vulnerable with limited lifespans and high maintenance costs. They often transform traditional-looking buildings into authentic fakes, resulting almost always in postmodernist or traditionalist kitsch (Krier, 1998).

There is therefore an ontological rupture between appearance and reality. The typological, morphological and tectonic depth of traditional architecture has been replaced by a surface depth. Traditional building techniques and natural materials are indispensable to ensure structural, architectural and aesthetic integrity. The slightly higher investment is generally vindicated by increased durability, reduced

maintenance costs and a more pleasing and, overall, better building.

III. THEORETICAL FRAMEWORK

This study is posited on the concept that modernism needs to co-exist with the traditional architectural language, its system of representation and its technology. About half a century ago, modernist movements claimed to have the definitive solutions to all the problems of the built environment. Today, one truth is evident, without traditional landscapes, cities and values, our environment would be a nightmare on a global scale. Modernism represents the negation of all that makes architecture useful: no roofs, no load-bearing walls, no columns, no arches, no vertical windows, no streets, no squares, no privacy, no grandeur, no decoration, no craftsmen, no history and no tradition.

Today, fifty years of modernism and thirty centuries of traditional architecture can be compared and judged. Infact, the public will accept any city plan and skyline provided that its architecture is traditional. The eradication of the teaching of traditional architecture has not succeeded in eliminating the demand and need for traditional architecture nor its worldwide practice. For three generations now modernist denunciations have merely succeeded in excluding traditional architecture from public commissions and have thereby brought it to its poorest level of expression in history.

IV. STUDY AREA

'Old Calabar' refers to a region that lies in the South South part of Nigeria along the coastal region off the Gulf of Guinea. Presently, Calabar is the capital city of Cross River State of Nigeria and is located on latitude 04° 57, North of Equator and 08° 19, E of Greenwich meridian. The city of Calabar is located on a peninsula between the Calabar and the Great Kwa River some 50 km distance from the coastline. There are no records on the founding of the town, but it appears that there were several autonomous settlements (Fig. 1) populated by different ethnic groups (the Efuts, Quas and Akims) on the territory of the present Calabar municipality (Old, Duke and Henshaw towns), in present Calabar South Local Government Area. First documents report on regular trading activities in 1688, when two English traders were killed (NCMM 1986, Tesco 1972). In colonial times, Calabar became the site of the headquarters of the Oil River Protectorate.

By Nigerian standards Old Calabar can be considered an 'ancient city' that had served as a port, a Presbyterian missionary base, a cultural centre for the Efik people, an educational place, and temporally also as the capital of Nigeria (Ajato, 1970). The importance of the city is reflected in a popular saying: "Who is tired of Calabar is tired of life".

The ruling castes were the Efiks in Old Calabar with a legal system that was closely interwoven with the social and political structure. Unlike the Yoruba or certain tribes in Northern Nigeria, the Efiks were described as simple acephalous by anthropologists. That means that they don't have a clearly designated leader or central authority in their political organization. Even today the cultural traditions of the Efik is still alive in parts, and include certain burial rites, masquerades, secret cults, the seclusion of girls for training (ufoknkoho) and coronation ceremonies. The more wealthy and influential Efiks used to live in palace-like houses or in large compounds on prime sites, protected by special guards. The homesteads, including servants and slaves, could reach several hundred persons.

The climate of the area is hot and humid, having heavy rainfall all the year round. The mean monthly rainfall is about 300mm in some areas and more than 450mm in some other areas. The months of July and August usually have the heaviest rainfall though sometimes there may be a break in the middle of the month of August. The heavy rainfall has been attributed to the nearness of the area to the sea and Cameroon Mountains which gives it a micro-climate of its own different from some other areas in the same geographical zone. In order to be able to ventilate the rooms which were always many in a family compound, courtyards had to be introduced. An example of a typical family compounds is shown in figure 2.

The compound may have up to 8 small courtyards and one big courtyard serve the function of letting in cold air into the interior spaces. These courtyards were also able to light spaces which would otherwise have been totally dark. Although there were small courtyards, they were very effective for the purpose for which they were meant, namely lighting and ventilation.

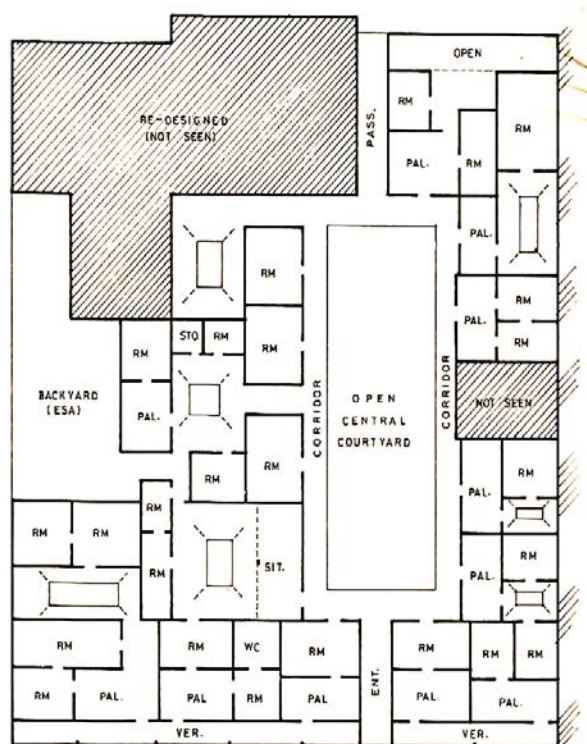


Figure 2: Typical Family Compound

and habitable. Few building materials used today as roof covering have the ability to absorb the heat of the sun as much as thatch.



Figure 3 : Thatch Roof

being very cheap and affordable by all. This made it a more suitable material than any other for making the walls of buildings. In the swamps where mud was not available or not suitable for building work, timber got from mangrove trees and other trees were used instead. This gave the architecture of the riverine areas a slightly different kind of character different from that found in the hinterland.

It is believed that the idea of having courtyards originated from the concept of centre which has certain religious connotations (Aniakor, 1995). The concept of

centre is believed to have been influenced by the religious beliefs of the people. According to this reasoning, the courtyard is the centre of the peoples' universe and is likened to the heart which is located at the centre of the most vital organs of the body. In much the same way the courtyard is placed at the centre of the compound. In a village set-up the most important activities of the people took place at the centre of the village: the market place, the ancestral grove ("akai") and the village square or dance square ("ufetmbre"). The centre always had religious connotations for the Africans in general. For this reason a courtyard was necessary at the centre of the compound to provide a place for keeping the ancestral shrine ("usanabasi"), which was an object of worship of ancestral spirits or deities.

V. ARCHITECTURE OF OLD CALABAR

The architectural history of Old Calabar can be divided in three periods: pre-colonial (period of unification); fragmentation (missionary period) and colonial (period of colonization), (Mbina, 1999).

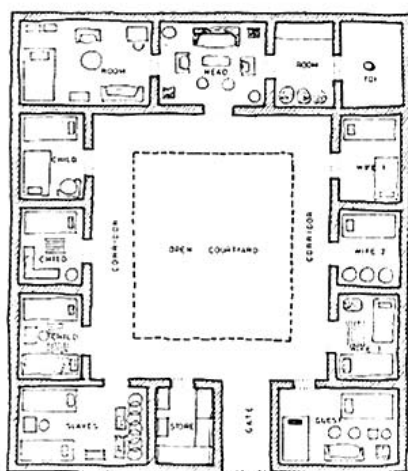


Figure 4 : Single Courtyard House

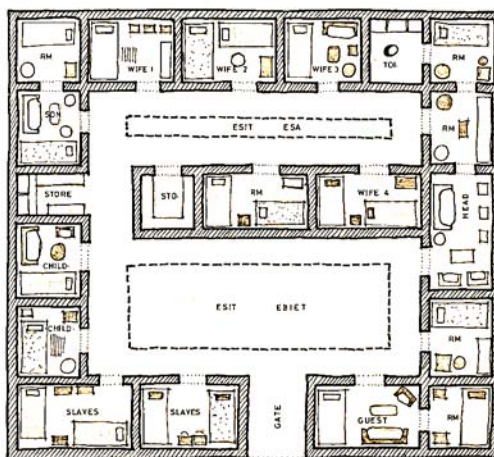


Figure 5 : Double Courtyard House

The number of rooms and the size of the dwelling varied according to the wealth of the family. In some cases, houses had more than one courtyard (Fig.6). In fact, the multi-courtyard house was an outstanding architectural feature of Old Calabar. It permitted that different kind of domestic activities such as cooking; bathing children, receiving visitors, family entertainment, etc. could take place simultaneously in different parts of the compound. Efik houses in Old Calabar generally had an unpretentious character when viewed from the street and apart from the main entrance normally no windows or other openings interrupted the external walls. The local customs foresaw that private activities were not to be seen in public. The building materials that were utilized in the making of the indigenous house were derived from the local

a) The pre-colonial period

This time span, also identified as period of unification, lasted from the time of the first Efik settlements in the Calabar peninsula to the early 17th century, when no permanent trade links existed with other continents. The architecture of this period was dictated by the locally available materials, basically earth, timber and thatch.

The settlement pattern in Old Calabar was made up of large, but compact compounds. The house of the chief stood in the centre of the compound, surrounded by those of his wives, dependent relatives, and servants. This house type usually had a central court (akwaesa) which was surrounded by deep verandas (peristyle) in front of the adjacent rooms. The shaded veranda served for sitting during family and house meetings and other social gatherings (Fig. 5). Also an altar used to be contained in the central courtyard area; it was dedicated to the 'true god' (usanabasi).

environment. None was imported or transported from another region. Everything was obtained from the same locality and so have local names some of which are difficult to interpret correctly.

A detail of the structural framework of the roof and wall of the indigenous house for landed settlements shows that the local people had a technique of construction which agrees with the basic principles of construction in the modern times. A timber beam known as *ibatai* runs along the length of a typical verandah supporting bamboo rafters known as *ntong*. This beam itself is supported by a timber column known as *abai*. The beam and rafter in turn support the purlin-like members known as *ndumia* which carries the roof covering. The roof covering is made of thatch (*nkenya*) prepared from raffia palm leaves knitted together with

special strips of raffia palm stem known as *ndubongas* shown in fig. 3.

The ceiling was made of specially prepared thatch which was sometimes made to be very decorative. The supports for the ceiling were bamboo stems drilled into the wall at strategic locations.

As regards the wall structure, the main components were *ndumia*, *mboi* and *mkpana* earlier described in this discourse. *Ndumia* are connected to the *abai* by special sting known as *nyang* earlier described above while the horizontal members known as *ndumia* are connected to the vertical members known as *mboi* by tying them together using *idid* (string from raffia palm).

b) Period of Fragmentation

The first phase of this period was marked by the end of slave trading around 1650. At this time, the Efik people, traditionally farmers and fishermen began to engage in large scale and distant trading. A mercantile class emerged who broke with customary family formations and incorporated all kinds of people – sometimes even strangers – in their compounds in order to gather more labour force (i.e. for oil production) and to compete better with other traders (Nair, 1972). Eventually the term *ekpuk* (lineage) even disappeared from Efik vocabulary. It was replaced by *ufok* (house) since the members of the compound were not

Architecturally the new social composition of the compounds was reflected by the fragmentation of large

building complexes into several independent smaller ones. The affinity to the compound head was often broken up with his death, particularly as a result of 'witch hunting' among family members.

Although no Europeans lived permanently in Old Calabar before the installation of the Presbyterian mission in 1846, several influential Efik chiefs had already acquired and erected prefabricated two-storey timber houses imported from Europe (Mbina, 1994). Rivalries among local politicians, trade barons and others caused violent fights which in the end led to the destruction of Old Calabar in the 1760s.

c) The colonial period

As a political strategy, the British refused to export their newly constructed industrial machinery to Africa until around 1891 (Nair, 1972). Only then appeared a number of dispersed factory buildings along the Calabar river; the first of them named South Sea, Matilda, Ivy, Millerio. Communication between the factories was by ship since there was no adequate road network. However, further communication between the factories and the individual customers on the compounds had to rely on narrow, steep and muddy footpaths. The first permanent houses of Europeans were built near the beach between 1884 and 1909 (Tesco, 1972). Many of them were prefabricated and had been shipped from Britain. Typical examples of them include the Old Residence, and the Saint Margaret Hospital (fig.7 and fig.8).

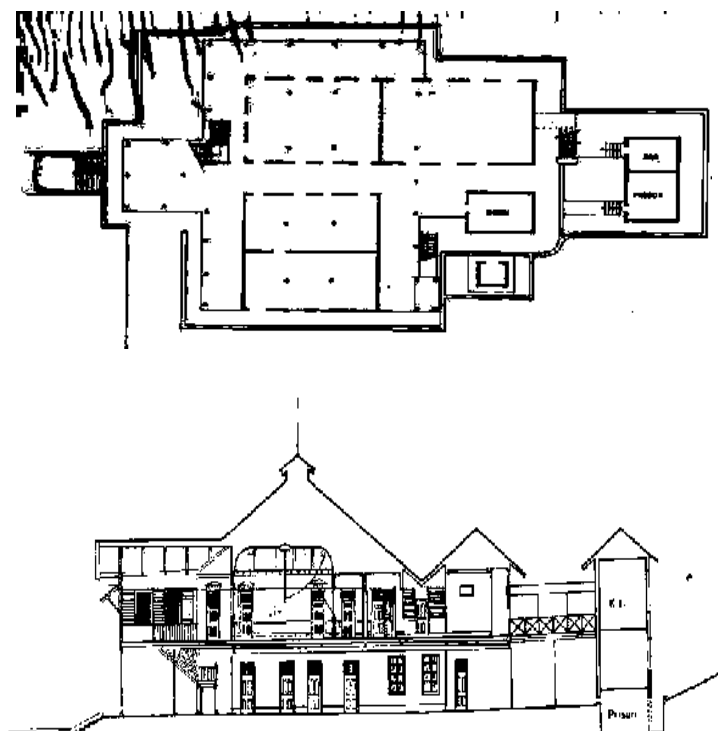




Figure 6 : Old Residency (Ground Floor Plan, section & Elevation)



Figure 7 : Saint Margaret Hospital

VI. RESEARCH METHOD

This research was aimed at determining the extent to which modern technology has affected the art of traditional architectural expression with particular reference to Old Calabar traditional architecture. Visits were made particularly to local communities, parks, public and private buildings with questionnaires to see and acquire firsthand knowledge of the situation.

Questionnaires, interview schedule and field surveys were used as data collection instruments. Twenty five questionnaires were distributed and only eighteen persons responded. The data collected from the respondents were presented in tabular format. The data were analyzed by comparing responses with the actual situation on ground. Questions and the responses were grouped and presented according to the specific objectives they were set to achieve, and the questions were structured in open and closed ended format but were basically centred on the influences of modern technology on the traditional architectural concept, materials used, technological skill in the construction methods, etc.

Field surveys of specific buildings were made. These included pre-colonial buildings whose designs, construction methods and materials used were mainly indigenous. Others included buildings of post-colonial era where the design concepts, construction methods and materials used were foreign to the communities under study.

VII. FINDINGS

While modern technology may be flawed, either from a nationalistic or socio-cultural or whatever point of view, it nonetheless served the purpose of the modern times admirably. It suitably adapts environmentally and meets the requirements of firmness, commodity and delight, especially within the limits of material resources.

The construction materials have moved from walls made of earth (cob or adobe construction) to more sophisticated materials like sandcrete blocks, bricks and even reinforced concrete and from roofs of vegetable matter to those with metals. Though windows are still of wooden panels, it is not strange to come across glass panes. However, the most significant evidence of such change, vis-à-vis door and windows, relates to their size. Unlike what obtained in traditional models, it is no longer necessary to stoop to access a vernacular building and windows are no longer slits (Edem, 2010).

In its architectural transformations, not only the overall character of buildings has been affected, the expected gradual change has also impinged on space – use, for example, the absorption of outdoor activities (traditionally associated with either the courtyard or ancillary structures) into the main building. As such, it is commonplace to see people cook in the spacious corridor of a typical vernacular model. This shift from outdoor to indoor might perhaps be connected to the corresponding arrangements in the western archetypes where buildings have kitchen, laundry and general

service quarters either semi – detached from, or only tenuously linked to the main building. In both cases the service spaces were always relegated to the back of the house and were always less pretentious in architectural articulation.

With the advent of the functionalist – rationalist approach to design of the 'Modern Movement' and modern technology, these spaces gradually became integrated into the general living quarters. Not only did they come under the same roof, they have been given an appreciated status, by appropriately spatially relating them to other spaces within the main building, whose functions they complement.

From the point of view of enduring Nigerian folk building practices, modern technology has played a signal role; the legacies of the phenomenon have served as stylistic inspiration over the years, successfully generating popular archetypes the local people are at home with, physically and socio-culturally. Transformation of the original model (traditional) has resulted, in a large measure, in widely accepted vernacular architecture of the Nigerian masses, particularly the Efiks.

Another significant area of transformation was the general configuration of the house. A typical Old Calabar compound was a sprawling, rectangular mass, with the centre perforated by a sizeable courtyard. With visible examples of more 'rational' house layouts (in line with modern architecture), a more compact house type (with discrete units) evolved, predicated on vernacular practices. The courtyard style was progressively eliminated, giving rise instead to an exaggerated central (double – loaded) corridor. Whereas the Old Calabar indigenous house was inward – looking (with activities focused on the centralized courtyard), today's vernacular model provides a general interaction space at two levels:

- i. At the semi – public levels that is, the front verandah (that abutts a public thoroughfare) and
- ii. At the semi – private level, that is, the corridor and verandah behind the house, that lead to the outhouses.

VIII. RECOMMENDATION

Economic considerations, as well as cultural and climatic factors, underscore the need to develop indigenous building technology to meet modern needs. The courtyard compound and subsequent open plan houses surrounding the courtyard make movement and ventilation in the house easier than does the modern plan which is very rigid. The choice of materials and thermal functions such as cooling also play a role. The traditional adobe structure and pliable roofing materials keep the house cool, but nothing can be more miserable than the heat of the day in aluminum – roofed house without air conditioning. On the other hand, poor

energy supply and lack of resources make the cost of cooling by air conditioning very expensive. So, it is important to seek building materials other than brick and aluminum. This raises the question of how indigenous traditional architecture can cope with the construction of houses that use expensive imported materials.

However, in most advanced industrial countries such as Germany and Italy it is no longer conceivable to promote industrial development to the detriment of craft. The co-existence of these two production methods and ways of thinking is now largely recognized as an absolute necessity for a modern economy.

On the architectural level, however, strong ideologically motivated resistance to this co-existence persists. Balanced development requires a profound change in mentality and the abandonment of outdated creeds that remain anchored in an industrial and collectivist teleology. It must be remembered that in the genesis of artistic and architectural modernism, the founding myths were established in a complex break with the past. The rest were pronounced pre-history. Some events and some works were elevated to the rank of paradigms for a new humanity, for a necessarily all – industrial modernity. Anything that does not go with the mainstream of this sectarian vision of modernity is disqualified as historic, late and superseded.

IX. CONCLUSION

No doubt, many Nigerians, informed by nationalistic sentiments, would want the curtain permanently drawn on the nation's colonial part – regardless of the legacies of this past. This paper views that as throwing away the baby with the bath water. It is an unchangeable fact of human existence that the history of a people directly affects their present, and informs their preparations for tomorrow. At the very worst, modern technological heritage deserves commendation, at least, for its varied built cape. Above all, it has been established that in a subtle way, modern technology impacts positively on the people every day. It has informed and will continue to inform the local interpretation of space and use of materials and techniques. This alone should be reason enough for appreciating modern technology and conceding some recognition to it.

REFERENCES RÉFÉRENCES REFERENCIAS

1. Ajato, A. (1970) Nigerian States: Focus on the South Eastern States of Nigeria. Vol. 1.No. 1.
2. Aniakor, C. (1995) The Adaptive Potentials of Nigerian Indigenous Architecture and Building. USO: Nigerian Journal of Art. Vol. 1 No.1 Lagos.
3. Edem, E. E. (2010) Architecture in Ibibioland: in Search of Style for Documentation of a People's Material Culture. A Ph. D. Thesis.Unpublished, Abia State University, Uturu.

4. Heynen, H. (1999): Architecture and Modernity. A Critique MIT Press, London.
5. Krier, I. (1998) Architecture Choice or Fate. Andreas PAPADAKIS Publishers, London.
6. Mbina, A. A. (2013) Traditional House Form in Old Calabar (Efik Land) – The People and Architecture. LAMBERT Academic Publication, Germany.
7. Mbina, A. A. (1994). The Architecture of Old Calabar, Nigeria. TRILOG 42,
8. NCMM (ed), (1986). The Story of Old Calabar. A Guide to the National Museum at the Old Presidency, Calabar: National Commission for the Museums and Monuments.
9. Nair, K.K. (1972) Politics and Society in South Eastern Nigeria, 1841 – 1896. London: Frank Cass.
10. Tesco, K. (1972) Survey and Development Plan for Calabar, Nigeria.

