British Journal of Environmental Sciences
Vol.2, No.1, pp. 9-20, March 2014
Published by European Centre for Research Training and Development UK (www.ea-journals.org)

ENVIRONMENT AND ADAPTATION IN ARCHITECTURE PLANNING AND BUILDING DESIGNS; LESSON FROM THE FOREST REGION OF WEST AFRICA

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ABSTRACT: *In many regions of the world, the natural environment is sometimes severe. Consequently, many methods of adapting architecture to the natural environment are usually provided by man. Traditional architecture is one of these methods. Various types of these traditional architectural designs are found in West Africa. There are, for example, one-room designs with common toilets, common source of water, sanitation and other facilities. There are also group houses and compounds the characteristics of which reflect the traditions of the various tribes and their family life. Many of the architectural design of these houses reflect the significance of the environment and indicate the need to take advantage of the traditional architecture in modern architecture. In spite of the significance of traditional architecture, particularly for adapting to the environment, not much has been done to examine the characteristics and the need to take the advantage of traditional architecture in modern architecture. This is for example the case in West Africa where, even in rural areas, the present day architecture have done a lot to alienate traditional cultures in designs, and eliminate local skills, making the local artisans obsolete. Also, most available studies and books discuss mainly modern architecture to the neglect of traditional architecture. Thus, "environmental decay" has been increasing at an alarming rate, and the "abuse of the environment" has become responsible for a lot of major ecological imbalances. With modern architecture, and the orientation of development towards the Western model, as well as the neglect of the concept of traditional architecture which, in many cases, is in harmony with nature, and with little emphasis on indigenous resources makes the concept of housing for all a mirage. Thus, the need to create 'model' architecture with improved housing facilities using local resources and involving community participation with strong motivation cannot be over-emphasized. In doing this, the first step of a good knowledge of the 'concept' and characteristics of traditional architecture is essential. Thus, there is an urgent need to have information on the characteristics and usefulness of traditional architecture. This need is of interest to this book, the purpose of which is to document the characteristics of traditional architecture. The study illustrates these characteristics by using major tribes in West Africa.*

***KEYWORD*: Environment, Adaptation, Architecture, Building Design, West Africa**

INTRODUCTION

With the rapid growth of Third World towns and cities, there have been huge accompanying environmental problems, the growth of subserviced self-help housing on marginal land being only one among them (Akinluyi & Adedokun, 2014). Hardoy *et al.* (1992) however, comment that if one could map such problems in any given city, they would strongly coincide with the

poor areas. The impacts of climate change on the environment are actually the visible indicators or evidence of its esistence in any locality. (Odjugo, 2010). Ahmad and Almad, (2000), IPCC, (2001), NEXT, (2003) and Hengeveld et al.(2005) provided indicators that one could use to assess the evidence of climate change in a region. These include increasing temperature, increase in evapotranspiration, decreasing rainfall amounts in the continental interiors,increasing rainfall in the coastal areas, increasing disrucption in climate patterns and increasing frequency and intensity of unusual or extreme weather related events. Basically; there are five major ecological zones in West Africa. (Fig. 1). These include the forests, guinea savanna, sudan savanna, sahel savanna and semi-arid zone. The study illustrates the characteristics and uses of traditional architecture in the forest region of West Africa by examining traditional architecture among the Yorubas, the Ibos, and the Bamilekes for the forest region. There are however overlaps in the characteristics of traditional architecture in these areas. Aspects of these overlaps are discussed in this study. No doubt, traditional architecture has over the years displayed technological developments among the various tribes and these have been used to find solutions to environmental problems. Such technological developments have been discussed in this book, in addition to other characteristics of architecture of the various tribes.

For most part of the tropics, traditional architecture is basically found in rural housing, although some aspects of them occur along the fringes of the urban centres. In these areas as in many parts of the world, the functions of housing include privacy and safe storage of possessions. The relevance of these functions and other issues in traditional architecture are emphasized in this region.

Among the other issues of significance in traditional architecture emphasized in the book are:

(a) the different styles which are peculiar to the different tribes and characteristics of the different cultures.
(b) the environmental affinity, available reserves and skills, providing labour, which are law-cost.
(c) the traditional practice of consideration for the local climatic conditions and for social preferences, and the use of the locally available raw materials.
(d) the characteristics of the different home-building activities, utilizing local technology and artisans
(e) the adverse impacts of modem architecture, including the neglect of low cost indigenous materials, which are often treated as of inferior quality.
(f) the environmental compability of materials, which overtook the problem of skilled workers and artisans migrating from the rural areas, resulting in the loss of the craftsmanship because traditional architecture and house building, have been marginalized.
(g) the dependence or reliance on expensive ways of housing and on jobs in urban centres to provide the means of livelihood, in contrast to the use of the low-cost local resources of the rural areas.

The study also emphasizes the need to reverse the trends of relegating traditional architecture, and integrate the good qualities of traditional architecture into modern architecture. Thus, the book emphasizes the need to promote traditional architecture with the purpose of:

(a) developing the spirit of self-help and community participation
(b) promoting self confidence in, and respect for traditional skills, and promoting the organizational and the cultural ability of the people;
(c) restoring respect for traditional architecture;

(d) controlling urban migration and increasing development in rural areas;
(e) fostering the use of traditional building materials based on local resources, and thus, synthesizing the use of local materials into modem architecture.

The study thus provides an excellent treatise on the need to use traditional architecture to make a healthy and economic use of the living space, promoting locally available materials and working through community cooperation. It tries to discuss the "living traditional architecture".

THE STUDY AREAS

West Africa is one of the major geographical regions of Africa, bounded in the south and west by the Atlantic Ocean. (Fig.2). Politically, the Republic of the Cameroons is usually regarded as the eastern bouindary. However, because of the strong affinity of this country with West Africa in general and Nigeria in particular, this study assumes that culturally, the peoples of the Cameroons have a lot in common with the other peoples of West Africa, particularly as 11w as architecture study is concerned.

Several fundamental differences exist between the north and south in respect of the physical environment and the cultural practices, both of which have significantly influenced traditional architecture. For example, the south is characterized by relatively heavy rainfall usually more than 1.00cm while rainfall in the north is less than 1.00cm. (Fig.3). Also, the south is mainly composed of forests while the north is savanna. Different tribes also have different cultures although, a lot of these cultures have some historical anticedents which have had significant impacts on their traditional architecture. The need for defence has influence on most of traditional architectural practices among many tribes.

For this study, the tribes used include (a) the Yorubas of western Nigeria, (flg.4) (b) the Ibos of southeastern Nigeria and (c) the Bamilekes of the south-western Cameroon highlands.

TRIBES OF THE FOREST REGION

The Yorubas

The Yorubas are one of the principal tribes in Nigeria occupying the south-western part of the country within the tropical rainforest. Their land is of the most densely populated of Nigeria, with population densities usually more than 50km2. The land consists of(a) the Plateau of Yorubaland (Fig.5) (b)) the lower Niger area and (c) the western coastal lowlands. The climate is tropical with annual rainfall of about 130-180 cm and relatively high humidity of over 6O-80% throughout the year. The mean temperature is also high, usually more than 25°C. Maximum temperatures are usually more than 30°C while minimum temperatures are between 21°-25°C (Table 1). The tropical rainforests near the coast generally give way to the Guinea Savanna to the northern parts of the region.

A lot of the environmental differences are reflected in the mode of life of the Yorubas. They are also reflected in the economy. The average Yoruba man is either a farmer, trader, an artisan or a professional. He settles in a village or town. The people have generally been living in large urban

and rural communities for centuries and are well known for their peculiar social-cultural amenities. Urbanization found nowhere else in tropical Africa (fig.6) is prevalent and the urban population represents more than 40% of the total population of the area. They usually live in compounds occupied by members of the same family and lineage. Thus, the Yoruba compound (Fig.7) is a physical expression of the genealogy traced from the ancestor. It is usually of rectangular construction made up of one-storeyed buildings enclosing an open space. Two or more storeyed buildings are signs of foreign affluence. They are highly industrious, and they build dwellings that accommodate some of their indoor activities. They house their gods, which they worship with reference in their houses, because of the belief that the gods hold the trust for protection and prosperity.

The Ibos

The Ibos occupy the tropical rainforest belt of the east-central region of Nigeria (Fig.8) characterized by dense scattered village settlements traced to a common ancestor. In this area, sandy soils derived from sedimentary rocks, well suited to oil palms are in abundance. The population of each village sometimes reaches 10,000 or more and some of the heavily settled areas have, suffered from a lot of flooding and soil erosion. The escarpment to the east side of the Udi Plateau, is for example, deeply eroded and has a number of gullies. Coarse sediments, eroded out of the hillsides, usually accumulate on the floors of nearby valleys, blocking tributary streams to form small lakes. The temperatures are usually high throughout the year with mean maximum usually more than 25°C and mean minimum between 24°C and 25°C. The rainfall is also high usually between 150 cm and 250 cm.

The typical village in the Ibo kind is composed of family units, with each unit living in a compound. The ways of the people and their living patterns constitute their rural economy. Besides the common language of the people, the extended family is a respected, perceived and powerful factor in the lives of the people. Religion is also part of the people's culture, and generally, the Ibos believe in one supreme God, and a host of other minor gods and spirits.

The Bamilekes

The Bamileke settlements are scattered about in small groups within the forested areas, (Fig.9) at the lower levels of the mountain region of western Cameroon. The environment is a typically beautiful open country on volcanic hills, rising to more than 2000m with bamboo forests on the hig1r peaks, fine waterfalls, and neatly built villages, sheltering alongside forest remnants in the valley heads. The rainfall is generally high (about 150cm to 200cm) with mean temperatures usually more than 25°C.

The Bamileke house serves the architectural functions of sheltering security and privacy within. Due to the abundance of rainfall with the subsequent grass and bamboo vegetation, materials which include bamboo, mud, stones and thatch arc available for housing construction.

CHARACTERISTICS OF TRADITIONAL ARCHITECTURE

The Yorubas

The Yorubas build courtyard architecture (Fig. 7). The basic form is cuboidal with a rectangular impluvial courtyard, placed in the rectilinear compound. A typical compound has only a single entrance (*enu ilo, ilo*) into the compound which leads to the colonnaded courtyard. The rooms are rectangular or square and arranged in a linear pattern to surround the courtyard which acts as the centre of activities or point of focus.

The household head occupies the room near the entry gate to provide surveillance and security. The tribe shows hierarchy from the oldest to youngest. Sometimes two rooms (with one serving as visitor's room) are provided. The older boys occupy the corner rooms because the rooms are bigger than the other rooms which are allocated to the wives and their children. These rooms have small windows and doors, which open to the verandah and the immediate courtyard.
The corridors of the Yoruba houses run through the inner periphery of the building and enclose the compound in a unifying manner. These architectural characteristics are an excellent solution for air circulation within the compound. The spatial flow of the corridors is very well defined by the columns, while the roots which overhang above the corridors tend to reduce the glare from the sun. The colonnaded corridor (*oode, odede*) allow for visual continuity (defensible space, harmony, surveillance in the adjoining courtyard, while the courtyard is an active social space for commerce, recreation and domestic chores through which members of the family come together. Thus, the corridor represents a strong physical and social centre in inter-family relationship within the strong kinship system.

The spatial arrangement of the rooms in hierarchical order between husband, wives and children is a reinforcement of close family ties, and represents a physical expression of genealogy, traced from a common ancestor.

The head being the decision-maker, bears the risks of the compound, and can be likened to an entrepreneur in a business venture. He has his room placed close to the entrance gate for control and restriction of movement in and out of the compound. He is regarded as the first and most important person in the compound; hence his room is first approached. The entertainment room is located close to the head of the family's room. This is to allow for easy access by the bead, and to keep visitors within the front portion of the compound for reasons of privacy.

The interplay of forms that are related perceptually, also defines a uni1ving relationship. For example, the relationships of the size of the rooms to the courtyard arid the courtyard to the whole compound connate a sense of visual unity. Consequently, a sense of unity is created by the courtyard space for ceremonial activities as it links the members of the household as they come together as ox in this courtyard. Activities are usually distinctly separated. Thus one can identify the front and some part of the back as dwelling/sleeping areas, while in the rear are concentrated domestic arid household activities such as cooking and bathing. The housing organizations simply illustrate the architecture as radiating spatial and orderly arrangements of function and spaces.

In the socio-cultural context of the corridor and courtyard the primary mode of achieving adaptability and functionality is through the placement of internal furnishing, which allows the space to be utilized for a variety of activities ranging from meeting, relaxation to cooking. This adaptability in architectural form helps to accommodate varying social needs. The core space of the courtyard thus enhances the interaction and sense of unity of the people, which further reinforces the respect and cultural values they have for one another. The basic geometry adopted by the Yorubas in traditional architecture is a manifestation and a good marriage of culture and architecture. Most compounds have wells for domestic water, while recreational activities provide I other social events.

The Ibos

The Ibo build huts of rectangular units of clay (mud) and thatch, both of which are obtained from the environment. Before building a new compound, a man plants stick of the 'Ogilisi' tree, which grows in front of the house and is called "*Ani-eze*"? The three represents the owner's dead father. Also, in the centre of the compound is the '*egbo'* tree, which is called *Chukwu* (god). This, together with the shrines in the compound represents the Ibo man's religious peculiarity. The compound is surrounded by a well - about 2-3m in height. The front section of the wall has an entrance with a door. Huts are built individually around the head of the family's hut (*Obi*), in a cluster, while ensuring safe distance amongst the other huts for privacy, lighting and ventilation. The family head's hut is unique and contains his weapons, treasures, implements and gods.

The villages and the surroundings were harmonious and perfect in their proportions. Everything was inspired by a certain orderliness. The peasants in the settlements made full use of what nature provide them. There are abundant supplies of wood, stones and clay and these are used in developing and giving definition to their environment.

Most people are involved in the erection of their own buildings and labour is drawn from friends and relations. This considerately reduce costs of construction. The walls are usually of clay or with wooden framework in the wattle and daub system. Some construct single room huts with closely packed upright logs. The intervening spaces in between serve for ventilation. Puddled clay is usually used for the best houses. The construction work is begun after the rains with puddling of the mud by stamping it under the feet to the right textural consistency. The tasks are clearly marked out and shared amongst the men and the boys — to cut the clay to size, to carry these to the site, to excavate the foundations and to build.

The walls of a small house sometimes take some weeks to build if the weather is unfavourable because the clay, laid in courses, and each course being 25-40cm must be given enough tune to harden, lest the wet clay slides down as a result of its own weight. Wails are dressed with a sharp cutlass, before the wal1 become too hard. Where rainfall is very heavy, palms leaves are used for roofing because the run-off is faster on palm leaves than on thatch. Thus, the roofs made of palm leaves with high pitch are able to drain off the rainwater more easily. The mud walls are kept low and the roof overhang the wall, thereby providing protection for the walls.

The connection between the environment and religion in Iboland was very strong and was borne out by several cultural facts; the local deities being mostly associated with physical and natural

features such as land, rocks and hills, rivers, trees and bushes, etc. The nature of the environment was, therefore, total in scope, extending beyond their known physical world and embracing the world of the spirits.

From the open spaces to the horizon a progression of green belt linked in the most dramatic and articulate manner to some landscape features, a hillock, a river or a vast wall of green; some of these features were not intended for man but for the supernatural beings and were, therefore, to be appreciated and contemplated from a distance and not to be profaned by intimate approach. Very old *iroko* trees with ritual and mystical contents gave grace, a sense of stability and direction to the complex network of the foot-tracks. These footpaths were of primary importance to the people; they were seen and understood in the content of the region and it tradition. They bore, not only close, but definite relationships to the sacred surroundings, merging and fitting themselves into the landscape.

Generally, the landscape is sufficiently integrated, varied and exciting to give pleasure and relief to the man travelling on foot. To go from a point on an ecological corridor to another is to go through series of experiences.

Natural features such as topography, the use of trees as focal point in the open spaces, and the use of rock and earth mound formations in the landscape were seen as symbols of existence. To exist and to continue to exist has always been the cherished hope of the people; therefore, each settlement sought a symbol of its own existence, a centre on which to focus life. While the village square remained the hub of communal life, the Ibo market is an institution, which articulates the dimensions of space and time. These open spaces are devoted to specific local gods which act as the guardian spirits, and which have to be appeased from time to time with food and drink offerings.

The Bamileke

A Bamileke compound is usually a large one (Fig. 9). The chiefs houses being the first to be in the village is at the rear. As time goes on, each adult builds his/her own house. Most Bamileke houses are of single rooms.

The layout of a Bamileke village can be divided into three sections, namely, the fore, centre and the rear. The entrance into the village, market place, some community houses, ancestors' statues, ancestral sculls or houses for sacrifice and the guard's house are all in the fore section of the village. The men's houses and those of their families together with granaries for food stuff and properties, are all scattered to both the right and left of the village, along the main pathways in the centre of the village, with the visitor's quarters located in-between them. The rear section where the large pathway from the main entrance ends, is comprised mainly of the chief's houses, some community houses and ceremonial houses.

The Bamileke family generally consists of the man as the head of the family, and his wives numbered up to four or more for those that really cherish large family and those that later embraced the Islamic life. There are usually as many houses as the wives and more in certain cases where already grown-up children, live separately. The family is closely knitted up, bound

by some ancestro-religious teaching or cultural norms. The husband is the head, the wives are the aids, and the children participate freely within the family.

There is a great tendency among the I3amilekes to live in separate and defined communities. Hence, they have numerous settlements in their region. These communities evoke a strong intra-communal links, morally and physically.

There is also a devote respect for privacy within the family group while maintaining unreserved intimacy within the community. The logic of this is expressed in their dwelling units.

In a Bamileke village the land is allocated to each family, which then decides on how to organize the spaces. A homestead can be on a piece of land, which may be up to an acre. The man's house being the largest in the family may be four or more metres square while the wives' houses/rooms are smaller. The homestead also includes the granaries where foodstuff, and other properties are kept. Their major architectural form is a very large cone like pyramid, capping a small rectangular or cylindrical prism. The forms though beautiful have a too bogous and massive roof structures on the small cylindrical or rectangular prism giving a visitor an astonishing and awesome visual perception.

A critical looks at these buildings with their massive roof structures over the small building walls beneath them makes one to wonder the significance or architectural concept behind them. Looking at the building, one is quickly reminded of a young mushroom; therefore one can again safely say that the Bamilekes probably got their inspiration or concept from a young mushroom.

The Bamilekes build their dwellings making use of wood, mud, grass, stones, etc. The method of their wall construction is wattle and daub. Walls of bamboo or raffia palm fronds daubed with mud are first erected. Later a roof platform on which the constructed roof trusses are made on the floor, before being lifted up on to the top of the standing walls. It is upon this that the roof trusses are built (Fig. 10).

After the roof trusses have been built on the platform, a thick layer of grasses is thatched on them giving a conical or pyramidal shaped roof structures. Whereas each building is generally about four metres square (or more for the men and the chiefs houses) the diameter of the roof base can double this size or can be more, to provide an external shade shelter during hot days. For prestige reasons, the buildings at times do rest on a platform of stones faced with bamboos.

Bamileke people also make use of mud bricks with bamboo to construct the walls. Their doors are small while in most cases, there are no windows. This is to prevent flies from entering the house.The Bamilekes worship their ancestors and for this, they need privacy. To them privacy is as important as food and the adored prestige. The taller, mare beautiful and stronger a house, the mare the prestige of the owner of the houses.

ENVIRONMENTAL ADAPTABILITY

Many development countries are responsible to environmental concerned Sooners than industrial countries did at similar levels of development (Afzal, Mosood and Balakishan, 2010). Brand, (1994) uses the word Environment, to refer to the outside area of the building or the available and expected materials at the building surroundings. New technologies and the spreading knowledge about the impacts of the environmental degradation also mean that development countries can make better environmental choices (Afzal, Mosood and Balakishan, 2010).

Various definitions of adaptable architecture are used in literature, but coherence between these is lacking. Different connotations are given, which are related to different levels of adaptation. Dekker (2006) stated that interactivity is specially used as an indicator of change in an installation or environment that a person can enforce, taking into account the mechanical, physical and psychological implications. According to Edler (2006) dynamic architecture or structures adapt to the varying needs of the users, to changing environmental circumstances or to the designers desires and imaginations. The examples of the traditional architecture of the tribes used in this study exhibit some measure of adaptability to their environment, characterized by high insolation, relatively high rainfall (in the forest belt), high temperatures and generally high humidity. In general, the interactions between climate and traditional architecture can be related to materials. For example, the materials used are those easily available from the environment. As already noted, mud from the lateritic soils, and banco (a mixture of sand and clay) used by the Bamilekes are easily available and are an indication of the direct effects of climate, as this is an important factor of soils and vegetation. Also, wood, palm fronds and thatch materials are easily obtainable from the tropical rain forest, which are products of the climatic environment.

In turn, the characteristics of the local materials used significantly affect the climate of the built environment, especially the indoor climate. For example, the mud (a red-earth material), and baneo, are particularly good regulator of heat. They are materials with low thermal conductivity, which is an advantage in the hot humid region. The thatch materials allow air to penetrate the house slowly, thus, regulating the indoor climates. Climate also plays an important role during construction, which is usually in the dry season. The various shapes of the houses mostly circular for the Bamilekes and rectangular for the Yorubas also significantly affect climate. In the rectangular shape like the Yorubas or the prism shape of the Bamileke's, walls are protected by heavy roof over-hangs, thus keeping away the rain. In this regard, the corners of the rectangular houses are not exposed to be easily washed off by the heavy rain with the attendant weakening of the wall structure. The high pitch of the roof equally ensures that the torrential rain drains off fast; thereby preventing leakage through the thatch or at least reducing it to the barest minimum. Run-off water is easily collected in pots in the courtyard for domestic work.

AESTHETICS

Another connotation is given by Kronenburg (2002), in which the ultimate flexible interior may be one that is completely amorphous and transitional, changing shape, color, lighting levels, acoustic, temperature, as the inhabitants moves through it-abandoning flat horizontal surfaces and demarcations between hard and soft, warm and cold, wet and dry.

Aesthetically, the materials employed in construction create contrasts and harmony with the greens of the vegetation and the reddish-brown earth. The quality of Yoruba and Ibo courtyard spaces, the generosity of the forms and the effects created by light and ventilation reflect son measure of architectural success. The infill includes all finishing components of the interior of the building; examples of elements of this group are walls, floors and ceilings etc. This group includes also non-bearing walls. The interior parts were excluded from the infill. The term interior in this research means the added components which are used to decorate and inhabit the building. Elements of this category are products like chairs, desks, closets etc. Finishes like paint and carpet are included in this group, as these aspects belong to the decoration of a house which can be renewed rather easy. A lot of traditional architecture also has decorative motifs on the walls reflecting the arts, crafts and skills of the people all of which are fast fading with "modernity". The mush-room like structure of the Bamilekes with their heavy conical roofs are superbly elegant creating its own identity.

FUNCTIONALITY

Functionally, the traditional houses respond to their primary role to shelter man and adapt climatically to his environment. Adaption to climate change is the adjustment in natural or human system in response to actual or expected climatic stimuli or their effects (IPCC, 2001). Climate change adaptation aims at mitigating and developing appropriate coping measures to address the negative impacts of climate change on man, animals and the vegetation. (Odjugo, 2011). Adaptation to climate variability is not new, but climate change is expected to present heightened risk, new combination of risks and potentially grave consequences. (Odjugo, 2011). Adaptability to climate change will be of relatively lesser problems in the developed nations as a result of their high level of technological development and high per capital income (Odjugo, 2011). In general, active and passive spaces are created in the courtyard and terrace systems, allowing an array of activities to take place and taking advantage of climatic situation in different seasons of the year.

The courtyards and terraces are not only spaces of security and privacy within the immediate surroundings; they equally fulfill the need for ventilation, circulation and recreation (social service). The corridor of the Yoruba house, for example, is well ventilated and is used for both indoor and outdoor activities such as weaving, cooking, socialising and recreation. The corridor also, having encircled the courtyard is a good solution for air circulation problem within the compound. it also insulates the living areas from environmental hazards such as smoke, noise, direct rays of the sun and blight. The ceiling space of the Yoruba houses, apart from its good thermal conductivity is a functional storage space.

CONCLUSION

The above analysis of the traditional architecture among the various tribes discussed in this study show a lot of sensitivity to the climate in particular and the environment in general, a lot of which can be incorporated into modern planning and architecture. As already noted, for example, the courtyard in the residential layout of the Yorubas has an insulation property from

environmental hazards, such as smoke and noise from other places, and from direct rays of the sun arid blight, which is also, true of the Bamileke house. Functionally too, the corridor, which is better ventilated than Liz, rooms, is used for indoor activities such as weaving, cooking, socialising arid recreation. Also, the corridor having encircled the courtyard is a good solution for air circulation problem with the compound, while the use of local materials is a good tradition that can be incorporated into modem architecture. This is for example true of the mud materials, used for the wall plane and which is a good insulator in the hot humid region. The type of ceiling space (*aja*), apart from its good thermal conductivity is a functional storage space. The high pitch roof allows torrential rain of the tropics to nm-off that, thereby preventing leakage through the thatch, or at least reducing it to the barest minimum. Run-off water is equally collected in pots in the courtyard for domestic work.

The materials employed by various tribes are in general, obtained at no cost, indicating affordability by most people. No doubt, further research into the properties and uses of these materials would yield high dividend in the provision of shelter for the poor.

Today's city planning and architecture causes a host of problems such as indifference, lack of community interest and insensitivity towards natural process. Feeling part of a neighbourhood requires knowing one's neighbours and being able to communicate horizontally. Concern is therefore expressed today about the deterioration in the quality of the rural environment especially in those areas where the rural peasants have tlir homes. Open spaces are no longer seen to flow and express community ideals. Before, the rural peasant had a sense of belonging, such that the group is an extension of him and an extension of the group. Residents now find it more difficult than ever before to feel their neighbourhood because the open space organism has lost its primitive linkage concept.
Modern planning, either gridiron, linear and radiocentric plans with the imposed automobile has consequently destroyed the communal sense. Open spaces, which do not progress sequentially and hierarchically, are bound to be static and of little or no significance to the peasant community in the new layout schemes; spaces within settlement groupings ought to be revealed as a chain of events or expectations.

In the past, open spaces increased progressively in size; importance, complexity arid meaning, until one encountered the principal (overwhelming) space - e.g. the community shrine, the village square or market. The main objective of this space chain was to create optical progressions and to dramatize the new layout of people and activities for a social experience. Such ideas and ideals can be incorporated into modem architecture and planning.

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