

**TECHNICAL KNOW-HOW IN THE INDIGENOUS KNOWLEDGE
SYSTEM UNDERLYING BATAMMARIBA TRADITIONAL
ARCHITECTURE IN TOGO AND BENIN**

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ABSTRACT

The desire to revitalise indigenous architecture and the built environment through socio-cultural, political and bio-physical relevance has created a strong need for the understanding of cultures and traditional built environments, especially in the developing countries.

This study aims to fill the gap in understanding indigenous knowledge in relation to the production and maintenance of traditional architecture and settlements. This can be achieved by examining how such knowledge is depicted and communicated by the traditional master builder in the absence of written language; as well as exploring the forms, quantities and measurements, structural processes, thermal control and waterproofing systems used by the builders, and ecological resource management.

The methodology used in this study emanates from the perspective of social anthropology. It includes informal interviews with local informants, participatory observation and reading, and interpreting written documentation of the Batammariba people and their indigenous knowledge systems. Information regarding prevailing technical know-how is obtained through investigations into readily observable facts and a comparative analysis of structure, context and style. It emphasises the importance of process rituals, building processes and technology, and an analysis of architecture in the context of both everyday use and special events.

Findings of this study revealed that the works of Batammariba builders demonstrated structural stability, consistency in form, quantities and measurements, site layouts and resource choices in their traditional buildings and settlements. Furthermore the study substantiated the coding and sharing of such know-how in the absence of a written knowledge system. It therefore demonstrated that there is an unlimited reservoir of aesthetic, technical and conceptual wisdom locked up in the minds of traditional builders in Africa.

The synthetic process so characteristic of the work of the great master builders of yesterday should be the answer to present day architectural problems. The present day generation of master builders all over Batammariiland consists of a group of intelligent and active craftsmen, who are capable of adopting indigenous technology to modern needs if given an opportunity. The future generation of architects has much to learn from both past and present day traditional builders.

The study also suggests a wide range of possible strategies to mainstream technical know-how of indigenous knowledge systems, as well as improve the way in which traditional indigenous architecture is synthesized in contemporary.

DECLARATION

I declare that this thesis is my own, unaided work and carried out exclusively by me under the supervision of Emeritus Professor Ambrose Adeyemi Adebayo. It is being submitted for the degree of Doctor of Philosophy in Architecture in the University of KwaZulu-Natal. It has not been submitted before for any degree or examination in any other University.

.....

Philippe Yavo

.....Day of.....Year.....

DEDICATION

To my lovely children

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ABBREVIATIONS

- **(AF)** Alliance Française
- **(APIK)** Association for the Promotion of Indigenous Knowledge
(Ethiopia)
- **(ARCIK)** African Resource Centre for Indigenous Knowledge (Nigeria)
- **(BARCIK)** Bangladesh Resource Centre for Indigenous Knowledge
- **(BRARCIK)** Brazilian Resource Centre for Indigenous Knowledge
- **(BURCIK)** Burkina Faso Resource Centre for Indigenous Knowledge
- **(CARICKS)** Centre for Advanced Research on Indigenous Knowledge
Systems (India)
- **(CCF)** Centre Culturel Français in Togo
- **(CIAV)** International Centre Vernacular Architecture
- **(CIKARD)** Centre for Indigenous Knowledge for Agriculture and Rural
Development (United States)

- **(CSIR)** Council for Scientific and Industrial Research (South Africa)
- **(CTK)** Centre for Traditional Knowledge (Canada)
- **(EAMAU)** School of Architecture and Planning in Lomé -Togo
- **(ELLRIK)** Elliniko Resource Centre for Indigenous Knowledge (Greece)
- **(GHARCIK)** Ghana Resource Centre for Indigenous Knowledge
- **(ICOMOS)** International Council on Monuments and Sites
- **(IFAS)** Institut Français de l'Afrique du Sud in Johannesburg
- **(IKS)** Indigenous Knowledge System
- **(ITK)** Indigenous Technical Knowledge
- **(IASTE)** International Association Study Traditional Environments
- **(ILO)** International Labour Organisation
- **(INTBAU)** International Network for Traditional Building, Architecture & Urbanism
- **(KENRIK)** Kenya Resource Centre for Indigenous Knowledge
- **(KEPDA)** Kenya Economic Pastoralist Development Association
- **(LIAD)** The International Fund for Agricultural Development

- **(MARCIK)** Madagascar Resource Centre for Indigenous Knowledge
- **(NIRCIK)** Nigerian Centre for Indigenous Knowledge
- **(NGO)** Non-Governmental Organisation
- **(SARCIK)** South African Resource Centre for Indigenous Knowledge
- **(UNESCO)** United Nations for Education, Scientific, and Cultural Organisation
- **(UNDP)** United Nations Development Programme
- **(WB)** World Bank
- **(WHC)** World Heritage Centre
- **(YORCIK)** Yoruba Resource Centre for Indigenous Knowledge (Nigeria)
- **(ZIRCIK)** Zimbabwe Resource Centre for Indigenous Knowledge

BATAMMARIBA ARCHITECTURAL TERMS

Geometrical terminology

- **Budo:** survey
- **Budotommu:** quantities
- **Budwammu:** measurements
- **Budwanomu:** scale
- **Bufitetye:** height
- **Bukambambu:** width
- **Bukudwommu:** length
- **Bukwammu:** parallel, equal (the ears of a donkey)
- **Bulatia:** small and round
- **Bunotida:** heaviness
- **Bunangetibu:** waist, the waist level used in measurement
- **Bupei:** large and round
- **Bupia:** short and thickset (said of columns)
- **Busotie:** symmetry and asymmetry
- **Butatie:** broad and thin
- **Butientetie:** loose in socket

- **Butera:** flabby
- **Butien:** softness
- **Buwennimu:** medium size, middle course
- **Debide:** forms
- **Deki:** knee measurement
- **Dekiari:** rectangle
- **Dekiaribide:** rectangular form
- **Deyabide:** triangle
- **Dibani:** angle
- **Dibiangiri:** edge
- **Dibo:** face
- **Didokwo:** corner
- **Dieme:** side
- **Dikon:** alcove
- **Dibobide:** space composition
- **Dibodonni:** triangular lot
- **Dibowanni:** a trapezoidal plot
- **Didou:** tiny pieces
- **Dipatiri:** long and thick
- **Diyenta:** square hut or plot

- **Dompwo:** massive and strong
- **Dori:** huge, massive
- **Fakunnafa:** medium, moderate
- **Fapwenfa:** thin, slender and weak
- **Fawosofa:** tall and big
- **Fahanfa:** slender, weak
- **Fabundemfa:** stride
- **Fabannofa:** parallel, side by side
- **Fakotofa:** too large to enter a hole, a door etc
- **Febipyefa:** a rope for setting out circular huts, a mathematical compass
- **Febonnafa:** emphasising hugeness of a house (hideous)
- **Feditidafe:** small and good looking
- **Femonkufe:** cute, tidy piece of workmanship
- **Kasubu:** emphasising straightness, rectilinearity and uprightness
- **Katenga yama:** emphasising completeness, fullness or finality
- **Kayu nate:** the wall has developed hooks
- **Kubiku:** orderliness
- **Kudatidaku:** large and round
- **Kupiku:** how solid and good
- **Massotie:** span

- **Moupeyaii:** to arrange well
- **Mubinangkwo:** squat, too low for its area
- **Munanwommu:** distance of about 100 metres
- **Muse:** being long, narrow and thin
- **Mutan:** in large chunks
- **Mutien:** big and strong, tall and strong
- **Mutiummu:** sloping ground, an inclined lot
- **Mutiunummu:** huge (e.g. columns)
- **Muyan:** large and round (e.g. columns)
- **Mutwo:** emphasising solidity or thickness
- **Mutiemu:** too dominant
- **Mutiye:** tall and well formed
- **Nanti:** emphasising duplication
- **Napento:** puffiness of walls
- **Nkwa:** disproportionately high or tall
- **Nkwo:** distance of about thirty metres
- **Nugue:** rough to touch, rough finish of a wall
- **Onwonta:** huge (say of a room), any huge thing
- **Odadari:** cubit (45.4 - 55.5 cm), length of the arm
- **Okunte:** emphasising hugeness

- **Okuntuma:** chest
- **Owannu:** fine and delicate
- **Pakankuagu:** marking out the plan for a building on the ground
- **Pakampo:** the foot measure
- **Pakannda:** palm of the hand in measurement
- **Sankata:** map, plan, landscape
- **Sibokwo:** human height
- **Tanete:** circle
- **Yeyomante:** levelness
- **Yopeti:** proportionality, equilibrium and parity
- **Ywo:** emphasising smoothness
- **Zara:** emphasising twinness

Structural process terminology

1: Builder's tools and materials terms

- **Badabatomme:** ropes made of peel
- **Benotiebe:** a small axe used for fine work
- **Bwanwana:** rake of wood
- **Beri:** sand

- **Butwo:** pods of *iroko* tree (*Chlorophora excelsa*) used in floor finishing
- **Butommu:** machete for clearing construction sites
- **Dibbo:** egg shaped brick (see also *tabodi*)
- **Dibintandi:** stone or rock, also mountain
- **Diundwa:** an axe or hatchet used to cut pods
- **Fakunfa:** gravel
- **Febisofa:** wooden ladder
- **Katenga:** earth, soil, mud loam clay etc
- **Ketenge:** the earth
- **Kuandi:** bamboo
- **Kuddu:** beams used to support a weak roof
- **Kuiaku:** a grass mat used as door curtain
- **Kukari:** rope ladder used by builders
- **Kukiauku:** type of hoe used by earth diggers
- **Kumudiendu:** roof drain of metal, ceramic or wood
- **Kunonwogu:** anything lightweight
- **Kuperiku:** open drainage gutter
- **Kusotepereku:** limestone
- **Kutangu:** chain used for securing doors
- **Kutiempeti:** gravel used in floor making

- **Kutiegu:** chopped pieces of reinforcement
- **Kwiatanne:** making windows or doors in an existing building
- **Mupwo:** weaker upper part of palm used for making sprouts
- **Mukommu:** a cailcedrat (*Afzelia Africana*)-like shrub used for roofing
- **Mupwommu:** central stem of a palm branch used in panel infilling
- **Mubo:** the palm tree (*Erythrophleum africanum*)
- **Mukwammu:** an adze used in chipping surfaces to smoothen them
- **Mukwetimrnu:** (*Borus flabelliformis*) young palm or its leaves used to make mats or thatching
- **Mukondimmu:** (*Terminalia macroptera*) raffia palm used in building
- **Mukonkommu:** sticks used in reinforcement (*Sarcocephalus esculentus*)
- **Munangwetimu:** sorghum stalk used in construction
- **Musengu:** a local or imported trowel used by decorators
- **Mutieremmu:** straw
- **Munantommu:** lower part of raphia palm used for reinforcing mud house
- **Otammali:** a builder working with traditional materials and techniques
- **Otammalimwa:** chief builder or chief of builders
- **Otokwansi:** cement, sand/cement screed, cement plaster, grout
- **Odwate:** local carpentry, the carpenter
- **Sitapwonyi:** padlock

- **Sompukada:** an iron crow-bar used for breaking up rocks or hard ground
- **Tabetitianti:** door made of wood, corn stalk, sticks or palm stems
- **Tabodi:** spherical or conical mud brick
- **Tetaoti:** local cement; very complex mixture of organic and inorganic materials
- **Tasanta:** a key
- **Tapenta:** grass added to clay or mud to make *tabodi*
- **Tantiarandi:** a heavy adze for digging, breaking walls, levelling mounds
- **Tapeta:** a spade or shovel
- **Tapedeta:** screen mat for door ways
- **Titanti:** banco
- **Yabennaka:** a bamboo ladder
- **Yanta Yantandi:** large hammer with wood or metal handle

2: Dwelling terms

- **Bulaba:** structural behaviour
- **Buneipurummu:** structural stability
- **Bupenommu:** structural properties
- **Bupimu:** load
- **Butie:** weight
- **Butiesimmu:** compression

- **Butieye:** deflection
- **Deha:** (pl. *tahata*) hut, room, or chamber
- **Denitipotadu:** curvature
- **Diboritandi:** heavy
- **Didatientenni:** rectangular thatched house
- **Dideytabo:** earthen oven
- **Dikonri:** section of the turret where cattle are kept
- **Dibbo:** granary
- **Didantiri:** latrine, lavatory
- **Dikwimponni:** the entrance hall of a tata
- **Fepampiefe:** a porch, especially in front of an entrance
- **Imago mundi:** building
- **Kudiegu:** the ground floor
- **Kufati:** cemeteries
- **Kedege:** three stones forming a cooking place
- **Katesinge:** a cooking shed made of forked sticks and roofed with thatch
- **Kubokanko:** a house with no privacy from the external view
- **Lilaboni:** foundations
- **Likeni:** small groves
- **Liaku:** kitchen, a hut for cooking

- **Libo**: miniature shrine
- **Liboli**: different tomb
- **Mubamu**: grass fence around a compound
- **Mubinonkwo**: fence of a compound
- **Muanuan**: the façade of a house
- **Mueotie**: an inherited compound
- **Mundi**: structure
- **Obouta**: process
- **Otau**: latrine, bathroom
- **Pakpantiamra**: wall of a compound
- **Pika**: circular building with mud roof
- **Pakanntiammu**: upper storey
- **Pakannkoue**: inner room, especially in women's apartment
- **Pakanntia**: back door, postern
- **Sikuntine**: bathroom, earthen bed
- **Taonta**: emphasising stability of a structure
- **Tadoukota**: the upper floor
- **Tafonkienta**: a hut of grass or stalks
- **Takuntisanta**: the inner side of a tata
- **Tatenti kyenta**: a roofed shelter

- **Tayemkyenta:** circular hut with a thatched roof
- **Tabati:** a store
- **Tabofwonta:** bedroom, a hut for sleeping
- **Takiensinta:** storey building
- **Tadakienkienta:** a detached compound (a bachelor house)
- **Tapa:** compound enclosure
- **Tataebwolota:** construction process ceremony
- **Tedante:** the boundary between properties
- **Tekienkote:** the apartment of the householder in a compound

3: Elements of dwelling terms

- **Babokwatibi:** granary climbing plant
- **Badowembe:** earthwork
- **Banitikifie:** place of the dead
- **Bunamunye:** jawbone of the cattle room
- **Bupe:** drainage dwell
- **Bulo:** underworld spirits
- **Bwadamrnu:** a niche, an alcove
- **Dikimpwo:** portal decoration
- **Demandibe:** wall of a hut, wall of any kind
- **Didikanontiau:** low level back door to a dwelling

- **Didori:** the centre of a circular hut
- **Ditiyareya:** clay pillar for an earthen bed
- **Diwadonni:** low mud platform at the door of a compound where people sit
- **Dikwannu:** a corbel
- **Dinan:** oval arched window or door
- **Dikoto:** raised platform
- **Dukuanjonni:** door, doorway, gateway
- **Falotinonfa:** wall eyes
- **Fatofakofe:** fireplace support
- **Famalifa:** horizontal building levels
- **Fabafa:** wooden picket
- **Faluafa:** echo
- **Fediafe:** top of a roof or of thatch
- **Great:** *mwa*
- **Iwangani:** entrance passage
- **Kalaka:** fireplace
- **Kunakwanku:** house entrance
- **Kulotinku:** female joining wall
- **Kulotilaku:** male joining wall
- **Kuminlo:** beam ends
- **Kubokaku:** granary top
- **Kulieku:** sleeping room
- **Kunamonku:** cattle room

- **Kunamonca:** path of the cattle room
- **Kunadakoua:** masonry
- **Kunanfon:** cattle room needing light
- **Kulotilakukufan:** male joining wall needing light
- **Kulotinikukufan:** female joining wall needing light
- **Kuconlaloku:** steep place for bathing
- **Kunoku:** resonance
- **Kumonku:** terrace
- **Kumudienku:** pottery drainage spouts
- **Kumaliku:** roofing
- **Kufati:** cemeteries
- **Kuperiku:** terrain of land
- **Kupaku:** fields
- **Kubotan:** circular stone
- **Kufiku:** flat-roofed shelter
- **Kuminlo:** beam
- **Kucuku:** circular building
- **Kupon:** gods of geomancy
- **Kuiye:** solar deity
- **Kua:** killed
- **Kedeke:** engaged column
- **Kukufonti:** door step
- **Kumadwoku:** a horizontal band around a building, lit. a belt

- **Kuman:** raised ground for directing flow of rain water in a compound
- **Kumondo:** a lintel
- **Kunnanjoti:** a rung, step, stair
- **Kuobeni:** stairway of a storey building
- **Kupedengu:** a partition within a room for privacy
- **Kupan:** lower part of a hut
- **Kupapagu:** forked stick for making sheds
- **Kubono:** stairs, steps
- **Kudotidaku:** raised ground after crossing the doorway of house
- **Kufigu:** roof drain for flat mud roof
- **Kukiendiekou:** decorative protrusions on the walls of granaries or huts
- **Kunantankwa:** josting beam
- **Kupuntampungu:** beam at corner of the room as support for saddle
- **Kustnsingu:** a type of window, also a door latch
- **Libo:** sacred power
- **Libolaku:** male granary
- **Liboli:** doorway
- **Liboloni:** resting place, shrine
- **Liboniku:** female granary
- **Libonu:** granary entrance
- **Libotolaku:** male granary support
- **Libotoniku:** female granary support
- **Liha:** auxiliary room

- **Lihakukufan:** auxiliary room needing light
- **Likatili:** small markets
- **Likeni:** small groves
- **Lilaboni:** foundations
- **Linakwanyeni:** entrance horns
- **Linanku:** lower back terrace
- **Lisan:** forked post
- **Lisenpo:** mound
- **Litokale:** kitchen
- **Litokalekukufan:** kitchen support needing light
- **Litowa:** cleared yard
- **Liwani:** cleared area
- **Liwatali:** door sill
- **Liyifuaboto:** columns
- **Liyuani:** soul
- **Mufonpei:** alcove inside a hut
- **Mukommu:** balustrades, vertical screens of reinforced mud
- **Mukwummu:** window slits on the wall, a window
- **Mumutirnu:** hole under clay bed for heating fire
- **Munamunimvomon:** a dias, a mound on which wares are displayed
- **Mupolenieru:** counterfeit beam
- **Mutummu:** European-type windows
- **Okoti:** elder

- **Otababo:** apprentice
- **Otammali:** architects, engineer
- **Otammalimwa:** master architect
- **Oyinkakwata:** sky god
- **Silica:** fest of the horns
- **Taboluta:** granary handle
- **Tabote:** house hole
- **Tafonta:** basketry fishing trap
- **Takuetute:** smoke oven
- **Tamunkakukufan:** darkened corner of a hidden place
- **Tamuntamiaka:** hidden place
- **Tatumpete:** division wall
- **Tanata:** stars
- **Titati:** ball of wet earth
- **Tiyabaminlo:** ancestral beam
- **Tiyati:** sky
- **Uba:** ancestral sponsor

4: Language of technical appraisal

- **Bobiangu:** heat
- **Busiemu:** decoration, adornment

- **Buwentetie:** lustre
- **Bu yo:** what a muddle! Said of poor workmanship
- **Dibodwonni:** mistake in workmanship
- **Dideyitandi:** of exotic beauty
- **Didu:** arrange symmetrically
- **Die:** reliability
- **Dieyentera:** negative criticism
- **Diffontikan:** humps on wall
- **Diffontiri:** indolence, laziness
- **Diffwoni:** emphasising permanence of a structure
- **Dikan:** leakage in continuous streams
- **Dikoetera:** hooklike, said of a bent wall
- **Ditiyobi:** hot
- **Dou:** crazy man's design
- **Dukoto:** emphasising intricacy, complexity
- **Ekienkienmuta:** climate
- **Fabonnafa:** long lasting, permanent
- **Fan:** diligence, intelligence
- **Fasefa:** dry

- **Fawonfa:** usefulness, utility
- **Febife:** beautiful small features, small and neatly built
- **Fediafe:** to make well, a building for example
- **Fedotifa:** that which delights the eyes, beauty
- **Fokonfe:** waviness of a wall
- **Femmofe:** buckling of structure under load, a sign of failure
- **Ketenge yege:** inimitable, said of a difficult feat
- **Kounigu:** excellence, pleasantness
- **Kuangu:** muddle up, spoil a work
- **Kubodaku:** haste, eagerness to complete a task
- **Kubonon:** arrange well, compose patterns
- **Kubooku:** modesty
- **Kudu:** radiance
- **Kudukukwantedu:** firmly embedded
- **Kukantanbiku:** emphasising clarity, boldness etc.
- **Kukukwo:** distinct, clear
- **Kukwo:** steadfastness in working
- **Kumondo:** wavelike, undulating
- **Kunanangu:** connotation of delicacy
- **Kuniengu:** connotation of unobtrusiveness

- **Kunitidadwoti:** of poor quality
- **Kuniti yuku:** correction, criticism
- **Kupagu:** leakage that drops one drop at a time drop
- **Kupaku:** parallel
- **Kupapagu:** to fortify, to improve the quality of something
- **Kuperigu:** hump, bump on a wall
- **Kutamma:** sign of deterioration in buildings as a result of weather
- **Kutangu:** a craftsman who handles a large number of tasks at the same time
- **Kutengu:** scattered about, disorderly
- **Kuti-Kuti:** emphasising lack of pinnacles on a house
- **Kutuku:** pleasant to look at, surprisingly good
- **Kuyentioka:** a master piece
- **Kuyasoku:** one by one, orderly composition
- **Kuyoku:** widely spread out
- **Kuyokukube:** a collapsed wall
- **Kuyongu:** patience
- **Kwandi:** bend as of fault
- **Ma tie:** perseverance, energy
- **Muau:** prominence
- **Mufimu:** opening out of a wall

- **Mutedyemou:** leak that lets water trickle along the wall
- **Muturummu:** monumentality
- **Muwendimmu:** obedience, compliance
- **Muya pedummu:** lack of skills
- **Nati:** perception, intuition
- **N'kwa:** pleasant looking
- **Nyama:** majesty, great size
- **Oa me yon:** muddled up, disorderly work
- **Okwato:** angular in shape
- **Okwatikenga ya:** said of a building that needs frequent repairs
- **Okwenni:** glitter
- **Onitidita:** misalignment, slant
- **Opankota:** what a badly fitting thatch, too small for the hut
- **Opei:** putting too much decoration on a facade
- **Otato:** emphasising fitness or appropriateness
- **Owankira:** waterproofing
- **Sakata:** sublimity
- **Sampafa:** to make pleasant
- **Sin:** beautifully clear
- **Tamienta:** thick and clumsy, bad construction

- **Ta'onta:** to invent, to create
- **Tammabudata:** season
- **Tanota:** twisting or bending of wall
- **Tayota:** luminosity
- **Tekwanyoti:** continuous leakage in a roof
- **Tinienti:** leakage causing water to drip from roof
- **Wara tanto:** dampness seeping through a floor
- **Yanon:** contemplation, concentration
- **Yekonkonsanka:** intentional delay by a craftsman
- **Ymuti:** dampness on wall

General terminology

- **Baboyama:** religious master, chief priest
- **Babwotwota otanti:** ritual, alteration of altar.
- **Batammariba:** inhabitants of the Koutammakou
- **Batammaliba, Bétammaribè, Somba, Tammariba, Tamberma:** other names
- **Badonge:** owner, patron
- **Bakwantedieta:** construction ritual
- **Bana:** millet beer also called *chapalo*
- **Banikuba:** leader

- **Banitidieba:** magicians, wizards
- **Bari:** to guard, watch
- **Batatiba:** twins
- **Bateni:** second day of the week
- **Bayopianna:** first ceremony of millet beer
- **Beanripetibe:** caste, social group
- **Bebakwennibe:** young, initiated
- **Bedatiynbe:** initiated
- **Bedi:** plant ashes
- **Bedore:** to arrange, to purify
- **Bedwaniba:** girls' body marks
- **Bedyebe:** powerful clairvoyant
- **Beffona:** end of the festivity, end of the rain
- **Berifiba teyota:** importance of building process
- **Bekenti:** harvest, crop (fonio, millet)
- **Bekiyribe ou Betiyribe:** *mana*, indigenous beliefs
- **Bekonima:** left hand
- **Bekotibe:** (pl.) old (sing. *okoti*)
- **Bekvvanribe:** (pl.) powerful, dominant, great (sing. *okwanri*)
- **Bekwintibe:** caste after circumcision

- **Bekwamipainbe**: old, circumcised
- **Bekwenni**: weak, fragile
- **Bekwentikotebe**: newly circumcised
- **Benumbe**: strangers, aliens, outsiders, visitors
- **Benyomie**: reptile
- **Bepeibe**: (pl.) the Whites, Europeans (sing. *opei*).
- **Bepia**: ritual of repair, refurbishment, renovation, restoration
- **Betienmu yebodwo**: putting in place the ancestors' altars
- **Betunti muti**: burn of straw
- **Bewanribe**: those from the East
- **Beyingede**: the heavens, the paradise, the nice, the blameless
- **Bini**: water well, spring
- **Bobiangu**: genuineness
- **Bokyon somu**: black ants' attack
- **Botanli**: sanctuary of a divinity
- **Bubokommu**: poisonous shrub
- **Butan**: goddess of the earth
- **Dadwonna**: village, settlement
- **Decimpo**: altars of the forebears
- **Dibo**: mind or supernatural strength embodied

- **Difuani:** boys' initiation
- **Dinaba:** mythical place of the origin of the Batammariba
- **Dikuntri:** girls' or women's initiation
- **Ditammari:** language spoken by the Batammariba
- **Fawaafa:** eponymous snake of the clan
- **Fediti:** cowry
- **Kapwen:** authenticity
- **Katenyeka:** priest of the earth
- **Kuye:** God
- **Koutammakou:** territory occupied by the Batammariba
- **Linaba, Dinaba:** first Batammariba village
- **Likantri:** march, stride, step
- **Litakon:** goddess of twins or fertility
- **Okoti:** an adult, an old person
- **Otammari:** singular of Batammariba
- **Passanta:** family chief
- **Tadonta:** red skin
- **Takienta** or **Tata:** residence, building (plural: *Sikien*)
- **Tekiente kobe:** family house
- **Tammari:** derivative adjective of Batammariba

Maintenance, Decoration and Materials

- **Baciriba:** seaming a rib, bringing out the features of the rib
- **Bana:** emphasising whiteness
- **Banya:** portal decoration, façade decoration
- **Bakotieburiba:** residue of *karite*
- **Bayoma:** sediment of dye pits used in wall and roof waterproofing
- **Bukwammu:** green
- **Bulaba:** chalk made from bones used as white paint
- **Bunangetibu:** silt from river beds used as roof finish
- **Buneipurummu:** vegetable-based blue paint
- **Bupia:** light coloured earth used in glazing pots and wall decoration
- **Bupimu:** coarse-ground floor, unfinished floor
- **Dabila:** dark, clay soil used in finishing
- **Dibodonni:** hair from tannery used in mixing plaster
- **Difuani:** decorator
- **Ditouperi:** wall finish made from black clay and straw
- **Ditolebili:** a skirting at roof level or in the middle
- **Diyete:** decoration, pattern composing, drawing
- **Duwakiri:** glossiness

- **Fabenfe:** making patterns on the plaster
- **Febemfe:** emphasising lustre or lightening
- **Ihonni:** emphasising blackness
- **Ikua:** roots of a wild vine used in water proofing café
- **Ipie:** old indigo liquid used as a mix for plaster
- **Isoge:** husks of the locust bean used in floor or roof finishing
- **Kayuu:** silt precipitate used as plaster
- **Kudengu:** kaolin, white clay
- **Kunadakua:** plastering
- **Muwemmu:** aluminium paint
- **Munantiar:** fumigation
- **Nkoti:** variety of colours
- **Nyabi:** smooth plastering, without pattern or texture
- **Oboya:** lustrous paint produced from mica
- **Okuenti:** emphasising lustre
- **Omani:** bluish colour
- **Onetietangu:** emphasising deceitful luminosity
- **Onopi:** wall finish made from stems and roots of twining plant
- **Opankota:** grey, ashy colour
- **Opon:** brown, colour of earth

- **Oseyeku:** yellow
- **Owente:** antimony, used as blue paint
- **Tadonta:** reddish clay, used as paint
- **Taonta:** stems of tobacco plant placed among pole and mat to prevent denudation by white ants
- **Takuata:** red clay soil used in decoration
- **Takwonta:** decorative motifs
- **Tadiete:** emphasising whiteness, snow white
- **Tatutatadota:** termite hill or ant hill
- **Tayonta:** blue, dark blue
- **Tekunte:** laterite
- **Tinanti:** hue colour
- **Tiwampete:** emphasising the unauthentic thing
- **Trinditi:** zig-zag in a decoration
- **Yopetotera:** horizontal band around the middle of a chamber

Ecological terminology

- **Bukwa:** trees
- **Butenia:** baobab fruit juice
- **Butwo:** *iroko* (*Chlorophora excelsa*)

- **Dibeketadu:** production
- **Dibodinu:** entrance of tata
- **Diduri:** plot
- **Dikon:** to use
- **Ikula:** open space, a clearing in the bush
- **Impurima:** land
- **Iwage:** snake of productivity
- **Katenga ya:** sustainability
- **Ketenge winni:** local environmental action
- **Ketenge ye:** land tenure systems
- **Kunammonku:** environment
- **Kutiauku:** to protect
- **Kutokannaku:** to grow
- **Mukwentimmu:** materials
- **Menakwa:** plants
- **Mumfwo:** *kapokier Shea (Butyrospermum parkii)*
- **Munuhan:** *néré tree (Parkia biglobosa)*
- **Mutammu:** *karite (Parkii butyrospermum)*
- **Mutudimmu:** *baobab tree (Adansonia digitata)*
- **Okun:** local

- **Okunta:** river
- **Sikyon:** resource
- **Tabota:** ecology
- **Tabwota:** exploitation
- **Takunga:** over-exploitation
- **Tebote:** management systems
- **Yakan:** abuse, misuse, mistreatment
- **Yeyo:** millet

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND STATEMENT

The making of the traditional built environment entailed an integrated knowledge system. However, since most of that knowledge has not been written down, it is rapidly disappearing. It is also not clear how such knowledge can be interpreted for progressive learning and enrichment. In order to interrogate this question, this study explores the traditional architecture of an ethnic group in West Africa, called Batammariba.

Adebayo (2001) corroborated in a significant paper that “sustainable construction has not received sufficient attention in Africa even though it is an important aspect of sustainable development”. Given the contemporary global paradigm shift towards sustainable development in the 21st century, there is growing interest in promoting indigenous skills and knowledge in a variety of areas such as agriculture, medicine, property development and socio-political structures and systems.

Although anthropological and archaeological studies have been conducted amongst the Batammariba, none of these have investigated the technical approaches used in the indigenous knowledge system to produce and maintain their traditional architecture. As a result this critical dimension has been neglected and undervalued. The recognition of indigenous knowledge as a field of study

facilitates analytical studies on indigenous architecture with a view to identifying the knowledge structures which sustain its construction and maintenance.

This study therefore examines attributes of Batammariba architecture such as material performance, resource utilisation, thermal control and water-proofing

1.2 MOTIVATION/JUSTIFICATION FOR THE STUDY

A combination of factors motivated this study. Firstly, the desire to revitalise and make architecture more relevant inspired the need to understand vernacular architecture and traditional built environments, especially in developing countries where it still exists but is disappearing, although at a rapidly diminishing rate.

Secondly, having unearthed a number of previously neglected cases of traditional architecture that were underpinned by cultural and geographical conceptions (Yavo, 2003) this study hopes to add to the understanding of indigenous knowledge in the production and maintenance of traditional architecture and settlements. This includes the concepts used to depict and communicate information and processes in the absence of written records.

Thirdly, the field of traditional architecture has generated renewed interest in the recent past, being perceived as relevant to sustainable development and the built environment. From a broader perspective, indigenous knowledge is linked to resource and environmental management.

If not documented in a retrievable repository, such valuable knowledge may be lost forever to future generations, depriving them of the means to understand the technology used to build these unique, yet outstanding structures or decipher their embellishments. Drawing on such knowledge could assist architects who wish to promote sustainable design principles in contemporary society. In the

current era, architects are expected to integrate sustainable principles into their projects.

The Poster in (Fig. 1.1) shows Batammaribaland (Koutammakou) that was used at the UNESCO meeting in Suzhou, China. In a nutshell, this study will not only provide information for tourists, but also inform the maintenance of the site and will thus contribute to the fields of traditional architecture and sustainability in the built environment.

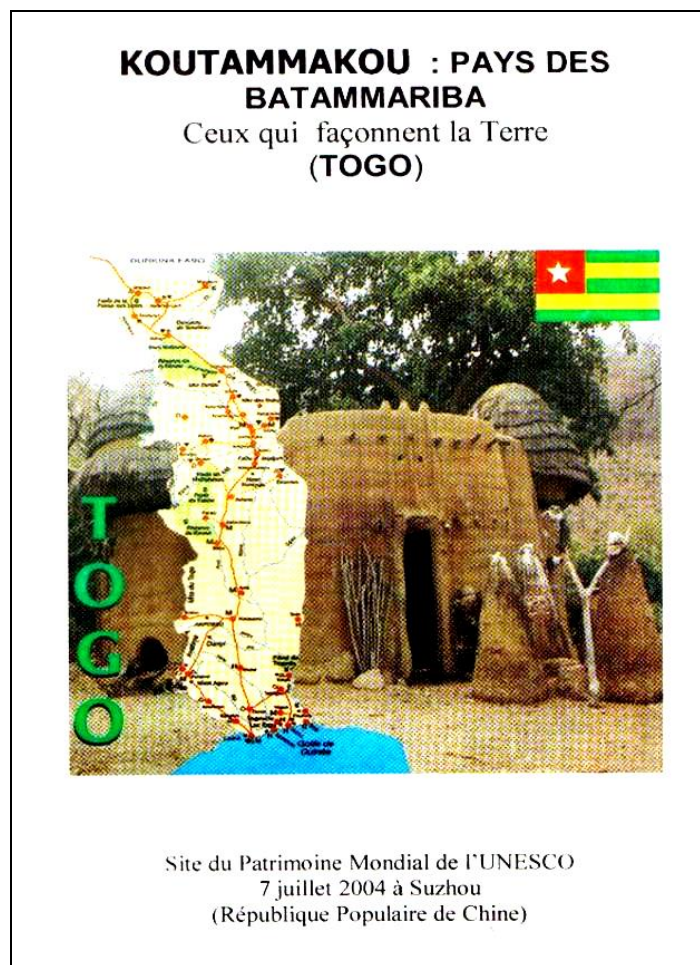


Figure1.1: Poster illustrating Batammaribaland (Koutammakou) used at the UNESCO meeting in Suzhou, China. Ministry of Culture, Togo 2004.

1.3 PROBLEM STATEMENT, AIMS AND OBJECTIVES

1.3.1 Research Question

The significant question of the research project is *“What is the nature and extent of the technical knowledge which sustains the production of the structure, forms and typology of Batammariba traditional architecture?”*

1.3.2 Statement of the research problem

Indigenous knowledge systems, as well as traditional indigenous architecture, are often underrated and in many instances are considered irrelevant for contribution to the modern architecture of the world today. The preference for traditional modern building methods has led to the neglect of these traditional modes of construction, which are considered unsuitable for further research and development. If not documented in a retrievable repository, such valuable knowledge may be lost forever to future generations, depriving them of the means to understand the technology used to build these unique, yet outstanding structures or decipher their embellishments.

Blier (1987) demonstrated in previous studies of the Batammariba that this sophisticated architecture can be attributed to a combination of their cosmological beliefs and socio-cultural structures; her study broadly explored the symbolism and anthropomorphist dimensions of the culture that underlies the structure, design and maintenance of the buildings. While her study provides insight into the meaning that Batammariba builders and occupants bring to their buildings, she does not address the technical knowledge pertaining to the conceptualisation, construction and maintenance of Batammariba buildings. Although anthropological and archaeological studies have been conducted amongst the Batammariba, none of these have investigated the technical approaches used in

the indigenous knowledge system to produce and maintain their traditional architecture. As a result this critical dimension has been neglected and undervalued.

1.3.3 Overall aims and objectives of the study

1.3.3.1 Aims

This study interrogates technical know-how that informs the production of Batammariba architecture, particularly in response to contemporary design challenges such as structure, heat exchange, waterproofing, ecology and resource management.

1.3.3.2 Objectives

This study has three main objectives which are derived from the research question. These objectives were set:

1. To explore spatial structures and forms of traditional architecture and settlements in Batammariba societies in order to assess the nature, structure and transmission mechanisms of indigenous knowledge.
2. To understand how Batammariba builders achieve the structural stability, consistency of site layout and resource choices demonstrated in their traditional buildings and settlements.
3. To investigate the structure, forms and typology of the indigenous knowledge used in buildings and the homestead space, and analyse their perpetuation in the absence of a written knowledge system.

1.4 SCOPE OF THE STUDY

1.4.1 Hypothesis

Embedded within the cosmology and anthropology of Batammariba traditional architecture lies a body of coherent and systematic technical knowledge which anchors the production of buildings. This knowledge can be demonstrated in the way the builders codify and communicate construction knowledge in order to achieve consistent forms, structures and performance. The key areas which demonstrate this knowledge are:

- The consistent realisation of forms and their resultant structural stability, entailing a shared understanding of structural properties and the properties of the materials used.
- The properties of effective shelter, which entails a shared understanding of temperature control and water-proofing.
- A resource and ecological balance which entails a shared understanding of the availability, suitability and sustainability of the different types of materials used for the various elements of the building.

These factors are likely to be more evident during the construction of buildings and settlements, during which time codification, terminology, technical transfer and communication can be more readily observed. Therefore this study focuses on the construction processes underlying the achievements or outcomes.

1.4.2 Research scope and limitations

This study focuses on the production and construction process underlying the manifestation of form, structural stability and weather resistance of the Batammariba settlements and buildings rather than examining a cultural and social process. Several sites of production and maintenance processes are analysed. Information in the text is supplemented by an explanation of terminology in (Batammariba architectural terms, page XXVIII and Appendix E: Glossary, page 280) and other forms of codified knowledge which signify abstract understanding which is transferable and can thus be shared. The study focuses on the western and eastern Batammariba territories, particularly in and around the rural communities of Boukoumbé, Koudogou, Kougnandogou, Koutagou, Natta and Zongo in Benin and Koulangou, Nandoba, Matéma, Pimini, Warengo and Wartéma in Togo; case studies are presented in order to enhance the analysis.

Fathy (1986) illustrated that communities in the Nile region adapted to local climatic conditions by adopting a variety of technologies such as thermal storage, directing air movement and evaporative cooling, among other more conventional strategies, in their traditional architecture. He tested the efficacy of methods using science-based principles. Such studies are extremely rare and most traditional architecture has not been addressed using this approach.

Although this research focuses on technical performance, it is also concerned with the knowledge and skills applied by the Batammariba builders as they construct their homes. While a broad technical and scientific analysis of the buildings is provided as background context, a detailed technical evaluation of the performance of buildings is not the focus of this study. A future study focusing on technical assessment would complement the current investigation.

1.4.3 Definition of key terms

This section defines some of the key concepts used in this study.

1.4.3.1 Indigenous knowledge

Indigenous knowledge is previously un-recorded (and sometimes past) systems of “understanding” and “doing” which generate a skill, craft, trade or other forms of practice or occupations that require to be incorporated into contemporary knowledge system as Omolaoye (1996) has indicated.

1.4.3.2 Technical know-how

In this study, technical know-how refers to indigenous competence which sustains the production of Batammariba architecture in the absence of formal or written knowledge systems in areas like mathematics and geometry, physics and engineering, chemistry, ecology and resource management.

1.4.3.3 Batammariba traditional architecture

The term “vernacular/traditional” in an architectural context has many definitions, starting, perhaps with the seminal term by Rudofsky (1965:1) where he calls it “unpedigreed architecture”. Adebayo (2001) points out the incorporation of natural materials, which is certainly appropriate in an African context. Batammariba traditional architecture thus refers to the structures of the builders called otammali; the style, characteristics and processes and techniques involved in the creation of such buildings; the rituals and myths that surround the erection of buildings; and the cultural spirit behind the phenomena associated with the built environment.

1.4.3.4 Process and actors

“Process” refers to the act of producing the form and structure of Batammariba buildings and settlements. It refers to the activities, rituals and procedures involved in the production and maintenance of traditional architecture. Once the buildings have been completed, they need to be maintained. This is different from repair, which involves restoration or reconstruction. All these processes are undertaken by people that are termed ‘actors’; those acting as direct agents in the production and maintenance process.

1.4.3.5 Communication

The process of building entails information sharing or communication among different actors, translating building form and production ideas/concepts and their coding into language during the production and maintenance of buildings. Relevant terminology and concepts are transformed from abstract to practical knowledge through both oral communication and action-learning.

1.4.3.6 Ecological resource management

It is of great importance to oversee the misuse or utilisation of the environment in order to safeguard against over-exploitation or degradation of Batatammariba land.

1.5 THESIS STRUCTURE

This thesis consists of nine chapters as follows:

1. **CHAPTER ONE: INTRODUCTION** presents the research context, the justification for the study, the research question, statement of the research problem, conceptual framework, overall aims and objectives, working hypothesis and the research scope and limitations. It also defines the research key terms and outlines the structure of the thesis.
2. **CHAPTER TWO: METHODOLOGY** discusses the methods used for this study and the research design. It outlines the methods used for data collection, the data sources and data analysis.
3. **CHAPTER THREE: LITERATURE REVIEW** by means of **THEORETICAL AND CONCEPTUAL FRAMEWORK** provides an appraisal of previous literature enabling to understand the “indigenous knowledge in traditional architecture” in terms of its production and manifestation in contemporary knowledge. This chapter analyses relevant archives, literature and folk knowledge relating to the study.
4. **CHAPTER FOUR: BATAMMARIBA TRADITIONNAL SETTLEMENTS** deals with contextual issues, namely the socio-economic and historical background and the physical environment of Batammaribaland and its architecture. It also describes the establishment of Batammariba homesteads in northern Togo and Benin, the climate and how these factors influence this remarkable architecture.
5. **CHAPTER FIVE: BATAMMARIBA HOUSE TYPES AND FUNCTIONS** discusses the local variants and role of the two-storey Batammariba

buildings. These structures are viewed as appropriate in a region confronted by serious challenges to the security of goods and people. The section on Batammariba numeric systems analyses the concepts/words for the abstract geometric forms one finds in the built form such as square, circle, rectangle, etc., and systems of measuring such as distance, dimension, weight, height, width, depth, area, length, quantity, intensity, span, step, strength, mass, etc.

6. CHAPTER SIX: BATAMMARIBA TRADITIONAL CONSTRUCTION, BUILDING PROCESS AND ECOLOGICAL RESOURCE MANAGEMENT

provides an in-depth appraisal of knowledge in pre-planning/design and an assessment of Batammariba traditional architecture. It also appraises the level of understanding of performance of materials, elements and buildings in terms of thermal control, heat, insulation, waterproofing and water-repellence. The chapter similarly focuses on renewed concern for the environment within the framework of traditional values that encourage the formulation of appropriate concepts relating to land use and shelter.

7. CHAPTER SEVEN: SUMMARY OF THE STUDY, ANALYSIS, DISCUSSION AND FINDINGS

presents a sum-up of the findings of the case studies and the analysis of the qualitative data collected for the research study.

8. CHAPTER EIGHT: CONCLUSION AND RECOMMENDATIONS

provides the principal findings based on the case studies, matches these to the stated hypothesis and discusses the overall findings in relation to the research questions. It evaluates the principal conclusions drawn from the findings and offers recommendations for further studies.

The next chapter presents the qualitative methodology adopted for this study.

CHAPTER TWO

METHODOLOGY

2.0 INTRODUCTION

Lebeuf (1961) affirms that architecture is a kind of script that can be read and that associated methodologies influence how these architectural texts are ultimately understood. They guide what is viewed, how it is seen, and the way in which it is contextualised and comprehended. This study examines Batammariba architecture by investigating readily observable phenomena and undertaking a comparative analysis of structure, context and style. It also emphasises the recording of ceremonies and rituals, the examination of building processes and technology, and the analysis of architecture in the context of both everyday use and special events.

A qualitative approach was considered most appropriate for this study. One advantage of the qualitative research method is that it enables a researcher to “reduce the distance between theory and data” (Maanem, 1982). This study therefore employed ethnographic research as well as library research. Spradley (1930: 3) explains that “the work of describing a culture and the central aim of ethnography is to understand another way of life from the native point of view”. The study, which focuses on the process of the construction of Batammariba buildings is based on participant observation and formal and informal interviews.

Batammariba architecture was chosen as a study topic as its building traditions, technology and settlement formation are fundamental to the life of the people of this part of Africa. Architecture and history are intimately intertwined. For example, the reason why two-storey buildings were chosen relate to the need for defence, space requirements, outside influences and creative inspiration in the early period.

The research design used to collect the research data and the methods used to analyse the data combined different approaches, including direct observation, formal and informal interviews, open-ended interviews, etc. The nature and extent to which formal knowledge fields (geometry, structural engineering, physics, chemistry, etc.) are embodied within the indigenous knowledge applied by indigenous societies in the production and use of their built environment is explored. This section presents an overview of case studies using ethnographic data collection methods to answer the research question. It also presents an analysis of the data. Content analysis was used to analyse the qualitative data obtained at the exploratory stage. This helped to establish the profiles of the respondents and the responses were formulated in tables in order to identify the key results.

2.1 RESEARCH DESIGN

2.1.1 Methodological considerations

It might seem poignant to speak of "technical know-how in Batammariba architecture", as the term "technical" invokes a distinct, rational discipline dealing with science and technology in general, as it exists in Western society.

Nonetheless, the genre of "technical" does exist in Batammariba society. It is even possible to find a term in Batammariba that denotes technical per se

(Batammariba architectural terms, page XXVIII and Appendix E: Glossary, page 280). Indeed, there are a number of terms in the language that cover the range of activities designated "technical" in the West. While no separate discipline of techniques exists that embraces all the so-called arts and technology, the merits or lack of it, excellence or shoddiness of works of art or craft, are debated by diligent practitioners of that art, perceptive patrons and interested observers, within Batammariba society. This is also the case regarding architectural works in traditional Batammariba society in northern Benin and Togo.

As Ladd (1988) observes, even in the West, where a distinct discipline of techniques exists; the concept "technical" has not been defined in a clear-cut manner. Despite the unclear, inexact, and open-textured nature of this concept, he argues that it is a valid and rational concept with certain distinctive properties, which enable us to recognise a technical situation. This observation can be extended to cover such notions as "work of architecture" and "technical experience", as well as the technical concepts that are used to perceive, evaluate, understand, appreciate and judge works of architecture in the present context. In a nutshell, this study deals with concepts which, though rational, are not scientifically quantifiable. A qualitative methodology is therefore most suitable for the study.

Ladd (1988) further stated that when dealing with technical judgment, there is a need to distinguish the skilled craftsman from the average builder, and the expert critic or judge from the layman. Technical judgment requires discrimination and the identification of qualities that account for the excellence or otherwise of any work of architecture. Such knowledge can only be possessed by an expert, technically knowledgeable person. He adds that the layman merely likes or enjoys a work of art, but does not have a command of the metaphors, the linguistic terminology, or the perceptual intensity of the expert builder, even though he/she may be quite articulate about what he/she likes or dislikes in a work of art. Since the views of the layman would lack the conceptual depth and

semantic density that characterise technical discourse, they will not be included in the sample of respondents for this study.

The foundations of this study are the verbal utterances and physical actions of builders, and their creative works. The researcher was privileged to have an intimate knowledge of the research setting, the people, the culture, the physical environment, and the language; this created a most conducive research atmosphere. The metaphors, similes and proverbs used by the informants to convey their perceptions are of great significance. In a traditional society such as Batammaribaland, every discussion or description of reality, facts and attitudes is embedded in thick layers of analogy and linguistic gimmickry that mark the difference between the expert builder and an ordinary builder not well versed in analysis, or a city dweller. By listening to and analysing the builders' responses, not only does the researcher gain access to the conceptual world of Batammariba architectural technology; but also to the conceptual world in which they live (Sanday, 1978).

Most interviews with respondents were open-ended. One or two questions acted as an impetus to provide momentum to the process of verbal interaction. People always have stories to narrate, anecdotes and genealogical data to divulge, and myths and legends glorifying their ancestors to recite to the patient fieldworker. During such accounts, philosophical ideas, metaphorical expressions, and apt aphorisms pertaining to the field of architectural methods find expression. Famous builders generally enjoy talking about themselves, their work, their lineage, famous buildings erected by their ancestors, the illustrious builders under whom they trained, the places they went during their training period or where they went to build after becoming fully fledged builders.

Builders enjoy discussing their relationship with other builders, with the guild, with their patrons and especially with the supernatural. A number of builders philosophise on a wide range of issues such as the decline in the taste of present

day patrons, the decline in traditional ethics and cultural values, or the decline in the standard of workmanship among builders. As questions grew out of the dialogue, the researcher gained a rich understanding of life histories. He heard insults about rivals, compliments to friends and clients, piercing criticism of people in authority, local gossip, fact, fiction and episodes; in short, a thick description of reality as perceived by the builders.

These interviews, together with verbal descriptions of works of architecture or appreciation of given buildings constitute what is called the soft data of the study fieldwork. In most cases, the soft data were recorded to be transcribed, translated and analysed at a later stage. The hard data consisted of sketches, measurements of buildings, photographs of houses and people, maps of villages and details of building components among other things. Surprisingly some of the hard data proved more elusive than the soft data. The customs and religious beliefs of the people had to be respected. In addition, one was often at the mercy of the whims of bureaucrats, who decided what could be photographed and what could not. It was found that the mood and temperament of local officials sometimes override government guidelines.

Many informants preferred the fieldworker to interview them at their site and raise questions while they went about their business, rather than engage in abstract discussions. In most cases, construction site activities were recorded on DVD in addition to note taking. As Ottenberg (1979) correctly observes, "much of African technology life is in doing".

The builder who invites the researcher to his construction site is certainly in agreement with this statement. He is aware that architectural technique is not limited to the finished masterpiece. It incorporates the process of building as well as the experience of watching a dexterous builder at work; the grace with which he handles the wet mud brick, the briskness and agility with which he grasps the egg-shaped mud brick pitched to him, the expertise of the brick pitcher and the

crowd of spectators fascinated by the "show", are all part of architectural processes in the traditional Batammariba context.

The songs and music that accompany the process as women delicately balance water pots on their heads from the pond or stream on their way to the building site are all part of the traditional performance. To have missed this would have been to miss a rich architectural procedure. One needs to watch the expert builder at work; his intense concentration and oblivion of all around him only broken by intermittent instructions to the obedient apprentice. The dignity and pride (even arrogance) with which the builder comports himself, as captivated observers waste their time arguing about aspects of the work are all part of this grey area of traditional architecture practice.

2.1.1.1 Primary data

The primary data were derived from direct observation and informal interviews covering selected construction processes in the western and eastern Batammariba territories of Togo and Benin, particularly in and around the rural communities of Boukoumbe, Koudogou, Kougnandogou, Koulangou, Koutagou, Matema, Nandoba, Natta, Pimini, Warengo, Wartema and Zongo. These major villages in Togo and Benin were selected for case studies because they are home to famous master builders and contain well-organised, complex and efficient dwellings (a more detailed analysis is presented in Chapter 5). Two local research assistants were employed; their contribution was indispensable as the researcher is not a member of their ethnic group and was therefore viewed as an "outsider".

- **Participant Observation**

Direct observation, whereby the researcher and his assistants accompanied the builders to the sites and participated in the construction process enabled the researcher to identify the concepts and words for abstract geometric communication, measurements and a record system (storing information and communicating it). This approach enabled the researcher (Fig. 2.1) to gain a comprehensive understanding of the key issues of the study such as the production and maintenance of Batammariba architecture, the setting up of a traditional settlement, the setting of a traditional house, collecting and processing materials and actual construction.



Figure 2.1: The researcher in action with Chief builder Tapiba in Koulangou, Togo. Yavo 2006.

Construction site activities such as ceremonies and ritual, the examination of building processes and technology, and the analysis of architecture in the context of both everyday use and special events constituted the hard data (Mintberg, 1975), which consisted of sketches, measurements of buildings, photographs of houses and people, video-recordings, maps and details of building components, in addition to note taking.

- **Interviews**

The interviews focused on Master builders, gatherers of materials and the owner-patron. Local Master builders were interviewed in order to establish how they plan and construct the Batammariba buildings. Most of the interviews were informal, using open-ended questions (Fig. 2.2). One or two questions acted as an impetus for verbal interaction.



Figure 2.2: The researcher in an informal interview with N'Tcha Lapoili, old Master builder of 90 years and Koulangou village Chief in Togo. Yavo 2006.

The actors of building processes always have stories to narrate, anecdotes and genealogical data to divulge, and myths and legends glorifying their ancestor builders to recite to the patient fieldworker.

These accounts, together with verbal descriptions of works of architecture and criticism or appreciation of given buildings constitute the soft data (Mintberg, 1975). Most of this data was recorded on voice recorder MP3 as seen in (Fig.

2.3) and was transcribed, translated and analysed. The content of the interviews was structured around the issues of know-how, production and maintenance.



Figure 2.3: The researcher in a formal interview with Master builder Tapiba in Nandoba, Togo. Yavo 2006.

2.1.1.2 Secondary data

The secondary data consisted of a review of relevant archives and literature which provided background information on the field of indigenous knowledge. Apart from images and descriptions of form and other folk knowledge, music, stories, legends, myths and poems, etc., were used to determine whether there is independent evidence of technical know-how in indigenous architecture and settlements.

2.2 CASE STUDY: BATAMMARIBALAND

Batammaribaland makes up the background of this study.

2.2.1. Research sites and participants

2.2.1.1 Selecting and gaining access to the sites and participants

The selection of the study sites and participants was based on four main criteria. Firstly, all research villages are concentrated within the same area as shown on the map (Fig. 2.4), although the area covers districts that belong both to the Republics of Togo and Benin.

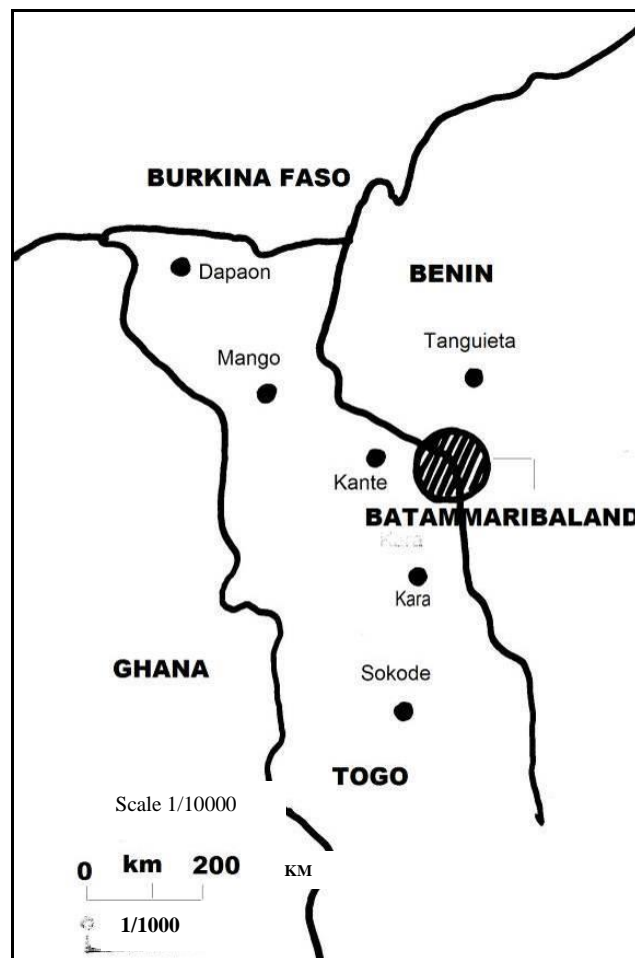


Figure 2.4: Location of Batammaribaland: Yavo 2006.

Secondly, they are accessible in that they are located within relatively short driving distance. Two research assistants from these villages were employed. Thirdly, the selected villages agreed to voluntarily participate in the research project and give the researcher access to the building sites and the Batammariba builders. Six villages in Togo and six villages in Benin were included in this study.

Kamuangu (2001: 34) observes that conducting qualitative research in a human group requires not only defining sites and describing participants and the specific methods utilised to gather and analyse the data but, above all, mediating 'intrusion' and defining the researcher's role in order to accommodate behaviour. He adds that this is likely to create or develop interpersonal relationships that are conducive to effective and manageable fieldwork in an unfamiliar setting. It is unlikely that any social setting will give a 'warm' welcome to an intruder who may be regarded as a spy.

Schultz (1971) calls this intruder a "stranger", or "an adult individual of our time and civilisation who tries to be permanently or temporarily accepted by a social group that he or she approaches and of which he or she attempts to interpret the culture" (Schultz (1971: 27). Although he used the term 'stranger' to refer to the psychological 'immigrant' (his term) in relation to various identities, some aspects of this definition might well apply to this study context. In the context of this research, a temporary contact was established with a view to immersing truly in the building practices of the Batammariba.

Any study involving human beings in a defined social entity must be negotiated with someone in authority over the people being investigated. The researcher approached and received assistance from influential members of the government, without whom access to some of the structures studied could not

have been gained. They are Mr Kourah Zato¹, Mr Koudéti NTéfé Kpakou and Mr Koundé NTcha².

Researchers from the Batammariba region and two research assistants who are familiar with the area of case-study were used during the fieldwork. The assistants introduced the researcher to the builders by explaining the aims of the study.

The importance of the fieldwork and its contribution to the recognition of traditional architecture was explained and the roles as observers, helpers were outlined. This clarification created some trust which was strengthened by the presence of the research assistants.

- Participant observation and taking part in the building process enabled the researcher to clearly understand the building processes, the ceremonies linked to them, and answer the research question.
- Informants can easily disguise many important details about themselves and what they usually do, because they feel uncomfortable. In such a case, observations and field notes may not be sufficient to unveil people's feelings, views, and emotions. Interviews address this issue.

¹ The Premier of Kéran, Northern Province of Togo.

² Members of Togolese Parliament. Natives of Batammaribaland.

2.2.2 Data collection methods

2.2.2.1. Introduction

The analysis of the data and the findings were based on a range of criteria which signified the presence or absence of the technical know-how that is shared among the actors in the production processes.

This study used more than one method to gather data (observations and field notes, interviews, informal conversations). The inclusion of these multiple sources of information was intended to increase the trustworthiness of the findings as advocated by Bassey (1999), Knobell and Lankshear (1999) and Gillham (2000) who address the issues of validity, reliability and representativeness. Validity refers to the extent to which the materials gathered represent an accurate picture of what is being explored. Reliability addresses the question of whether or not the information collected is the product of the techniques used, whereas representativeness focuses on whether the particular groups being investigated actually represent wider groups. While the participants selected for this study represent a small sample, they provide an accurate picture of Batammariba traditional architecture.

2.2.2.2. Observations and field notes

- **Preparation for field research**

Observations are considered a useful way to collect information for ethnographic research. The researcher negotiated the frequency of observation with the builders. The researcher primarily relied on the guidelines provided by Spradley (1980). “You need to analyse your field notes after each period of fieldwork in

order to know what to look for during your next period of participant observation”, as Spradley (1980: 33-34) vividly stated.

- **Conducting observations**

The researcher acted as a participant observer amongst builders. He established good relationships and interacted with others present at the sites as demonstrated in (Fig. 2.5). In so doing, he managed to record events as they happened and engaged in conversations where appropriate. The bulk of data was sourced from observations, field notes and interviews with members of the Batammariba communities. Important observations were recorded on the Observation Sheet; this included the date, site name, subject, time or duration, activities performed, and any details relating to the building process and materials. It is recognised that participants may behave differently when there is a stranger present; this may prevent the participant observer from gathering all the evidence required. Taking this into account, the researcher used other sources such as interviews, documentary data and conversations.



Figure 2.5: The researcher in action with building-apprentices in Koulangou, Togo. Yavo 2006.

2.2.2.3 Open-ended interviews

- **Preparing for interviews**

Before conducting interviews, the researcher immersed himself in the community in order to learn more about them and their world. He also studied background information from published research. This was crucial in rephrasing the questions and making them understandable to the interviewees. The information gathered during the observations also helped the researcher to develop specific interview questions relating to the building process. The interview questions focused on building activities and the ritual surrounding them, as well as the social norms contained therein. Additional questions arose during the interviews and the researcher acted as a participant observer while working or interacting with the interviewees after the interviews.

- **Conducting interviews**

Knobel and Lankshear (1999: 59) note that, interviews are key data sources in a case study in that they allow access to participants' opinions and unveil their hidden assumptions. 12 villages were selected: Boukoumbé, Koudogou, Kougnandogou, Koutagou, Natta and Zongo in the Benin Republic; and Koulangou, Nandoba, Matéma, Pimini, Warengo and Wartéma in Togo. At least one master builder from each village was interviewed and 20 others, mainly builders, gatherers of materials and owner-patrons were also interviewed. A total of 32 people were interviewed for this study.

Each interview was based on specific questions (Appendix C and D); however, in order to facilitate a natural atmosphere, interviewees were free to offer further information.

Additional topics and issues were discussed in informal conversations to add to the information gleaned from the interviews. Overall, all the interviews were very useful and informative and the informal conversations provided valuable insights. During the interviews, each participant was free to speak the language he or she felt comfortable with: French (in which the researcher is proficient) or a local indigenous language as interpreters were available.

All the interviews were recorded. The people who were interviewed are listed in Chapter 7 and represent a sample of traditional builders in Batammaribaland. In some cases, photographs have been inserted in appropriate places. The participants also expressed the wish for their names and those of their villages to appear in the thesis. Such consent added to the validity and reliability of the gathered data. A more detailed analysis of the interviews conducted is provided in Chapter 7.

- **Informal conversations**

Conversations or informal interviews (Fig. 2.6 and Fig. 2.7) also revealed important information about the building process and the culture surrounding this process. Some of these conversations were conducted while helping the builders with construction or at the end of day while relaxing.

Conversations allowed the gathering of useful information which was not forthcoming during the interviews, and allowed to understand processes that

were not comprehended while observing. Below are some photographs illustrating the researcher's discussion with selected Master builders.



Figure 2.6: The researcher in tête-à-tête with Master builders in Koulangou, Togo. Yavo 2006.



Figure 2.7: Another meeting interviews with Master builders in Koulangou, Togo. Yavo 2006.

- **Artefacts**



Figure 2.8 (A, B, C, D, E and F): Pictures showing the researcher on site with an apprentice builder in Koulangou, Togo. Yavo 2006.

Photographs (Fig. 2.8 and Appendix I) were taken as proof of the building materials and processes in Batammaribaland as well as proof of the researcher's involvement as a participant observer. All the photographs are a record of building practices and add important contextual dimensions to other data for validity purposes. In practical terms the documentary data was used as evidence in the analysis of data. To understand this analysis from a methodological perspective, the data gathered during the interviews is presented with pertinent quotations in Chapter Seven.

2.3 RESEARCH LIMITATIONS

This study is constrained by certain limitations. Firstly, it is to a certain extent impossible to achieve a complete analysis of the production and maintenance of traditional architecture of Batammaribaland in a study such as this. Nevertheless, an overall understanding of the diverse aspects of the traditional architecture process is necessary if we are to appreciate the density of the concepts, terms and syntax of the builders' architectural heritage.

Secondly, participants were aware that they would be interviewed and could thus withhold certain information they considered "taboo". Finally, assuming the dual role of researcher and participant observer might impose possible limitations, in that some useful details might not have been observed or recorded.

2.4 METHODS EMPLOYED IN THE DATA ANALYSIS

- **Assumptions**

The following assumptions underlie the collection of data used in this study:

- 1) Master builders (otammalimwa) and builders (otammali) approached for the investigations were unbiased, well informed and experienced enough to give useful feedback on the information sought from them.
- 2) The needs and objectives elicited were organisational, rather than personal. Where an individual was vested with the authority to make representative statements, the individual's responses were assumed to be representative of the organisational voice on the matter under study.
- 3) The interviewees' or respondents' perceptions reflected in the responses, were assumed to flow out of production experiences, the collective experience of which could provide a more objective reflection of the ultimate truth about the subject matter under study.
- 4) The responses were sincerely and thoughtfully made. Details of the analysis of the qualitative data are provided in Chapter 7.

The following Chapter on Literature Review provides an appraisal of previous literature, analyses relevant archives and folk knowledge relating to the study.

CHAPTER THREE

LITERATURE REVIEW

3.0 INTRODUCTION

Existing studies on African indigenous knowledge derive from a variety of materials and/or documents. These range from published diaries, to memoirs and notes by early travellers, missionaries, and educators, to intelligence reports by colonial administrators anthropological studies. These materials do not constitute an in-depth study of indigenous knowledge in traditional architecture. Indeed, many are restricted to a few paragraphs on house decorations and household furniture, while others such as the study by Burdo (1959:46) contain only a few lines on house construction techniques.

However, certain general observations can be made from these works. This chapter presents a review of relevant literature, which formed the theoretical background or framework for the thesis. This study has been fairly broad-ranging in terms of its references, focusing on three areas: indigenous knowledge systems and the concept of know-how, African traditional architecture and a critical appraisal of previous works.

3.1 THEORETICAL AND CONCEPTUAL FRAMEWORK

3.1.1 Conceptual framework

While previous studies, particularly that by Blier (1987) provide satisfactory explanations of the form and pattern of complex buildings and settlements, they do not adequately explain how these buildings and settlements are actually produced and maintained. Moreover, the competence which sustains the construction of well resolved and well performing buildings is rarely investigated. It is now accepted that such expertise would fall under the newly emergent field of indigenous knowledge systems.

This is understood as the application of a contemporary knowledge system to comprehend previously non-recorded, and sometimes ancient systems of “understanding” and “doing” that generate a skill, craft, trade or other forms of ‘practice’ or occupation in general.

The table below illustrates the conceptualisation of this study. This framework is formulated, refined and substantiated for application in:

- Chapter four: Batammariba traditionnal settlements
- Chapter five: Batammariba house types and functions
- Chapter six: Batammariba traditional construction, building process and ecological resource management
- Chapter seven: Summary of the study, analysis, discussion and findings

3.1.1.1 Diagram

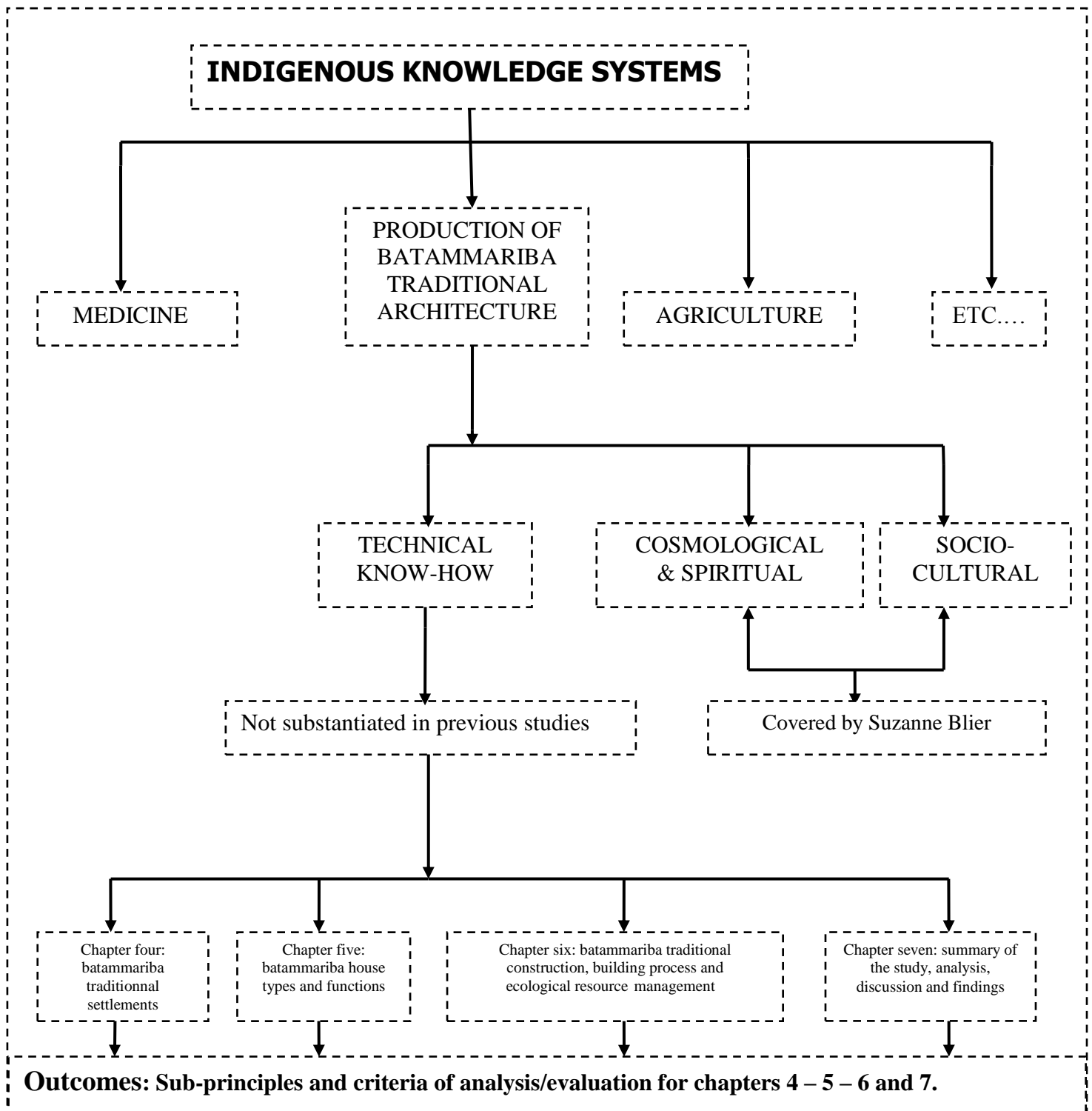


Table 3.1. Conceptual diagram, Yavo: 2006.

3.1.2 Theoretical synopsis of indigenous knowledge systems

Indigenous knowledge systems (IKS) gained recognition as “the latest and best strategy in the old fight against hunger, poverty and underdevelopment”, when the top-down, technical solutions approach to development came under fire (Agrawal, 1995:413); it was recognised that development policies and projects should build on the knowledge and experience of beneficiaries (Warren *et al.* 1983:2). Together with Warren *et al.* (1991:2) and the IDRC, 2000:2) they provide a number of reasons why the inclusion of indigenous knowledge in development is essential.

This research study roots technical know-how in its contextual hinterland of cultural practices, relevance and traditional technologies (and materials) and thus firmly supports the argument that indigenous knowledge is a critical part of the technical base of technical know-how.

While the focus in development has been on technical know-how, a number of studies (Marks, 1984; Norgaard, 1984; Richards, 1985) claim that indigenous knowledge systems are about more than technical solutions and that they include “non-technical insights, wisdom, ideas, perceptions, and innovative capabilities which pertain to ecological, biological, geographical or physical phenomena” (Thrupp, 1989:139). Brouwer (1998) sketches a hierarchy with indigenous knowledge as a general or umbrella concept that represents participants’ knowledge of their earthly and social space. However, Brouwer (1998) warns that these technologies are often treated in isolation.

According to Ingold and Kurtilla (2000:185-6), indigenous technical knowledge, as a body of knowledge, is passed down through generations along one or several lines of descent. Any changes are the result of imperfect mechanisms for passing

this knowledge down. Kalland (2000) differentiates between three different levels of local knowledge:

- Empirical knowledge
- Paradigmatic knowledge
- Institutional knowledge

Kalland (2000) emphasises that Empirical knowledge pertains to perceptions and information about the environment; for example, how to use local plants and materials. Accumulation of information is driven by the need to have a pool of information to assist with responses to real-life situations. Knowledge at this level is practical.

Yet again, Kalland (2000) describes Paradigmatic knowledge as the level in which empirical knowledge and observations are interpreted and placed in a larger context to establish understanding and construct cosmologies and Institutional knowledge refers to knowledge embedded in social institutions, which regulates social relations. It is thus possible to divide indigenous knowledge into two main categories of knowledge, one largely spatially defined and the other primarily temporally and socially defined:

- the first category relates to knowledge situated in a particular local context such as local knowledge, empirical knowledge or indigenous technical knowledge; and
- the other is knowledge that forms part of the cultural traditions and worldviews of a particular group of people (traditional knowledge, paradigmatic and institutional knowledge, or indigenous knowledge).

However, as Brouwer (1998) pointed out, knowledge and understanding of indigenous knowledge systems is particularly relevant where intervention in, and in this context, it is also recognised that indigenous knowledge systems cannot be removed from their location. This is well illustrated by the Table 3.2 below.

3.1.2.1 Diagram of Qualities Associated with Traditional Knowledge and Western Science

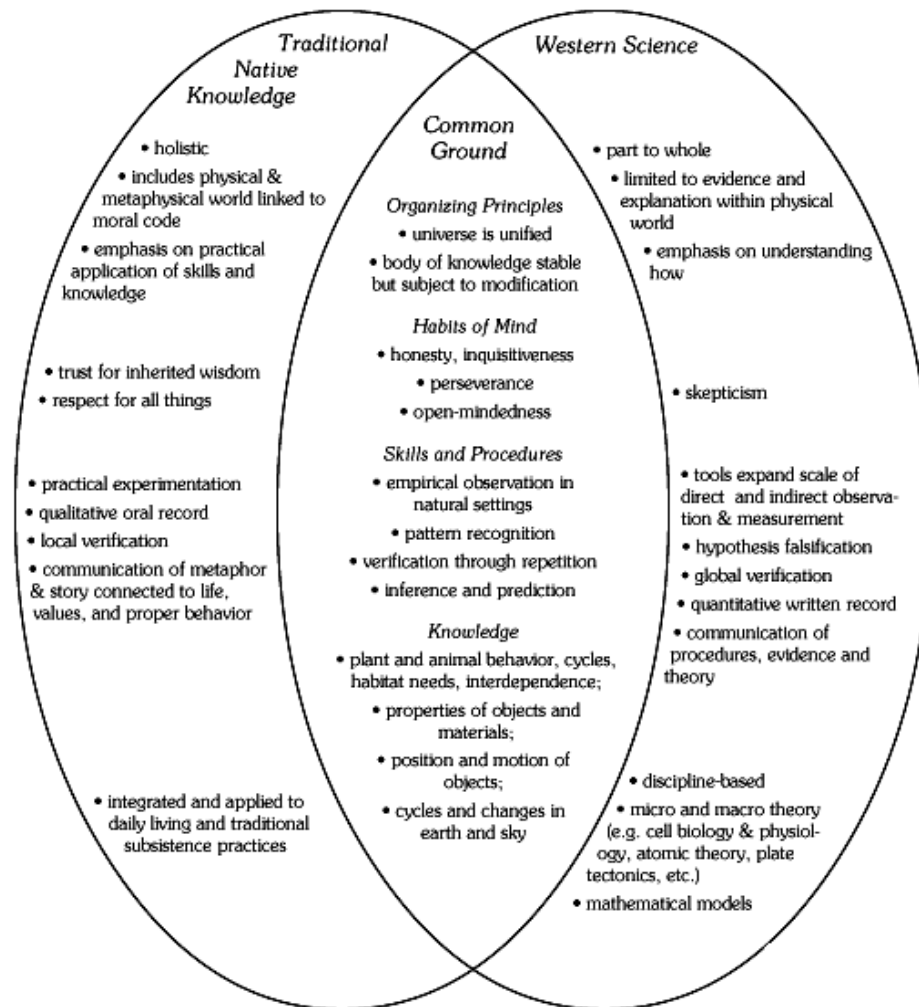


Table 3.2: Source: www.ankn.uaf.edu/publications/handbook/integrating.html (Retrieved in May 2007)

3.1.3 Indigenous/traditional architecture theory

3.1.3.1 Introduction

Phiri (2011) established in his study that Jencks (1973: 49-50) predicted that, in the future, accomplishments on a scale unheard of would drastically shift beliefs. In the post-millennium era this shift is indeed being felt throughout the world. A general energy for reinvention has become the tide that has swept in new-age theories to change the way we view space, form and the broader environment. While this wave of innovation has given birth to buildings of various types, it has also lead to an unsettling belief that tradition is dead and history obsolete. This perception is championed by Kultermann (1969), who notes in his introduction to *New Architecture in Africa* that over the past few years the world has found itself constantly re-evaluating Africa's potential for growth *via* new systems of development. The discrepancy between the new and the old is immense and out of control. A visitor to the African continent today might encounter a rondavel house or a shack dwelling on their right, with a high-rise, corporate skyscraper on their left. Kultermann points out that there is a duality about African modern architecture that cannot be fully reconciled. Neither modern nor traditional outcomes are purely African but, both developments, by virtue of adoption and innovation, have become a part of the African architectural spectrum.

Phiri (2011) stated that the greatest cities in the world are old and are constructed around principles of order that mesh the urban framework in an appropriate manner. These cities are, by and large, located in a deep historical context; everything that evolves is a response to this historical context (Lynch, 1990: 109). Rapoport (1969) notes that the traditional roots become lost in the mire of present day architecture. More often than not, it is only in the rural areas that one finds remnants of truly indigenous architectural history. The divorce between the old and the new, results in a loss of culture and identity. Forgetting culturally

conventional mannerisms, the new generations slowly adopt a foreign demeanour. The result is a growing preference for the context-less and alien. This is a dangerous slope, leading to mimicry rather than open and vibrant creativity. Without creativity, sustainable methods are lost and innovative process dies. Kultermann (1969) argues that Africa must develop its own identity and context in order to avoid the people of the continent suffering the pitfalls of a western world already struggling to maintain a healthy environment and polluted by the industrial mechanisms of the past. Mechanising and industrialising Africa outside of the cultural context could lead to rapid, negative growth.

Phiri (2011) noted that Heath (2009) affirms that indigenous wisdom is the foundation of all architectural development. The value of indigenous wisdom has recently become a topic of heated debate. According to an article posted on News 24.com (Nov 25 2010), due to corporate exploitation countries like Brazil and South Africa have been prompted to recognise indigenous knowledge as intellectual collective property; meaning that it becomes a unique and valuable commodity that must be treasured, preserved and appropriately managed. This decision was taken in light of the exploitation of Amazonian tribal medicines and San Nomadic dietary supplements by pharmaceutical companies. This raises a question. What about indigenous architectural knowledge, both primitive and modern? Surely this knowledge is just as precious, at the very least too precious to be overlooked and far too precious to go underutilised?

Phiri (2011) argued that Jencks (1972) observes that the intuitive or layman's approach to architecture is constantly evolving. As specialist designers challenge the boundaries of architectural form, respect for indigenous processes is slowly eroded into obscurity. A type of hegelianistic theory has been adopted by popular culture within which architecture is pushed forward by architects of stature who advocate the "Zeitgeist". This Zeitgeist or "spirit of the age" is often made manifest in high culture and the *avant garde*. This rush to the future is, however,

not all-inclusive. It fails to cater for the evolution of architecture outside of high culture, despite the fact that vernacular and traditional development represents the most prevalent form of shelter provision in the world. The adaptation of indigenous processes to African architecture is well documented by Kultermann (1969). He analyses both the new architecture in Africa and the direction this architecture is taking; illustrating that there is a constant process of adaptation at work. Rapoport (1969) defines this phenomenon of the ever adapting house form and its relevance to culture. He challenges the physical determinists by pointing out that every known criteria a physical determinist can adopt has at some point been proven by the practices of traditional and primitive architecture in various parts of the world to be fallible and at times entirely untrue.

Rapoport does not deny that a building is shaped by its environment; but rather notes that there are exceptions to this rule. There is more to built form than the environment it responds to as noted (Phiri, 2011).

3.2 KNOWLEDGE VERSUS THE CONCEPT OF KNOW-HOW AND ITS TRANSFER IN THE BATAMMARIBA WORLD

3.2.1 Knowledge versus know-how

Knowledge can be referred to as an expertise, and skills acquired by a person through experience or education. Nonaka and Takeuchi (1995) provide an understanding of the formal knowledge that technical specialists acquire through education as well as other knowledge that is acquired through some sort of apprenticeship. The former type of knowledge is mostly found in the West and is called explicit knowledge and the latter is mostly found in the East and in Africa and is called implicit or tacit knowledge. Comparing knowledge in the West and the East, they claim that:

Drawing from these considerations, Batammariba design and building knowledge pertains to the realm of implicit or tacit knowledge. The expertise and skills of Batammariba master builders as well as their practical understanding of design and building are not acquired through reading textbooks, but are gained through experience or through inheritance in the form of a gift or unique talent.

According to Ekanza (1999: 58), Africa has a rich reserve of knowledge in its indigenous knowledge systems, which could be excavated and integrated into 'modern' knowledge to alleviate the pressing needs of its communities. Such indigenous principles focus on the livelihood desires and practices of the majority of the population. Indigenous African knowledge systems are mainly recorded in verbal format, commonly known as Oral History, which has contributed to its erosion and does not allow for re-orientation to reflect 'modern' challenges.

The documentation of indigenous knowledge has often been stochastic and static; whilst indigenous knowledge is holistic and has remained unquantifiable. As Senyo (2003) argues, taken in isolation, aspects of indigenous knowledge would have an insignificant impact on the development process in the region.

Documentation of indigenous knowledge has thus far been descriptive and has lacked innovative perspectives on its integration into critical segments of national development planning. For example the indigenous African knowledge system recognised the role of agriculture in human civilisation's progress. It therefore ensured access to land and designed tools and cultural practices around agriculture through its indigenous governance mechanisms. This is well illustrated in the cultural significance of yams³ in West Africa as described in the literary works of Achebe (1958).

Such knowledge which should have formed the basis of sustainable development in the region, has either remained in a primordial state or, sadly, has been substituted with ideas of foreign origin that do not reflect the realities of local populations. In Africa a gap exists in many built environment practices.

3.2.2 Knowledge acquired through experience

Due to hands-on learning and the oral nature of communication in Batammariba society, know-how is viewed as procedural knowledge (which term also reveals its nature). What is communicated or divulged to apprentices or heirs is the procedural knowledge that enables and empowers them to perform the design and construction of their houses.

³The Yam Festival is a popular holiday in Cote d'Ivoire, Ghana and Nigeria. Yams are the first crops of the season to be harvested.

“Procedural knowledge is different from other kinds of knowledge, such as declarative knowledge, in that it can directly be applied to a task. For instance, the procedural knowledge one uses to solve problems differs from the declarative knowledge one possesses about problem solving. One limitation of procedural knowledge is its job-dependence; thus it tends to be less general than declarative knowledge” (Wikipedia, 2006).

This procedural knowledge is well evident in the process of construction where, despite their lack of formal education, the Batammariba “master builders” or “chief builders” demonstrate a sophisticated and meticulous understanding of the building and operational codes with which their designs and buildings must conform.

They demonstrate a degree of knowledge that prevents them from omitting any necessary requirements, or producing inappropriate, incoherent or confusing designs. They show an awareness of the various methods available to the builder. The outcome must conform to the traditional standards of architectural form and techniques, as determined by the village’s master builders, who are the custodians of values and attitudes which underlie Batammariba architecture.

There is a strong believe that this exclusivity in the style or manner of designing and building derives from tacit knowledge. According to Polanyi's (1983), “tacit knowledge is knowledge that people carry in their minds and is, therefore, difficult to access. Often, people are not aware of the knowledge they possess or how it can be valuable to others. Tacit knowledge is considered more valuable because it provides context for people, places, ideas, and experiences. Effective transfer of tacit knowledge generally requires extensive personal contact and trust. Tacit knowledge is not easily shared.”

Consequently, in order to acquire design and building knowledge, one has to either belong to the social and architectural culture of the Batammariba or spend a significant amount of time with technical specialists to participate in on-the-job peer discussions, apprenticeship or training. The latter include the learning of the knowledge required to design and build in accordance with the Batammariba's cultural, behavioural and social systems. Because such knowledge is tacit in nature, it has significant and far reaching implications. It cannot be spread effectively or communicated verbally or in writing.

3.2.3 Knowledge acquired through inheritance

Like builders in Haussaland, the Batammariba jealously guard knowledge of the deeds and achievements of their ancestors in the form of sanctified oral narratives that are passed from father to son.

Tradition is as dear to the scholar as it is to the master builder; each of these two guards his folklore possessively. The builder's tradition is embodied in oral history and skills sanctioned by magical powers and handed down from one generation to the next. And scholars in Europe have their legends embodied in written narratives and travel logs sanctioned by the magical powers of the "printed word" transmitted from one generation to the next (Saad, 1981: 66-67).

In the same vein, Yavo (2003) observed that each builder in Lobiland is seen to be the holder of a unique talent. This talent is said to pass to the heirs and ultimately to the children they will bear. Because of this ancestral gift, considerable pressure is placed on current architects to conform to traditional standards or architectural form and techniques. These standards are determined and enforced by a village's chief builder who must approve every foundation design before the house walls can be raised:

“In our world, each and everyone is endowed with his or her gift, his or her power, his or her strength. This is why after birth; one keeps carefully his or her gift in the fetish representing them. On this fetish, your father, the sages, will make sacrifices for it to protect you. You may go anywhere; you will preserve your health. It is as if you were washing with water. If you abandon your fetish, you will become crazy; no one will recognise you and you will die in the grass (N'Tcha Lapoili, Chief of Koulangou village in Batammaribaland)”.

In light of the foregoing discussion, it is feasible to characterise the concept of indigenous knowledge by referring to Batammariba builders' experience and apprenticeship. Traditional knowledge may be then described as understanding that is holistic.

3.3 GEOMETRIC CONCEPTS SYSTEMS IN BATAMMARIBA ARCHITECTURE

3.3.1 Introduction

The beauty of the designs of simple items such as turrets, tree trunk stairs, granaries and the walls of dwellings made from dung is often striking. The concepts and terms of measurements, quantities, and surveys are of importance. It is sad to learn that much of the art that was handed down for generations has been lost due to the disruption of African cultures. It is also flattering that the remaining forms of this folk art are now being archived, catalogued, and studied. It makes one proud to uncover this rich and unknown knowledge by undertaking this research study.

As noted during the investigation, the human eye has a natural affinity for patterns possessing certain geometric characteristics. It could be argued that some geometric theorems could have been suggested by examining artwork. Geometry has always played an important role in African architecture as observed in Batammariba house walls in (Fig. 3.1). Nonetheless, reconstructing exactly how the relationship between architecture and geometry worked in Batammariba culture may prove rather complicated.



Figure 3.1: Geometric signs on Batammariba house wall. Yavo 2006.

3.3.2 Geometrical concepts in Batammariba architecture

- **The circle (tanete)**

The importance of the circle in traditional African culture

In traditional African culture the notion of the circle is an important element that links all forms of life. Notably, the circle symbolises completeness, fullness. It is the fundamental source of energy and wisdom. The circle is therefore an illustration of what is termed God. The relationship of God with the circle (or vice versa) clarifies why many life forms, ceremonies, rituals, buildings in traditional African culture follow the shape of a circle. Hence, the circular shapes that ceremonies, buildings and certain life practices obey express spirituality, holiness, harmony and completeness.

For instance, the circular form of the rondavel is intended to align the homestead with the Creator and the completeness of life. It represents the origins of creation and harmony of life. Equally, dance gives expression to a deep connection with the Creator or epitomises a relationship with the Divine spirit. Most forms of dance follow the shape of a circle in traditional African culture.

In Batammaribaland, *Baboyama* (the religious master, chief priest) uses a circular dance when performing acts of divination. Participants in the ceremony of divination sit in a circle singing and clapping. In traditional African culture, the geomorphic design does not use a circle as an abstract expression of form. Men and women in a rural village sit in a circle, drinking home brew beer out of circular utensils, and circulate the utensils among themselves (Fig. 3.2 A and B).. When people meet in a circle, everyone occupies a front-seat, so in a circle everything is interrelated.



Figure 3.2 (A and B): Men in a circle, drinking home brew beer out of circular utensil (Calabash) in Nandoba, Togo, Yavo 2006.

The circular form of Batammariba house

The cosmology of the Batammariba symbolises the continuity of human beings in terms of a snake gobbling its tail. This is a symbol of perpetuity and stability. Batammariba architectural concepts are inspired by the

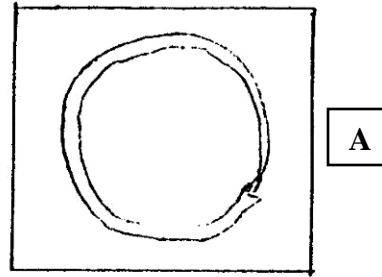
circular form (Fig. 3.3) represented by this symbol. In Batammariba society, ancestors are always omnipresent and are epitomised by various objects in the house. The perpetuity of life and death is an absolute reality. Generally, the Batammariba house is a habitat to insure everlasting human life or immortality, therefore, its endurance is a meaningful emblematic expression. Hence, the Batammariba house cannot undergo modification in terms of space.



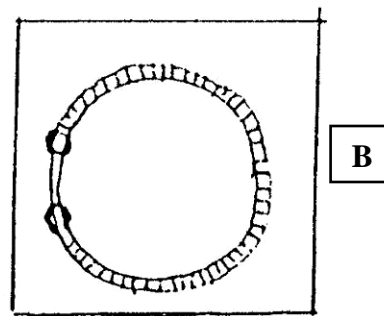
Figure 3.3: Trace of circles marking the beginning of a Batammariba house construction in Nandoba, Togo, Yavo 2006.

The circular form of Batammariba architecture symbolises a snake devouring its tail signifying an infinity principle. The room represents a unit of infinity principle and the Batammariba house embodying a composition of units of infinity principle as illustrated in (Fig. 3.4).

A snake devouring its tail
Infinity principle



The room
Unit of infinity principle



The Batammariba house
Composition of units of infinity principle

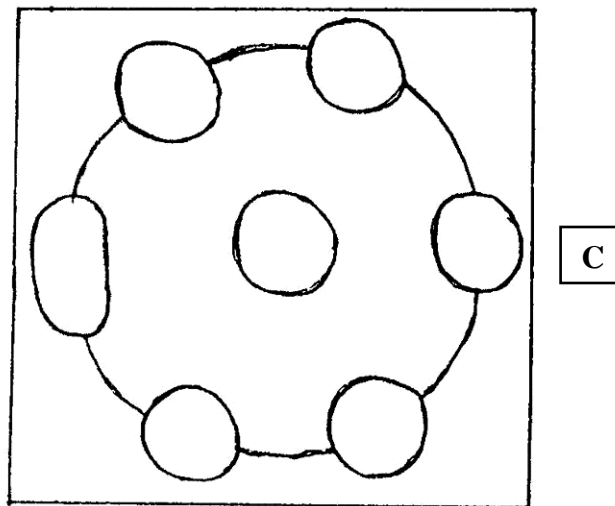


Figure 3.4. Batammariba architectural concepts as inspired by the circular form. Yavo 2006.

- **Composition (*dibobide*) and orderliness (*kubiku*)**

The notion of the space composition, *dibobide* which fulfils social requirements as well as other physical imperatives arising from the conditions of the site, is said to display *dibobide*; the builder who was responsible for planning it is also endowed with *dibobide*. Thus *dibobide* is an open-textured concept that every skilled builder and cultured patron is cognisant of, talks about, extols the virtues of; yet cannot define precisely.

It seems to us that, what constitutes *dibobide* in a dwelling varies from one environment to another, depending on the abundance of land or its scarcity, among other determinants. In the organisation of decorative patterns, one uncover the terms that extol orderliness, *kubiku* of composition. The Batammariba verb, *moupeyaii*, actually means "to arrange well, to systematise or to regulate", all of which express the concept of orderliness.

- **Proportionality/equilibrium (*yopeti*)**

The majority of the geometrical terms have to do with proportions in one way or another. Proportionality, *yopeti* is so abstract a concept that metaphorical expressions are the best way of handling it in Batammariba. A monumental Batammariba house was thus described by Mr Yakata Téou, an illustrious critic of Boukoumbe village in Benin, "it is like an ostrich; the big one with a tiny head". Frogs, men and women were all used metaphorically to communicate proportionality or lack of it, by critics.

- **Straightness/rectilinearity (*kasubu*)**

We arrive at the notion of rectilinearity by examining the numerous geometric expressions that pass judgment on walls that do not display this

quality. Takpalata NPoh of Matéma village in Togo, eloquently conceptualises his idea of a poorly constructed walls. "The wall twists and straightens; stoops down and stretches up; it has a hunchback and a bulging chest; it has humps, bumps and protrusions."

When contortions are so pronounced in a rectilinear wall the critic says, "*kayu nate*" (the wall has developed hooks). Using the earthworm and snake in metaphors that describe the waviness of walls, a building should be upright but the face should not be vertical, for reasons already stated. It is familiar to notice terms like *muyopotimmu*, used to criticise verticality in walls as evidence of lack of construction skill by a mason.

- **Symmetry/asymmetry (busotie)**

Nowhere does utility infringe as much on the perception of beauty in traditional Batammariba architecture than in the evaluation of the attractiveness of a façade on the basis of symmetry and asymmetry. In the traditional Batammariba dwellings, the door is never in the middle of the façade.

This does not refer to recently built Batammariba house that imitate European buildings, but to authentic Batammariba houses. N'Tcha Lapoili, Master builder of Koulangou village in Togo, explained that the skilled builder, on seeing a symmetrical façade, knows that it is the work of a novice.

- **Rhythm/twinness/duplication (zara or nanti)**

The desire for eurhythmy is expressed in Batammariba architecture through the duplication of elements to achieve twinness. Without going into the mythology, the birth of twins in a family is a good sign in

Batammaribaland. In architecture, the aesthetic value of twinness (*zara*) is emphasised by critics. The birth of coupled structural elements does not seem to have any omenal value.

All of the duplicated elements enhance the aesthetic qualities of a piece of architecture in Batammaribaland, i.e., two main granaries, two main granary supports, two front joining walls, and two main levels of living space, etc. However, the chief of Koulangou village and well-known Master builder in Togo, N'Tcha Lapoili has an anthropomorphic explanation for twinness in architecture:

“Why do we use twinness in our tata? We have two eyes, two ears, two nostrils, two hands and two legs. God (*Kuiye*) could have created man with one eye and man would see well. But to make man more handsome and balanced, *Kuiye* gave him two eyes”.

- **Composition (Dibobide) and the physical conditions of the plot**

Purely physical problems arising from the conditions of the plot play a significant role in determining the plan configuration. Over the ages, builders have developed a conceptual vocabulary for dealing with all conceivable situations that an *otammali* (builder) may face in his attempt to serve his patron.

It was noted that plots are never precisely rectangular or square in the typical traditional situation in Batammaribaland. Parcels of land come in all shapes and sizes. Other physical aspects of the land that occupy the mind of the builder include the slope of the land and the problem of ensuring that water used in the house flows easily and quickly along the open drainage gutter (*kuperiku*) in (Fig. 3.5 and Fig.3.6) to the (*bupe*) nearby.



Figure 3.5. Batammariba house open drainage gutter. Yavo 2006.



Figure 3.6. Another Batammariba house drainage gutter. Yavo 2006.

- **Physical orientation of Batammariba house**

The physical orientation of openings of the Batammariba house is an aspect of composition (*dibobide*) that belongs to two worlds: the natural physical world of the movement of winds and the direction of rainfall; and the supernatural world of the direction of movement of evil spirits (*bulu*). The North is seen as an evil direction for one's dwelling entrance and most builders avoid this at all costs. East is avoided for climatic reasons, being the direction of rain. A southern entrance to the Batammariba house is good sign, but has climatic drawbacks, so is avoided despite its occult value. West is therefore the preferred entrance to a Batammariba house; supernaturally it is neutral; in addition it has climatic advantages over other directions; no dusty *harmmatan* winds, or torrential monsoon rains disturb the building.

A number of younger *otammalis* (builders) and patrons dismiss the belief about the magical merits of the southern entrance and the supernatural undesirability of the northern entrance as superstition, but the majority of village dwellers take a middle course and hide behind an aphorism which states, "Do not be the architect of a new superstition; but if there be already one in existence; it would be expedient to heed it."

Hence in the modern context when the town planner cuts his streets in defiance of local beliefs and climatic conditions, the builder and his patron, in an effort to "heed" the beliefs, finds ways of avoiding the northern entrance.

3.4 CRITICAL APPRAISAL OF PREVIOUS WORKS ON WEST AFRICAN ARCHITECTURE

3.4.1 Overview

Few scholars have taken an interest in the study of indigenous knowledge in traditional architecture in sub-Saharan Africa. The few who have done so have not focused on indigenous knowledge in African traditional architecture; nonetheless they have made descriptive references to traditional architecture. No study has investigated the world of the African built environment to demonstrate the relationships between contemporary knowledge fields and the practice of traditional architecture. Most such writers rely solely on oral traditions. Ekanza (1999) and Niangoran (1984) have provided some information about the circumstances which led to the practice of Yams and the life of goldsmiths, but offered no information about Akan knowledge in architecture.

The studies cited above highlight the focus and direction of this study as suggested by Rapoport (1969:38), "A house is a human fact and even with the most severe physical constraints and limited technology man has built in ways so diverse that they can be attributed only to choice, which involves cultural values". These values stem from man's tendency to conceptualise everything that happens to him. Thus architecture is seen as one of the most suitable means of creating an ideal environment based on man's notions of reality which depend on the goals, the ideals and values of people.

Other publications or sources on indigenous knowledge in traditional architecture are described below. These sources have been selected because of their useful methodologies, although they may not provide information on the relationship between know-how and traditional architecture.

3.4.2 Explorers of West African architecture in medieval period literature

Medieval Arab geographers, historians and travellers were the first to record various aspects of the life of the peoples of West Africa. Their narratives were meant for the consumption of their Muslim compatriots in the Maghreb and the Middle East, but translated versions of these monographs found their way to European libraries.

West African architecture did not feature prominently in the earliest records. Al-Bakri (2000) in his description of Northern Africa provided an account of the ancient Empire of Ghana (Fig. 3.7) and its capital, Kumbi-Saleh often erroneously discussed as the current Ghana Republic. His description of town planning and architectural details of the twin-capital has been corroborated by recent archaeological excavations in Mali.



Figure 3.7: <http://coastalplainsraceway.com/sounds/ghana-empire-map>. Retrieved 10 November 2008.

However, it was the succeeding Arab scholars of the Renaissance that laid the conceptual framework through which European travellers perceived traditional architecture in West Africa, and by extension, in Batammaribaland. They laid the foundation of Western scholarly tradition in this area.

Clapperton (1829) pioneered a wave of European explorers that swarmed into the interior of West Africa in the nineteenth century, as a prelude to the colonial occupation of sub-Saharan Africa. He visited Hausaland and his description of architecture is particularly penetrating. Thus, he found architecture in Hausa cities more impressive than that of any other region he visited and his description of Hausa architecture is all encompassing; ranging from the city walls and city gates at Kano, to landscapes within the city walls and houses "built of clay" which were "mostly square form", to the details associated with the work of Leo Africanus, in particular, the legend concerning Es-Saheli and his architectural influence in this part of the world.

Clapperton (1829) was able, possibly by asking leading questions, to squeeze out information from the poor master builder at Sokoto concerning his architectural training. According to him, "the builder's father having been in Egypt, had there acquired a smattering of Moorish architecture". While not suggesting that this story was fabricated by the respected explorer, Clapperton's (1829) perception of the situation was heavily tinted by the popular ideas of his time and place.

It was therefore not difficult for him to obtain "this firsthand information" from the builder. Furthermore, coming from Western Europe and not being familiar with the techniques and processes involved in traditional building, Clapperton (1829) must have conceived architecture as something created out of examples from books, papers, and drawings of plans, sections, elevations and details.

It is therefore not surprising that on further inquiry, he discovered that the said master builder's father died leaving him "all his papers, from which he derived his only architectural knowledge". In addition, the construction of a building such as the one he saw at Sokoto ought to require the aid of gadgets, scales, plumb lines, and especially a Gunter's scale, in his conception. After all, that is the way it was done in Scotland. He therefore perceived the chief builder as "particularly attentive to possess a Gunter's scale". As noted later, builders jealously guard knowledge of the deeds and achievements of their ancestors in the form of sanctified oral narratives that are passed from father to son.

On the question of the papers and scales mentioned above, it may also presume that such items have never been part of the stock of trade of the traditional chief builder. Hundred years of exposure to Western influences has not changed this situation; the *bona fide* master builder still builds in the same manner as his father did, and his grandfather before him. Such gadgets and conveniences do not find favour with him. Even now, master builders regard it as a sign of incompetence to resort to papers and instruments in the performance of one's craft.

However, tradition is as dear to the scholar as it is to the master builder; each guards his folklore possessively. The builder's tradition is embodied in oral history and skills sanctioned by magical powers and handed down from one generation to the next, while European scholars' legends are embodied in written narratives and travelogs sanctioned by the magical powers of the "printed word" transmitted from one generation to the next. Each of these two lineages safeguards the treasured wealth left by its ancestors and is mistrustful of the other.

A number of explorers of French origin, such as Monteil (1890 and 1892), and Foureau (1898) "who traversed Batamaribaland" were equally fascinated by its architecture. However, they did not seem to add anything to the already established myths and legends.

3.4.3 Scholars and traditional architecture in West Africa

The renowned German explorer, doctor and scholar, Barth (1859) was an extremely perceptive observer and a very skilled artist. Like his predecessor, Clapperton (1829), he was particularly interested in the architecture and building technology of the places he visited. He made a number of interesting and accurate drawings of architectural subjects such as city plans, villages, palaces, merchants' residences, commoners' houses, granaries, huts and sheds as he traversed Hausaland. Descriptions and drawings left by him include mosques at Agades, Kano, Katsina and Sokoto; palaces at Kano, Sokoto, Kukawa and Yola; humble huts at Mubi, the cottage of Mbutudi, Kanembu kraals on Lake Chad and the conical huts of Musgum compounds in Cameroon.

His contribution to European understanding of traditional architecture in Hausaland is most evident in the rural sphere. However, since construction techniques, planning and building processes have changed very little since the time of Barth (1859), the details he provided will not be lingered on. Even though most of the actual buildings described by him practically 150 years ago may have disappeared; they have been replaced by others similar in all respects. What is admirable here is his role as the architect who reinforced the shaky edifice of the "Es-Saheli legend". This is where the scholarly aspect of his character comes to the fore.

Foyle (1951) devotes much space to Hausa architecture, especially the early colonial houses built by Kano master builders for their British patrons. These houses are referred to as "the great houses of yesterday, the celebrated Kano residences" by Kirk-Greene (1981). A keen observer, Foyle (1951) contrasted these European inspired buildings with those built for traditional patrons. Nonetheless, he was not the least interested in the builders or their traditional patrons' conception of the aesthetics or symbolism associated with these structures. He therefore perceived the residences through the lens of the

established tradition of European literature. He did so despite his close association with Kano and Niamey builders and dwelling owners. Foyle's (1951) apparent obsession finds symbols on every decorated portal, every visible corner of a building, or invisible partition and every attractive parapet of traditional house.

Oliver (1971) and his fellow travellers endlessly read into and deciphered meaning upon meaning, from every dot, to every circle, every line, every engraving, every sign, or painting that appears on traditional shelters, as symbolic of one thing or another. The authors seem to be engaged in an incessant monologue; since they only talk to themselves, quoting one another, contradicting each other and occasionally criticising each other. This monotony is often broken by the narration of anecdotes or legends, with a view to ridiculing the beliefs of the so-called 'primitive peoples'. The volumes of works edited by him excel in derisive scholarship, in addition to their consuming obsession with symbols.

Prussin (1986) has produced a serious body of work in the field of African architecture and she remains equally an outstanding scholar today. There is no denying that she has published studious works on traditional African architecture than anyone else in the Anglo-American press. Nobody can accuse her of academicism⁴, because she is not engaged in duplicating the achievements of accepted masters in her field. She is in fact, the master builder of theory building in an academic niche that she has carved out for herself through rigorous fieldwork and imaginative scholarship.

By using a different methodology, her work has gained wide acceptance in both the art world, where it belongs, and in the circles of social scientists, because her approach to the "business", has an illusory similarity to theirs. She often starts with a hypothesis such as, "the Fulani jihad effected a qualitative change in society... so the architecture of that society became crystallised into a visual

⁴ Doctrines of Plato's academy; specifically the sceptical doctrines of later academy stating that nothing can be known.

unique style". She then proceeds to prove this hypothesis. In so doing she assembles an array of discrete "facts", which she is able to marshal by sheer power of imagination and the sharpness of her pen, to support these preconceptions.

Prussin (1969) skips linguistic hurdles, crosses ethnic boundaries and confronts physical barriers such as mountains, deep rivers, extensive deserts, frightful jungles and dark forests, in her endeavour. None of these constitute obstacles in her quest to prove her hypotheses. She, perhaps unconsciously, reduces Africa to a mere abstraction, a caricature of European scholarship that created "The Dark Continent". In this jungle of absolute darkness, any distortions, any twists, or mutilation of facts to suit theory is permissible, acceptable, if not desirable.

What matters to the adherents of this genre of scholarship, is the uncountable number of references, footnotes and endless bibliography that enables them to support the *grande idée*⁵ of their formulations. She epitomises this preoccupation with theory building in the conclusion to her dissertation which claims to give an investigative theoretical framework within which to ultimately write a true and accurate account of architectural history in both Djenné and Africa as a whole.

This preference for theoretical formulations over facts is apparent in most of her works; whether it is architecture in Northern Ghana; or the architecture of Djenné; or in "Fulani-Hausa Architecture", where Hausa builders, in an attempt to simulate the nomadic Fulani tents of their overlords in mud, accidentally invent the "Hausa vault".

At times the hypotheses put forward by Prussin (1995) are so simplistic as to attract the attention of even non-specialists in the field. For example she asserts that the "spherical brick dictates a curved wall; it is technically impossible and conceptually illogical to create a rectangular building form with spherical brick".

⁵ The Grande Idée was a Greek nationalism in sixteenth and twentieth century.

Logically this conception leads to the conclusion that, the introduction of "the carpentered brick leads to an entirely new spatial concept, cubism". Apart from the simplistic logic involved, such statements are poetic formulations that are not founded on facts, or based on observing chief builders at work or discussing their techniques with them. The conical or spherical brick (tubali) is still the main prefabricated element used by Hausa builders in constructing rectangular buildings.

These theoretical constructs, at times, permit Prussin (1995) to neglect the role of skilled master builders in the building process in African society. She concentrates on the role of dynasties, such as the nineteenth century Fulani jihadis in northern Nigeria; or the influence of erudite tomes, such as the "The Malikite Law of Ibn Khalil", on traditional architecture. One such construct is the wrong conception that the primary problem in studying creativity in African architecture is "the very existence of individual creativity".

This directly leads her to the concept of the "compound owner/chief builder" as model of African societies, in the absence of specialised masonry skills. This absence is conceived of as extending "beyond the West African Savannah". There is a hope that fruitful discussions engaged with skilled chief builders will help to clarify some of these issues and many other misconceptions in various books and articles in Euro-American libraries.

3.4.4 The other side of Western scholarship on Africa

It would be grossly unfair to accuse the whole Western academic establishment of the misrepresentation of African traditional societies. Not all Euro-American scholarship is fascinated in legend building, myth edification, or the imaginative construction of pseudo-scientific theories. European academia, in particular, has its rebels and deviants, people who refuse to "tow the party line", by rejecting the

well-established legend of the Maghrebian origin of traditional architecture in West Africa.

Works that belong to this genre are best illustrated by Urvoy (1949) and Leary (1953). These scholars have one thing in common; they lived among the chief builders of Hausaland, closely observed them at work, and discussed their work with them. In addition these scholars seem to possess firsthand knowledge of the architecture and building techniques of North African peoples. This enabled them to discern the crucial differences and processes involved in the creation of traditional architecture in the Sahara Desert.

Urvoy (1949) was the first to draw the attention of Western scholars to the distinctive character of traditional Hausa architecture and to demarcate the geographical limits of its occurrence, in the western and central zones of West Africa. In his own words :

“Mud architecture is found in Haussaland and mainly within the Songhai and the Djerma tribes”.

He goes on to note the most prominent difference between this architectural style and the architecture, popularly known to scholars as, "the Sudanese Style", whose geographical distribution extends across western Niger, Burkina Faso and Mali, with its centre of gravity at Djenné. The critical difference, in terms of external appearance, is the noticeable absence in Hausa architecture of the engaged column (the *sara fa har* of Labelle Prussin) on the facades and angles of buildings. These are the buttresses referred to by Miner (1967) in *The Primitive City of Timbuktu*; he asserts that they are "found in their most elaborate form at Djenné, where they dominate the architectural style".

In addition, he provided an accurate description of the construction process for the most important structural element in a Hausa roof, the "Hausa vault", or the

bakan gizo in the parlance of the traditional master builder. As he points out, the structures are not "vaults", in the rigorous sense of the term, since they are "fortified curves cob with wood". This construction technique, "of a great flexibility allows dazzling combinations " in the creation of the "true Hausa ceiling work". Urvoy (1949) plausibly reached these conclusions by watching the master builders at work and holding discussions with them on the site during his fieldwork.

Almost two decades later, Gardi (1968) published *Indigenous African Architecture*. He sought out traditional master decorators and dwelling owners with whom he held discussions. Not only was he able to observe the builders at work, he was also able to appreciate the value house owners placed on beautifully adorned facades which do "wonders to the image of" the dwelling owners.

This approach did not endear Gardi (1968) to the Western academic establishment. Guggenheim (1971) sums up the group feeling when she complains that Gardi's "approach is not scholarly". He committed the criminal offence of letting "natives" (the builders and their patrons) talk, rather than hypothesising on, theorising upon and expatiating on traditional architecture through the legends created by "established authorities" such as Barth, Clapperton, and a host of other "accredited" references at his disposal. Gardi (1968) reported similar impressions on his visit to Zinder, where he says that "the custom of facade decoration was experiencing a sort of renaissance". Had Delisse's work been published, he might also have been accused of being "journalistic and unscholarly".

Even though Leary's (1974) work pertains to the development of Islamic ecclesiastic architecture in the whole of West Africa, it demonstrates a penetrating understanding of traditional Hausa architecture; not only in its historical dimension, but also in the realm of structure and technology. As it has been mentioned to elsewhere, Leary

(1974) does not subscribe to the "ES-Saheli legend" of Leo Africanus and Barth, nor Clapperton's myth of Egyptian connections to traditional Hausa architecture.

Leary (1974) explains the similarities between the construction techniques and linguistic terminologies of the Songhai and Hausa not in terms of the Songhai imperial push eastwards into Hausaland (in the sixteenth century, bringing with them new methods of construction), but in terms of common origins. In his formulation, this represented "a shared technical and cultural sub-stratum in proto-historic times". He correctly argues that Saharan construction is based on stone while Hausa construction is based on mud techniques. He echoes Urvoy (1949) and sums up the conviction of many master builders in Hausaland, when he affirms that "arch construction in mud was an innovation that was peculiar to Hausa states" and did not penetrate further west, east, or north of Hausaland. Leary (1974) draws the attention of devotees to the cult of the Moorish derivation of Hausa architecture to the fact that the example of the stepped minaret at Katsina (Fig. 3.8) often cited as *prima facie* evidence, was in fact built "under European direction".



Figure 3.8. Gobarau Minaret part of 18th century Mosque in Katsina, Nigeria. Retrieved in Wikipedia 09 October 2007.

3.4.5 The New Perspective

To build on Jencks' (1972) argument regarding an impending shift of beliefs, one needs to explore what these beliefs entail. Widely recognised as the person that coined the term "post-modern" architecture, Jenck (1972), observes in an article on the *Rise of Post modern Architecture* that this term is very imprecise, in that it describes a movement in the same way that one might describe a woman by calling her "not-a-man".

More recently attempts have been made to define post-modernity in a more precise manner. Architectural development practitioners agree that many designs labelled post-modern demonstrate room for significant improvement (Baker, 2000: 2). However, there is still debate on the parameters within which such improvement should occur. Post-modern design often fails to capture innovative and naturalistic processes. As a result, off-shoots of post-modernism have started to emerge.

The analysis of indigenous forms of architecture involves a close blending of architectural forms with their social and symbolic significance. Though Nooy-Palm's (1990) contribution does not speak of architectural anthropology as such, she observes that technological aspects of houses have been studied first, with the study of how houses stand in relation to society, or as a representation of it, coming later.

She stresses that all-embracing studies are best accomplished through team fieldwork such as the one undertaken among the Sa'dan Toraja by herself and her anthropologist, architect, and photographer colleagues (Kis-Jovak *et al.*, 1988). Her contribution, based on fieldwork and years of experience among the Sa'dan Toraja, is more descriptive than theoretical, but succeeds in depicting their settlements, with their impressive and magnificent houses as the core not

only of kinship and social organisation but also of economics and a whole complex of mythological beliefs, cosmological practices, and life rituals, from birth to death.

The disposition of the houses in relation to the Sa'dan River replicates the Ainu⁶ situation described by Egenter (1992), where important features of the landscape are incorporated into the layout of the settlement. The houses' distinct structural elements also fit his interpretation of the development of houses as the result of the addition of several separate components over time. Trees are present, both as structural-semantic features, with the "navel post," cosmic axis of the house, and markers planted to commemorate events. Last, but not least, fibrous materials (bamboos) and woven clothes are an important feature of the Sa'dan Toraja's lives.

Nooy-Palm (1990) also observes that, in a society where there is no written record of past circumstances, the house serves as a repository of memories and history. She states that the house is a reminder device to trace back ancestries and events, "mythical" or "real", a typical Cartesian⁷ distinction, since both are tangible realities based on facts; this opens new possibilities for interpreting domestic architecture.

This, points to to other relevant questions that the researcher cannot develop here that relate to whether "vernacular architecture" is an adequate analytical concept for cross-cultural research that implies qualitative and distinctive features. Why and how do some dwellings and by extension, some built environments show greater cultural congruence than others? Are there limitations to the often-stated idea that built forms and settlements embody memories and express meaning and identity? If so, what are they? Is it possibly because when people build for themselves, according to their own traditions as

⁶ A study the Ainu house in the context of its construction rites and annual cults focussed in various parts of the house at the agrarian level too reveals the traditional house defined in highly complex ways by toposemantic architectural elements.

⁷ French Philosopher and Mathematician Rene Descartes theory.

opposed to imposed, alien traditions, it is easier to reflect one's own culture, beliefs, and values?

Major studies in traditional architecture have mainly taken the form of broad descriptive surveys in the past eight decades. Examples date back to the time when Herskovits (1938) was collecting his data on Africa in Dahomey, Griaule (1938) among the Dogon in Mali. However, more recent studies focus on specific issues, ranging from art and social control (Harley, 1950), to mask symbolism (Dieterlen, 1959), stylistics (Olbrechts, 1940), art as a creative process (Cole, 1969), art and cultural mobility (Bravmann, 1973), art and leadership (Fraser and Cole, 1972), African textiles and decorative arts (Sieber, 1972 and Newman, 1974), art as a cultural dynamic (Ottenberg, 1975) and the study of the African builder as a creative individual (d'Azevedo, 1975).

Over the years, studies on African art have shifted from a general emphasis on sculpture to more specialised studies on many aspects of the arts. These include Prussin (1969) on cosmology and rituals as well as decorative art, Rapoport (1969) on forms and typology of house and Oliver (1971) on the understanding of shelter in African traditional architecture.

A different picture emerges when one examines studies on traditional African architecture. In spite of the considerable knowledge of the arts in Africa gained over the years (as the abovementioned studies demonstrate), there is limited knowledge by way of documentation of indigenous knowledge in African domestic architecture. Our understanding of the African world through the variety of its house forms, settlement types and building techniques has been greatly limited by the dearth of literature in this field of study. The reasons are not hard to find.

Among the many factors is the western attitude to African domestic architecture observed by Foyle (1951), who notes that, "there is no indigenous 'architecture' in the true sense of the word in West Africa". To the casual observer, most of the

towns of West Africa consist of a collection of nondescript buildings, mostly built in a shoddy manner out of temporary materials by Africans for their own use, while the more pretentious, permanent buildings have been designed by European officials. Such a hasty appraisal is very far from the truth.

The second factor derives from the first and relates to the use of certain descriptive concepts in the literature on African architecture. As Aradeon (1977) has noted:

What remains disturbing though is that scholarly interpretations of the African and Black contribution to architecture have not changed much since the first European explorers, ethnographers and historians set foot in Africa. Yet with the advantage of hindsight, we can see how ignorant, prejudiced and ethnocentric most of them were. Despite all its connotations, the expression 'African hut' or in Francophone 'la case' has survived even among the educated elite in African university circles as though African houses neither fulfill the functions of a house or home nor conceptually define architectural spaces.

Such attitudes derive largely from a western definition of architecture in which the considerable variety of man's creative devices in response to his social needs and environment are relegated to the realm of building technology. The dominant features of architecture are 'durability' and 'monumentality'; factors that are merely part of the central theme in African architecture. While these factors constitute an important aspect of African architecture, as has been noted in the monumental quality of the Palaces of Yoruba land in Nigeria, architecture as a humane expression of African societies and culture distinguishes African from Western architecture.

The beauty of African house structures may be gleaned from the following observation; even in its ruins, Frobenius (1903) was greatly fascinated by the physical grandeur of the Oni's palace of Ife in Nigeria and commented:

“The monumental ruin of the Oni's palace met our gaze. We stood before the portal of the castle in the middle of an enormous square and made my horse climb the high flight of steps and rode through the delicately carved door of the entrance, across the courtyard and through the dilapidated colonnades with my companions. It was like an enchanted castle. It was large and noble in design, superbly pure despite its broken lines, its moldering to decay and the sordid exterior it now presents”.

House structures and decorations underscore important themes such as kingship and leadership systems in Africa. This largely explains the reason why houses belonging to rulers are the most monumental. The structural and aesthetic aspects of African architecture are equally interesting and significant. For example, the thin shell structures created in banco (earth and water with a vegetable admixture) without framework or reinforcement by the Musgum and the Gobirawa are remarkable for their strength as well as their formal beauty (Aniakor, 1979).

Using the techniques of a potter, they build large spaces as wide as six metres and as high as seven and a half metres for the rounded conical forms of the Musgum (Fig. 3.9) and averaging four to five metres in both diameter and height for the Gobirawa. Both architectural styles include an opening at the apex to allow smoke to escape and light to enter. During the rainy season the Gobirawa cover the domes with thatch. The decorative protrusions on the Musgum houses function as scaffolding which the builder stands on during construction and later during repairs. The entrance and the circular forecourt of the Musgum houses are smoothed and plastered with vegetable matter to achieve a fine finish which contrasts with the rougher weatherworn finish of the house itself (Aniakor, 1979).

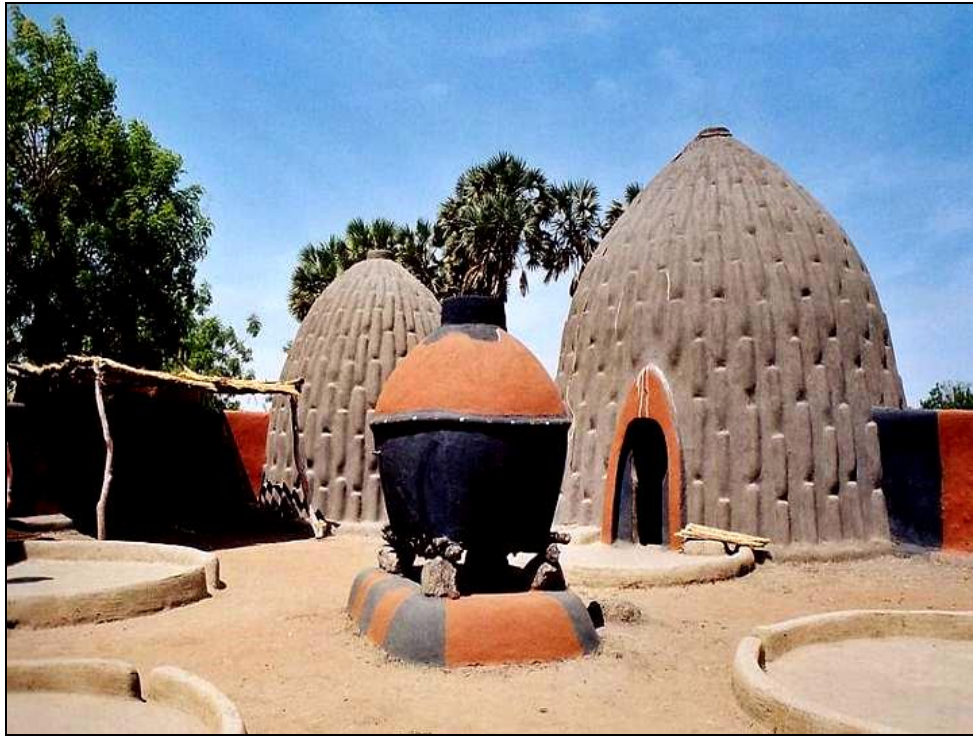


Figure 3.9: Musgum house in the shape of a shell (artillery) in far North Province, Cameroon. Ostorero 2003.

The attributes of architecture are closely related to the ideas it embodies. Architecture can therefore be utilitarian and practical, aesthetic and symbolic. It is artefact as well as icon. In its formulation within the Batammariba culture, it is a development from concept to type whether it is a house, a compound, a village or a settlement. To grasp this architecture's meaning, one must move in a reverse direction from the extant form (whether it is a house or compound) to its concept, that is, the idea system or conceptual principles on which the building act is based.

In other words, there is a close relationship between the symbolic nature of architecture and its multiple functions whether at individual (house type), family (compound), village (settlement) or social, religious and other institutional (cults or shrine architecture) level. This includes craft specialisations (techniques). The functional basis of Batammariba architecture derives, as Michelis (2000) notes more generally, from the fact that "architecture is an object projected beyond itself

so that through the idea it suggests, it becomes a symbolic form.” These ideas are embedded in functions.

Fathy's (1986) ideas are not only applicable to Egyptian society; he goes beyond mere academic documentation and advances certain speculative theories which are of value to our work. He approaches the African architectural landscape with tremendous intellectual energy; introducing a totally new conception of the study of architecture. By employing an innovative methodology, his work has gained wide acceptance in both the art world, where it belongs, and in the circles of social scientists, because his approach is similar to theirs. His scientific analysis of indigenous architecture is of importance to this study although we will use a different approach involving participant observation.

Oliver (1971), a scholar of indigenous building, offers an inclusive and balanced view that does not perceive architecture purely from a western point of view. In his collection of articles, Oliver (1991) demonstrates an approach to the study of architecture in non-western societies. These examine cultural, geographic, climatic and environmental aspects and provide a picture of a dimension almost overlooked by the disciplines of architecture and ethnology.

His encyclopaedia also explains the meaning of the term ‘architecture’ which was conventionally linked to the “preselected samples of Euro-Mediterranean (and others) historical, or high architecture such as pyramids, temples, cathedrals, and palaces”. This Euro-centric vision, has neglected a wealth of indigenous knowledge in traditional architecture spanning several centuries. The present study aims to complement and extend his work by unveiling the wealth of neglected technical indigenous knowledge in African indigenous architecture.

Openly, Rudofsky (1965) affirmed that "part of our troubles results from the tendency to ascribe to architects, or for that matter, to all specialists, excessive insight into problems of living when in truth, most of them are concerned with problems of business and prestige." Meaningfully, he affirmed that "vernacular architecture does not go through fashion cycles. It is nearly immutable, indeed, not improvable, since it serves its purpose to perfection."

This research study has drawn inspiration from the works of these scholars, even though their fields of interest are principally anthropology, ethnology, philosophy, fine arts, music, dance and drama, rather than traditional architecture. Their approaches, which apply their methods of discourse to practitioners of the arts and members of their communities, have a direct influence on the methodology of the present study.

These methods of inquiry into artists' manner of working, innovations, experience, training, technical skills, artistic criticism, ideas, philosophies, legends, life histories and beliefs; can be applied to master builders, who are the main practitioners of the traditional art of building. This ensures that ideas emanate directly from the builders and their patrons, rather than from the intellect of imaginative experts.

Prior to analysing the research case studies and the findings of this study, the next chapter on Batammariba traditional settlements which deals with the socio-economic, historical background and the physical environment of batammaribaland and its architecture are discussed.

CHAPTER FOUR

BATAMMARIBA TRADITIONAL SETTLEMENTS

4.0 INTRODUCTION

Mercier's (1954) selection of names for the various subgroups has led to some erroneous assumptions regarding Batammariba culture and history. His diverse names suggest, for example, that only the eastern Batammariba around Natitingou are real Batammariba, as he defines this group as Bétammaribé or Batammariba. Yet each of the three principal Batammariba groups refers to itself by this name. In addition, the western Batammariba, who are widely assumed to be the oldest of the subgroups, are erroneously designated by Mercier (1968) as non-Batammariba, "étrangers par excellence".

He calls the western Batammariba Bétiabé, the name of a shrine outside a village in the northwestern part of this area. Yet these western Batammariba, by Mercier's (1968) own admission, have a critical place in Batammariba origin myths and ceremonies. Their settlements are among the most densely populated and this subgroup occupies the area generally identified with the first Batammariba villages.

4.1 BATAMMARIBA TRADITIONAL SETTLEMENTS SYSTEM

Batammariba village settlements can in one sense be described as diagrams in space of Batammariba kinship and social groupings and affiliations. They underscore the Batammariba's concept of territoriality as reflected in patterns of land use. In another sense, these village settlements are the product of economic exigencies which can be explained in terms of prevailing Batammariba land regulation, patterns of land use which are modified by population density and agricultural practices.

The observation of the normative pattern of Batammariba settlement shows that it is planned to allow a number of villages to live reasonably close together as a single community and yet be able to expand without too much friction. It achieves this by zoning the villages around one or more central meeting place (Fig. 4.1), at the same time giving each village the right to occupy the land extending in a specific direction away from the centre.

In other words, each village that constitutes one of the components of the village group occupies a specific land area which is delimitable in space. Within each village, the lineages of which it is composed are also differentiated spatially as minor units of the village territory. All these units are grouped around a central meeting place.

Thus, while the land occupied by the various segments of a village unites them into a large territorial unit spatially distinguishable as a large political corporation, that occupied by the various villages that make up a village-group unites them into a larger territorial unit on the basis of economic interdependence, defence needs and broader politica association.

The factors which underline Batammariba land morphology are therefore economics, agricultural practices and land regulation deeply embedded in certain social attitudes; population density, its dispersion in space, the growth and expansion and consequently the segmentation of villages, kinship groupings and social affiliations. Patterns of land use are crucial to the process of Batammariba architecture.

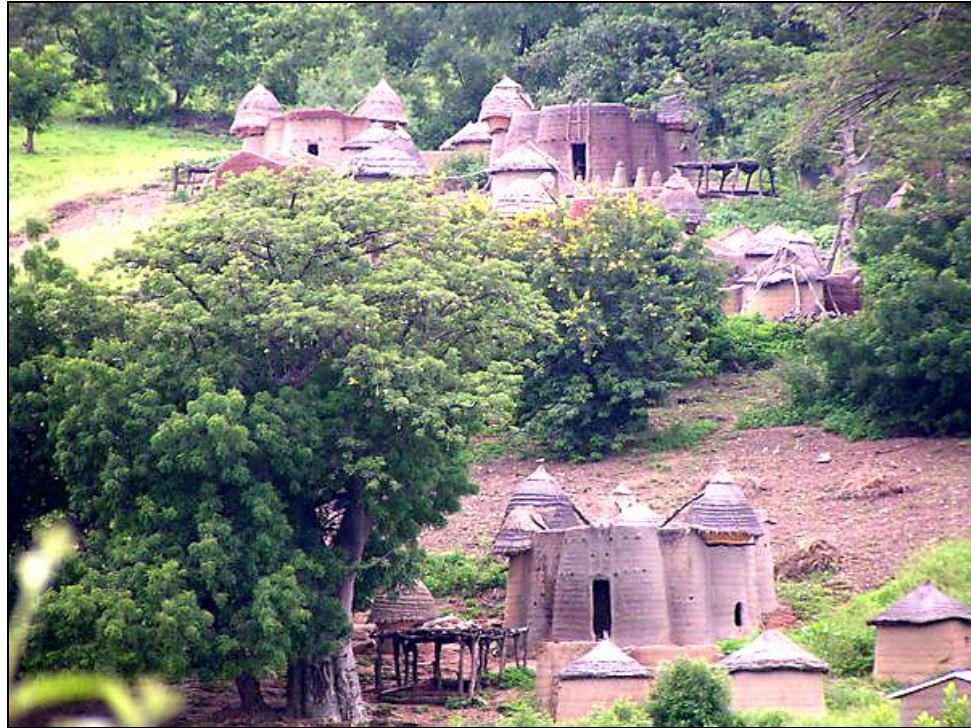


Figure 4.1: Village of Warengo in Togo: Robert Powell, 2009.

4.2 HISTORICAL BACKGROUND

4.2.1 Batammariba ancient occupations

Oral traditions remain the essential source of the history of the Batammariba and still they are often divergent and often subject to different interpretations. First, the notion of a very old population of pygmies has to be disposed of, as the

legend of the yètenkodè would testify, short men who still haunt certain sites (Mercier, 1968:105, 128). Furthermore, the idea that the Batammariba are the direct descents of the Neolithic hunters of the Sahara desert, having walked a very long distance with imprecise and unknown stages, seems audacious, despite the similarity of some of the characters in their rock paintings. Again, there is no proof of a close link with the Dogons. It was noticed in the map (Fig. 4.2) that nations are demarcated by only tribal groups appartenance or kingdoms.

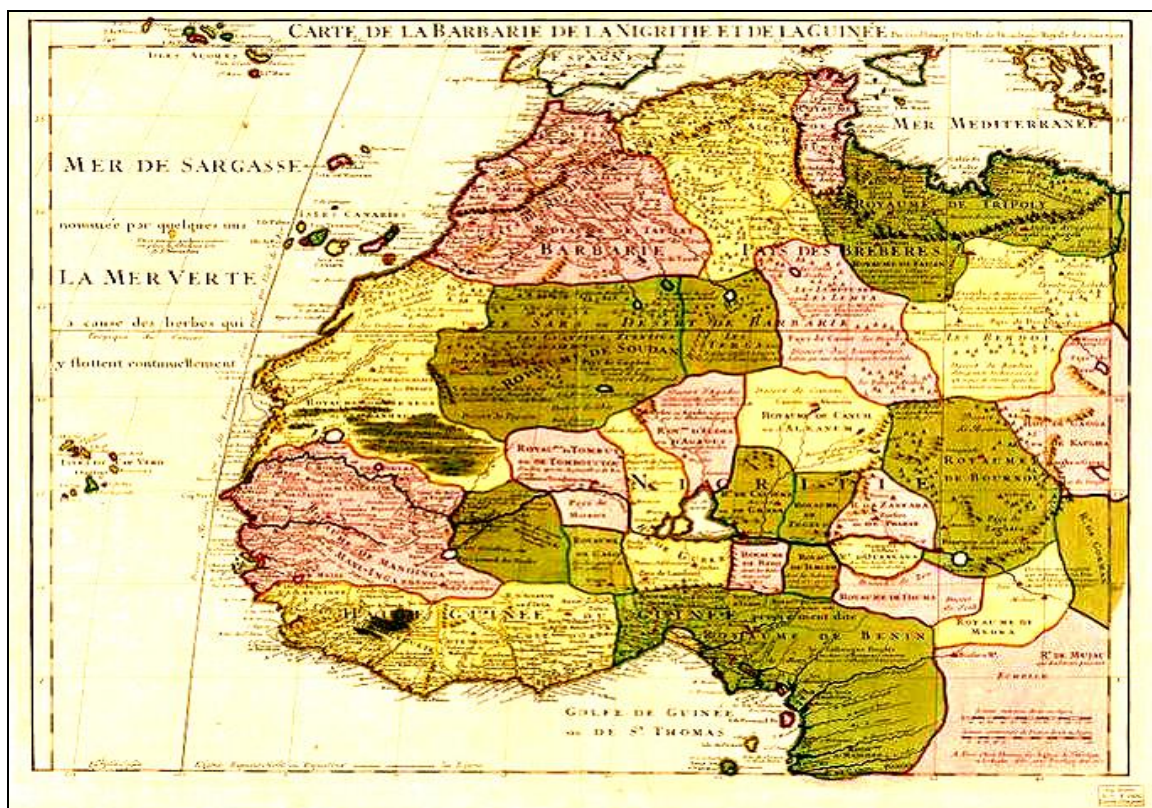


Figure 4.2: Old map of the populations of North and West Africa without boundary division to countries rather it is ethnic integration by Guillaume Delisle in 1707.

Different researchers have consulted the writings of Arab travellers who traversed Sudan, souvenirs of old people, the stories of the griots, and sometimes incomplete genealogies to trace the migrations over time. It is extremely difficult to draw up an incontestable chronology. However, it is possible to make a

distinction between the groups who acknowledge that they came from elsewhere and those claiming to be native or first settlers of their lands.

The most ancient period relative to the neighbours of the Atakora was identified by Urvoy (1949). He believed that around the 7th century a vast inhabited zone was spread between the gurma and bariba countries: this region corresponds to the extension of the Atakora towards what we sometimes call the “W” of the Niger River. However, remnants of ancient settlement are rare. As far as the Borgou are concerned, Mercier’s (1968) work has revised earlier conceptions. The Waba originating in the west would have populated the eastern region of Kouandé, perhaps up to Nikki. The Bariba groups, probably formed by scattered clans, would then have moved to the west, in search of new hunting areas, their main occupation, and therefore would have pushed the Waba back. These groups had been named Yowabu at the beginning of French colonisation; they would be very close to the Tankamba and even the Databa (Tiando, 1978).

Mercier (1968) stated:

“From all this it seems to me that at the beginning of the 18th century a vast zone consisting of at minimum the Natitingou-Birni-Massedénya-Tapondé quadrilateral was inhabited by a bayobè populations’ group of which it is really impossible today to analyse the faces and possible components. This group was dismembered at the beginning of the 18th century by the infiltrations of the Batammariba coming from the north-west and of Woaba (Yowabu) pushed back from the Borgou by the Bariba and, finally, by the Bariba attacks for the region of Birni.”

According to (Cornevin, 1959), the ethnic group, which brought together the Lamba or Lama, the Losso, under the umbrella of Lama or proto-Lama, would have settled in the south of the Atakora (Batammariba country) and occupied the region between Djougou and Sansanné-Mango before being dispersed and pushed back into the current sphere.

Spreading the inquiry to the west, there is also much uncertainty; the most ancient populations would have been very close to the Gurma (or Gourmantchè). However, due to subsequent movements from the north, there is a link between the Batammariba or their ancestors, the Niendé, and between the Tayaba and Berba in the north. The Konkomba are mentioned in the dagomba legends dating back to the 11th century (Cornevin, 1962). Froelich (1963) notes that, around 1543, the gbanyé or gondja fighters, having come from the southwest, pushed the Dagomba back and reached the Konkomba who were the victim of their subsequent attacks. Sometime later, the sovereign Dagomba Na Louro (1554-1570) chased them away from Yendi and established his people there (Cornevin, 1962: 31).

These movements are relatively important because of the subsequent displacement of the local populations; some clans may have moved a little further, perhaps beyond current Togo. Troestler (1939) hypothesised that the Batammariba originated in the southwest; the clan bears the name that the Konkomba pass on and is similar to them. It has been established that, during these times, the Gurma “came down” from the north towards the ocean following the bank of the Oti River. There was also, undoubtedly, progressive assimilation by the “native” ethnic groups; clear-cut differences are noted in the mosaics produced by current populations and, for example, the linguistic maps by Manessy (1971: 226) and Prost (1973: 445).

Among the causes of the Gurma movements to the south were internal quarrels in the Mossi country whose repercussions spread from one close relative to another. Despite the presence, even today, of Gurma groupings in the northeast of the chain, the road that the founders of the Taneka and Tamba dynasties would have followed, the origins of which are attributed to this same ethnic group, are difficult to distinguish. The reason for the Djerma and Dendi migrations lies in the Soncha expeditions of the 16th century. The result was slow, peaceful infiltration based on trade, coupled with Islamism. This north-south movement

joins at a very populated point, Djougou, and it was also to join the Bariba movements from the east to the west. In summary, around the 16th century or towards its end, it seems that important groups occupied the east and south of the Batammariba: Lama or on the one side and Waba on the other, constricting the centre of this region occupied by the ancestors of the Bèsuribè-Biyobè, following the schema outlined earlier. While there are few records, it seems that the situation was more complicated in the north and the west, where migration movements were more intense (Fig. 4.3).

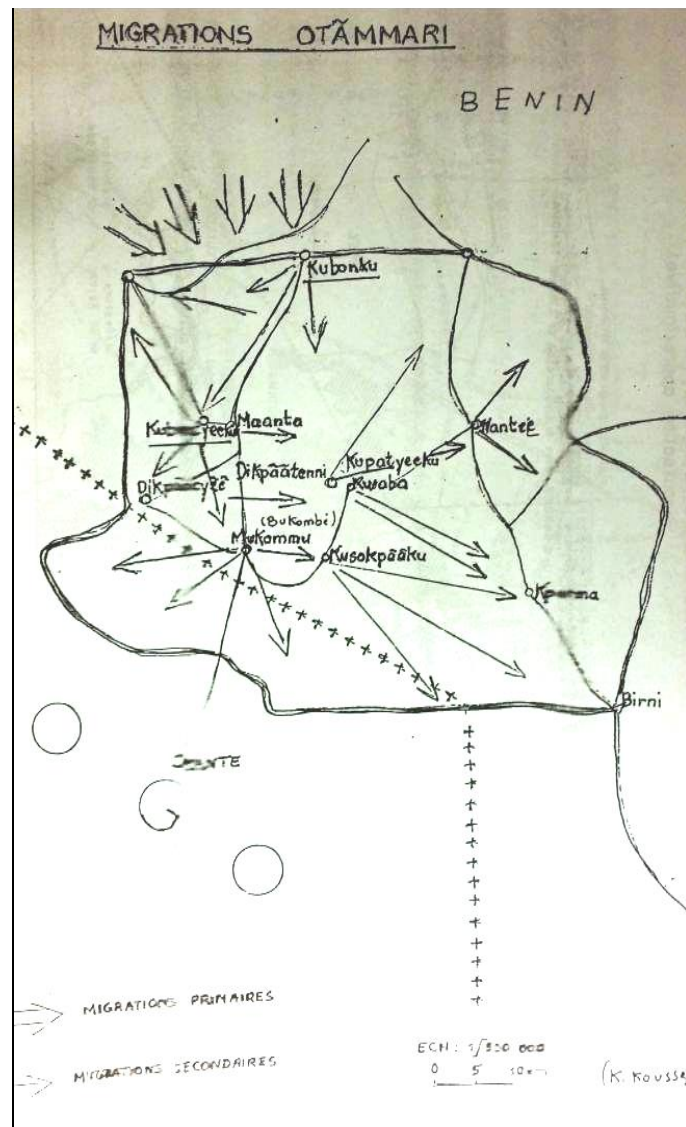


Figure 4.3: Batammariba Migrations Map drawn by Lieutenant Troestler in 1938.

4.3 PHYSICAL- ENVIRONMENTAL BACKGROUND

4.3.1 Batammaribaland

The Mountains (Fig. 4.4 and Fig. 4.5)) of Togo and Benin take the form of two almost parallel chains towards the north-north-east and the south-south-west which form the essential framework of the area. To the east of this mountainous mass extends the Bariba steppe with an altitude fluctuating between 350 and 400 metres. The central plateau is limited by an abrupt eastern edge dominating the Bariba lowland of Mékrou, close to Birni in Guilmaro. The western cliff is much steeper but is notched with several openings, sometimes extremely close together. Above the plain, the average altitude is 200 metres.

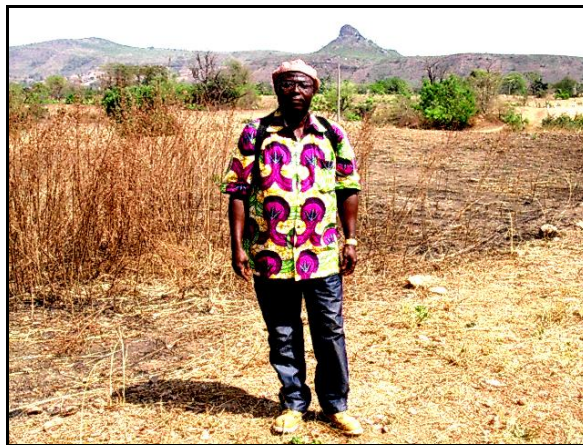


Figure 4.4: Researcher in Attakora Valley in Boukoundé, Benin. Yavo, 2005.



Figure 4.5: Another view of Attakora Valley in Nandoba, Togo. Yavo, 2005.

The space between these two borders is dominated to the west by the Yowabou plateau whose centre is close to Kotopounga, occupying about 600 metres of the extended field. The eastern part is distinctly mapped out. A watershed runs through the northeast into the south west partially through Natitingou in Kouaba. On the northeast of the plateau, the high plains of Pendjari lead to Kounné and Tikou, while to the northwest the valley of Koumangou initially faces the north, then moves towards the southwest.

The Kéran in the south of this watershed collects water from many rivers whose valleys resemble a vast half-circle; the centre would be the approximate point of confluence of this water and the Togolese border. This mountainous unit forms what geologists call Atakorian which is made up of quartzite and schist. Its altitude ranges from 400 to 600 metres with the lowest points remaining above 200 metres.

Toward the west extends the plain of Boukoumbé, geologically divided into two bands directed to the north-south: Kandé-Boukoumbé in the east and Buem in the west. Slightly crooked, this plain inclines westwards, with altitudes decreasing from 300 to 200 metres, but the Koumagou plain runs into the narrow range of hills in a zigzag manner, closing the Batammariba pathway linking Koruntière in the south and Cobly in the north. On the roadsides linking Natitingou-Boukoumbé and Natitingou-Birni, in the south, the Benin plain looks broad and narrow, but towards the northwest it is more narrow, due to the several small hills which are subject to seasonal torrents.

Sinaïciré or Kounônkwé is the principal river in this area; it is initially fed by the Perma River, whose source is close to Kotopounga and which originates in the northeast. Traversing the bends, the valley faces the east. Shortly after being fed by the Iriwakou or Tiyatukwo Rivers, the river runs through the southwest into the Kéran which is a branch of the Oti, the principal river in Togo, which finally runs into the Volta. The decomposition of rocks has produced clay laterites and

reddish stones. The top of the hills covered with clear forest are often supported by these rocks, which look like a low-lying cliff. The bottoms of the small valleys are dark and damp.

The highest zone called the Yowabou Plateau offers a heavier structure. Its edge consists of wooded slopes. The land of the south is not very fertile; we crossed large, sterile lateritic breast-plates, but the plateaus located further in the north, to Pouya and Kotopounga, seem to offer more resources. While the southern region is cut deeply by ravines into which the Perma and the Kota flow, the area is divided by the upper course of the Irikouakou and its tributaries which sometimes flow at the bottom of very deep gorges. As in the south, the sharp slopes are wooded, while the relatively level and horizontal surfaces of the plateau allow for cultivation.

Ethnically, this eastern zone of the Batammariba country is the meeting place of the Yowaba, of Bèsuribè and of the Natimba of the northwest: for the Somba, it is a land of emigration less populated than the west, promising more productivity. Natitingou and its surroundings are at the meeting point of two mountainous zones; this region separates the valley of the Pendjari or Kunné (in Otammari) from the plain mentioned earlier, formed by the valley of the Sinaïciré.

Steep-sided, this basin of the Kunné is large; the eastern slopes crossed by the Natitingou road at Tanguiéta have more resources than the western slopes and have allowed for the establishment of numerous villages. The western part of the valley is more arid, perhaps because of its orientation towards the Harmattan. In the north of Kokoré there is evidence of the onset of desertification due to erosion. However, the clear, grey or ochre alluvial lands close to the river are often used to cultivate sweet potatoes, tobacco and cassava.

The mountainous western zone has several natural barriers that separate the Magou, Koumangou, Kunniti, etc. One of the most interesting areas is the plateau

that spreads more or less from Koussokwangu-Féri, to Kwaba and Tagaeye and extends from the south to the north, then divides itself into two branches; this frames the high Pendjari. This plateau is relatively populated and offers some land that can be cultivated but its fertility is decreasing.

The northern part borders of the Natimba country are not very fertile and are made up of rocky hills, dotted with pieces of quartzite. The rivers cited above and their tributaries flow at the bottom of very deep ravines. There is very little level, cultivable land. The extreme edge of the west along the chain from the Togo border up to Tanguiéta and further, marked by the Tannogou Falls is far from Konkobiri, with sharp cliffs.

The most well-known feature of this landscape is the Kousokwangou-Féri cliffs on the way to Natitingou at Boukoubé. The villages are located at the bottom of the valleys, with isolated houses on hillsides. Near Kutagu, some small stone walls signify crop cultivation on the terraces of the Kabrè. The land is greyish white and very different from that of the plateaus, for example, at Kuniângu.

The western plain, usually called the country of the Bètiabè, consists of grey clay, often mica, a product of the decomposition of the old schist. The houses are this colour, offering a contrast with the red tones of the fields and the purple of the plateau. Population density is high in this area and at the borders of some villages, with 100 inhabitants per square kilometre. Demographic pressure has prompted emigration to Tchoumi-Tchoumi and Birni.

There was also information that some individuals had moved further afield to Djougou or South-Benin. It is possible that there is also some migration to Togo, but the predominant movement of people is in the east. The plain near Koruntière (Fig. 4.6 A and B) is considered exhausted and the land in the neighbourhood of Boukoubé is getting poorer and poorer. It seems that the north-south band

spreading along the jasper and sandstone hills from Korontière at Cobly is less fertile than the land that borders the bottom of the cliff.



Figure 4.6 (A and B). The researcher on site visite in Boukoumbe area in Benin. Yavo, 2005.

4.3.2 Setting

4.3.2.1 Choice of the site

Visits to the 12 villages where 6 typologies were chosen (Maps in Fig. 4.7 and Fig. 4.8) for site location, which form the case studies for this study revealed the procedure for choosing a site for Batammariba buildings. Normally, the Batammariba builds his house in a clear space with a slight slope for effective drainage. The soil can be of any quality, hard or loose, however, a preference was observed for solid terrain where the house will be built on tough laterite; only places where some detritus was deposited were excluded, for fear of an evil influence.

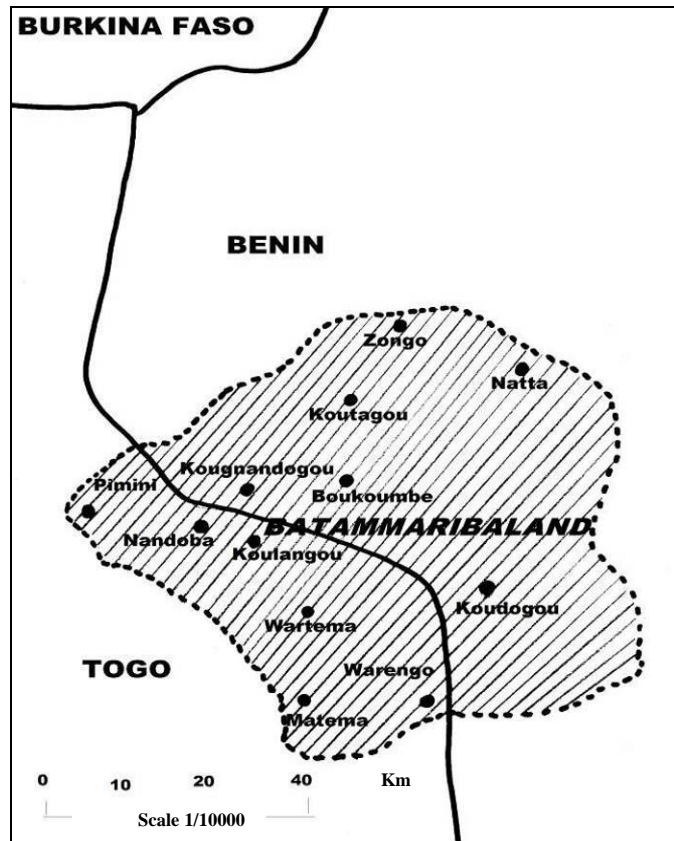


Figure 4.7: Map of Batammaribaland showing selected villages used for case- studies. Yavo 2006.



Figure 4.8: Location of Batammaribaland. Retrieved from UNESCO World Heritage Site. 2007.

The patron of the dwelling chooses the appropriate site. As soon as the rainy season starts, he will clean up with help from his children, flattening the ground and creating a circle with dimensions that are a little bigger than the envisaged dwelling. If the land is horizontal, a ditch with very smooth slopes, almost 30 centimetres deep, is dug around the perimeter, to prevent running water from destroying the bottom of the walls. A secondary ditch will often flow from the first and will lead to well with a variable depth and course.

As soon as the storms stop the labour is resumed in the dry season. If necessary, a kind of mortar is smoothed on the surface; a small area is prepared to determine whether the choice of the site is judicious. At sunrise the next morning, the head of the family needs to establish that there are no footsteps at the site. Even a small stone would indicate that the soil belongs to an evil spirit, or is a path used by some spirit. However, fallen leaves are not regarded as a bad omen.

If an enemy of this kind presents himself the Batammariba consult the fortune-teller, the oracle of the stick; this will explain the reason for the opposition of the evil spirit. A local divinity can sometimes be won over by the offer of a sacrifice. Otherwise, the head of the family will look for another favourable space.

The head of the family digs a small hole in which he buries an egg which is left for five days. If the egg remains in the same place, he can build. At Koulangou in the north of Nandoba, the same procedure is used: termites often attack the egg; these insects are seen as representing the evil spirit.

To decide on the site of the house, the Béyianbé do not consult a magician: they know traditionally harmful places called dadwonna; it is the same at Kougnandogou between the huts of Nkué and Menkienti. These places are haunted by ghosts or visited by wizards; very little distinction is made between these two evils. These beings are extremely malicious and if someone touches them, he dies. They present themselves in the form of giants 20 metres high and

are capable of changing form and colour. In principle, their presence does not harm cultures, only building construction. Their known trajectory zones are also prohibited and called tadiana. Places where the soil moves belong to them and people who pass by get stuck in the sand.

For example, a one kilometre swamp exists in the northwest at the crossroads of Natta and Zongo. Some places can no longer be cultivated; the harmful hours are noon and midnight. Old people report the case of a man who was followed and caught by one of those demons and died. These wizards cook at midnight and light fires. A careless person who is attracted by those fires and passes nearby will have sand thrown at him; if the sand touches him, he will go mad.

4.3.3 Climate

Climate is an important factor in both the location and form of Batammariba settlements. West Africa has a tropical climate with wet and dry seasons. It is characterised by broad east-west belts in which the duration of the seasons depends on proximity to the sea or the Sahara. The savannah is the result of lengthened dry seasons and a sharp drop in rainfall. This region is located in less humid areas than the forest belt.

It begins at the periphery of the forest, forming a horseshoe enclosure around the belt. The Batammariba people live on the northern fringes of the forest belt in the savannah. Five hundred kilometres away from the Gulf of Benin, Batammaribaland has a similar climate to that of Sudan. The most elevated peaks in the west are 600 metres and the highlands of Taniapéta-Kotopunga in the East of Natitingou reach 640 metres. The Boukoumbé plains have an average altitude of 200 metres.

- **Rainfall**

According to the Togolese Weather Bureau Chief Mr Kodjo Damasse, the average rainfall in Batammaribaland and Nandoba is about 1,270 millimetres per annum (see Fig. 4.1 and 4.2). The region experiences rainfall for an average 100 days a year. Data collected over the past 30 years show that the most rain fell nine times in the month of September, six times in July and four times in August.

Calculated over 10 years, the average rainfall in Boukoubé is 1,078 millimetres, with the monthly maximum rising in September. Zongo, on the borders of the eastern Atakorian plateau, has 80 days of rain per annum and receives 1,218 millimetres. Natta presents similar statistics as Boukoubé with 1,044 millimetres falling over 78 days.

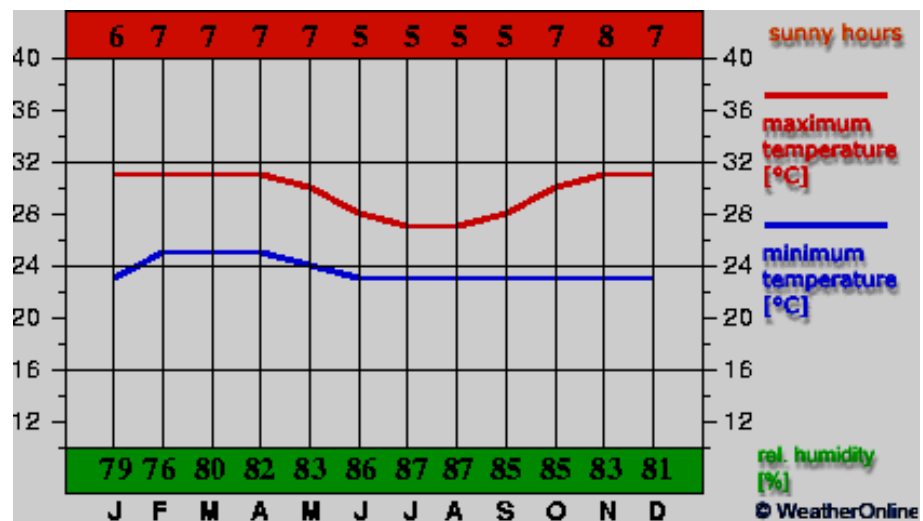


Table 4.1: Climatic Diagram with temperature variations in Nandoba. Retrieved from WeatherOnline, 2013.

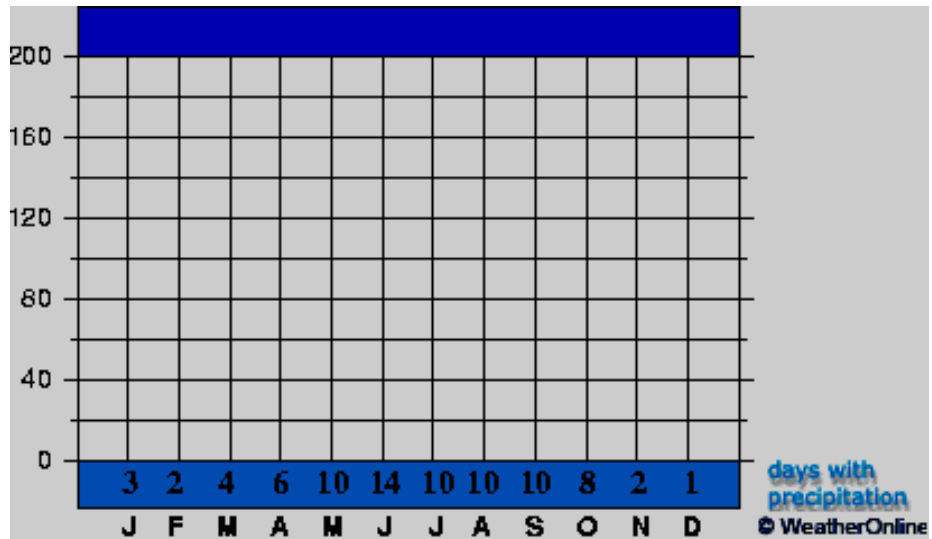


Table 4.2: Climatic Diagram with precipitation in Nandoba. Retrieved from WeatherOnline, 2013.

According to (WeatherOnline, 2013), there is no general explanation of the word 'precipitation days' yet. The amount of precipitation is generally expressed in units of liquid water depth (e.g., centimeters or inches) of the water that has fallen on a horizontal surface at a given point and over a specific time interval (e.g., last 6 hours). Nonetheless, sometimes this amount of water is so small that weather stations correctly report precipitation, but simply cannot gauge it.

For instance, a typical source for such 'non-measurable' precipitation is very light drizzle, dew or rime and even sea spray. Fog is the most common reason for precipitation less than 0.1 mm. The diagram of Nandoba shows that every day precipitation includes days with non-measurable precipitation. Thus the actual number of rain days appears to be somewhat too big. Table 4.3 illustrates the number of days for climatic review in Nandoba (Togo).

Parameter	Jan	Feb	Mar	Apr	May	June
Max Temp	755	678	756	735	757	732
Min Temp	755	675	752	735	767	726
Insulation Time	248	226	248	240	248	270
Precipitation	659	587	651	649	673	679
Humidity/Visibility	107	85	99	98	105	102

Parameter	July	Aug	Sep	Oct	Nov	Dec
Max Temp	769	758	737	771	755	755
Min Temp	765	755	735	779	753	753
Insulation Time	217	217	270	248	210	279
Precipitation	684	695	685	708	674	137
Humidity/Visibility	119	101	109	120	117	106

Table 4.3: Number of days available for climatic review (Nandoba, Togo). Retrieved from WeatherOnline, 2013.

- **Wind**

Like all of West Africa, Batammaribaland is subjected to monsoons. In winter, high pressures are constant at the centre of the Sahara and blow towards the low pressure zone of the Gulf of Guinea, forming masses of dry air which are relatively cold. This is the famous northeast Harmattan. In November, it settles down gradually and becomes humid and icy. Carrying particles of dust, the wind blows slowly in the morning and the evening, then blows eastwards at high speed. The December winds blow steadily to the northeast.

The month of March is famous for its morning wind of 10.1 kilometres per hour. In April, storms have a speed of 9.7 kilometres per hour in the morning and nine in the evening. In April and the following two months, the direction settles steadily towards the west-south-west at a speed of close to ten kilometres per hour (Togo Weather Bureau). In July, the wind blows steadily to the southwest at close to eight kilometres per hour.

In August and September, the direction of the wind is more to the southwest, with some changes towards the east. Finally, December and November are relatively calm with the wind blowing equally from the east and the west at around four kilometres per hour in the morning and two in the evening as seen in Table 4.4.

In conclusion, the climate of the whole region from Cotonou to Gao is generally fair. It is neither too wet nor muddy; however, it is excessively dry, with altitude determined by latitude and distance from the ocean. This climate is relatively favourable for human activities and, in my view, is one of the reasons for the relatively high population density in Batammaribaland.









N	4 %	
NE	3 %	
E	1 %	
SE	1 %	
S	23 %	
SW	48 %	
W	15 %	
NW	5 %	

Table 4.4: Wind-direction (January 2013 - December 2013)

4.3.4 Vegetation

Deforestation is very pronounced and it is impossible to establish whether man or domestic animals such as bullocks and goats are responsible. The Fulani groupings that cut branches off trees as fodder for their animals are currently sparse in Batammaribaland.

The Atakora is a sparsely-wooded savannah. The land that is inhabited and cultivated resembles a park with its karités, nérés and recently imported mango trees, while the tamariniers, baobabs, cailcédrats and other trees still survive and are preserved for food or for religious reasons. In this country of plains and hills, the savannah is criss-crossed by forests lining the bottom of the thalweg, but in many places these wooded areas have given way to crops. This is very evident in Boukoumbé and the north. Deforestation seems less pronounced around Natitingou, but is very visible in Tchourni-Tchoumi along the banks of the rivers of the Irikuakou.

There are no longer forests worthy of the name on mountain cliffs and more particularly on the slopes facing the west. Strips of scanty forest are sometimes found on the flat terrain south of Natitingou-Kouandé crossroads, 11 kilometres south of the administrative centre or in the west of the Perma. The provisional map of 1953, established by the National Geographic Institute, which the 2000 edition confirms, indicates three forests, two small ones near Nandoba (Fig. 4.9) and a vast one at Birni. Reforestation will require more intensive efforts. It is also important to bring the local population on board, since numerous ethnic groups such as the Somba have their own sacred forests and graveyards. Skillfully managed, this could promote the systematic reforestation of the country.



Figure 4.9: View of green savannah landscape during the rainy season in Pimini, Togo. Sawane, 2009.



Figure 4.10: View of arid savannah landscape during the dry season in Koutngou, Benin. Powell 2010.

4.3.5 The Batammariba builder and the seasons

Building in the traditional mode is a seasonal activity. While village agricultural activities prevent builders from undertaking construction work during the rainy season, the main building material, earth, cannot stand the devastating effects of the torrential monsoon rains during the rainy season. One intensive downpour is enough to destroy an uncompleted or unplastered wall. Consequently, the building season is at the end of the rainy season. November, December and January are the ideal period for building.

The stagnant water lying in the hollows only dries up by March. Hence the builders, *otammali* have both water and loam on site to manufacture mud bricks, *tabodi* (Fig. 4.11). The ground is still moist and soft and easy to break up with a hoe. Workmen expend less labour on piling up loam for *tabodi* moulding. By the time the ground has baked to solid rock, the labourer would need a pick axe or pointed crow bar to break it up.

The other component of the earth bricks, various grasses, would also still be in abundance, having not yet been destroyed by the perennial bush fires that characterise the latter part of the dry season. At this time of the year, a combination of the hot sun and the dry Harmattan wind dries the daily course laid by the builder, so that it is strong enough for him to stand on as he puts the next course on the following day. This is not possible in the wet months of the year; while in the hottest part of the dry season, the process of drying would be so fast that countless cracks develop, giving the finished wall the appearance of the skin of a pachyderm (elephant).



Figure 4.11: Mud bricks making by an apprentice builder in Koulangou, Togo 2006.

A further crucial factor at this time of the year lies in the arena of labour economics. Villagers have just harvested their crops in preparation for storage during the dry season. These seasonal labour migrants swarm into the villages. The oversupply of labour reduces the costs of construction.

Furthermore, relatives of the patron, now free from agricultural work, can lend a free helping hand, further lowering the cost. The best suited period for plastering and mending is towards the end of the dry and beginning of the rainy seasons. This has to be done before the return of the rains; otherwise leaking roofs would sustain more serious damage.

Most external construction ends with the beginning of the rains, except for emergencies arising from damages due to rainfall. However, internal work like roof decoration and the construction of built-in furniture, such as the dais, clay

bed and dado occupy the builder during this long period. This is the hardest time of the year for the full time otammali; some master builders are forced to participate in secondary occupations. Some own small shops and others sell kola nuts while some own farms outside the villages.

The top master builders do not participate in secondary occupations, since there is always enough for them to do. However, for the average otammali (builder), the period around July and August is especially rough. Food prices rocket as the previous year's harvest stored in granaries has been exhausted and the new crop has not yet been harvested. This is the best time for the shrewd patron to befriend a builder if he intends to build the following season. A local saying advises the patron to, "Befriend a ferryman in the dry season; come rain, you will be the first to cross the river".

With the end of the rainy season, the annual cyclic rhythm, perfected by generations of practice and sanctioned by tradition, starts all over again. The master builder and his patron believe that "nature designed things to happen the way they do".

Having provided a general Background to Batammariba life and Settlements, the next Chapter clarifies the importance of house types and their functions that have been identified during the study investigation. It discusses the local variants and role of the two-storey Batammariba buildings

CHAPTER FIVE

BATAMMARIBA HOUSE TYPES AND FUNCTIONS

5.0 INTRODUCTION

According to Smith (1938), house types as the basic unit of architecture are important because “the significance of a type may be an ideal, a concept, to which was associated meaning and importance”. This study found that there are six types of two-storey houses amongst the Batammariba in Togo and Benin. They include: typical *Berba*, *Beyanbe*, *Osori*, *Otammari*, *Otchaou* and *Tayaba* (Table 5.0) scattered all over Batammaribaland within the 12 villages. The most predominant is the Otammari house type (Section 5.4.1) which readily meets the need for storage facilities such as yam barns, goat pens, kraals, etc.

It was noted during the investigation that the two-storey tata buildings are scattered on the mountains and in the plains of the Atakora. The peoples that use this form of architecture are known under the common name of Batammariba. For reasons of convenience, the two-storey house is called the “*tata*” or “*takienta*”. The Batammariba “castle” stands tall with its towers and granaries, alone and proud on the rocky slopes of the Atakora, pointing the conical hats of its multiple and gigantic pieces of pottery to the sky.

Batammariba architecture presents great originality and offers a striking contrast with that of their neighbours, namely the Berba in the north, the Yowaba in the north-east, Bariba in the east and the Pila-Pila and Kabré in the south. The populations of the

neighbourhoods of Sansanné-Mango all live in the Sudanese farmstead on the ground, formed by a group of “soukalas” (Yavo, 2003). This varies from person to person and perhaps with each family or “clan”; the uninformed visitor has the impression of a complicated labyrinth of courts and huts. The Batammariba, the masons or builders of banco, "*mma*" which means to build and "*titanti*" banco or adobe, are known for their outstanding and ingenious architectural ability.

Projected in the space of a small farm, the tata's fundamental character is its vertical nature; its surrounding wall is usually three or four metres high and covers an adequate open terrace. The diverse tata-castles of the Batammariba villages are spread over several hundred metres. To our knowledge, nothing distinguishes the Tamberma models in Togo from the Somba models which are also two-storey houses. In African and particularly in Batammariba architecture, anthropomorphism is an important issue, “the house is like a human” as was identified in Lobi architecture (Yavo, 2003).

This study confirmed that the region of origin of the two-storey Atakora building is the northwest. A visit to the western and eastern regions established that the western region incorporates numerous and varied models of tatas as already indicated. From the architectural point of view, these models are of less rigid conception; more simple and more predisposed to modification.

BATAMMARIBA HOUSE TYPOLOGY	
SIX TYPES OF HOUSE ARE FOUND BOTH IN BENIN AND TOGO	
Béyanbé	Bèrba
Otchiaou	Osori
Otammari	Tayaba

Table 5.0: Six types of house found both in Benin and Togo. Yavo, 2006.

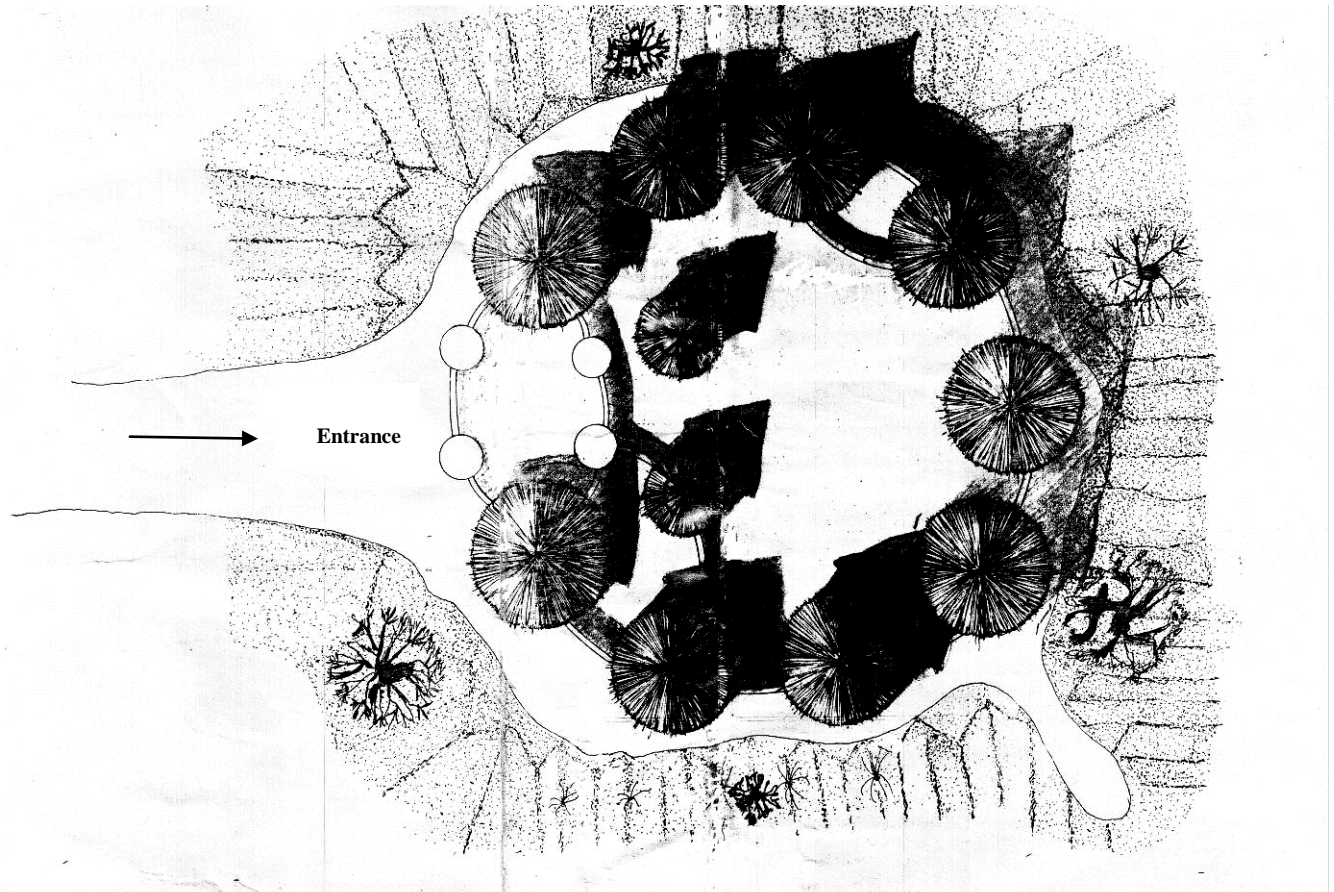
5.1 BERBA HOUSE TYPE

It was noted that whenever possible, Berba tatas (Fig. 5.1.18) are located on sites that have already been consecrated by previous human dwellings. Consecration is evident in the existence of conical ancestral shrines. A new shrine is added before construction of the new compound begins. Building construction is a cooperative effort by the future inhabitants of the compound and their relatives.

The division of labour is simple: the men build the walls and lay the roofs, while women apply the finishing surfaces. The circular mud walls are built up tier upon tier with moulded balls of wet mud, under the direction of the new compound head. The conical thatch roofs are then lashed to a radial framework of rafters. All the room units are thatched except the millet-grinding room, which has a domelike mud roof supported by horizontal wooden beams. The mud roof is a rounded extension of a bullet-shaped enclosure.

The study revealed that women are responsible for the wall surfaces as well as the patterns on the surfaces. The plaster is a mixture of cow dung, locust bean-pod juice, and mud. As the surface dries it hardens and becomes waterproof, lending smoothness and durability to the wall. The incised patterns are not made by finger application, but are cut with a sharp tool in deliberate patterns that bear no relationship to appliqué techniques. Floor surfaces are also plastered so that they can be used to dry the various grains and greens that complement the staple diet. It also indicated that Berba buildings exhibit technical proficiency (sketches 5.11) which far exceeds that of either the Beyanbe or the Osori. This can be seen in the regularity of the wall surfaces, the formation of curved surfaces, and in the careful transition effected between surfaces when the plaster is applied. This high level of proficiency suggests a long history of the internalisation of a building process particularly appropriate to the physical environment.

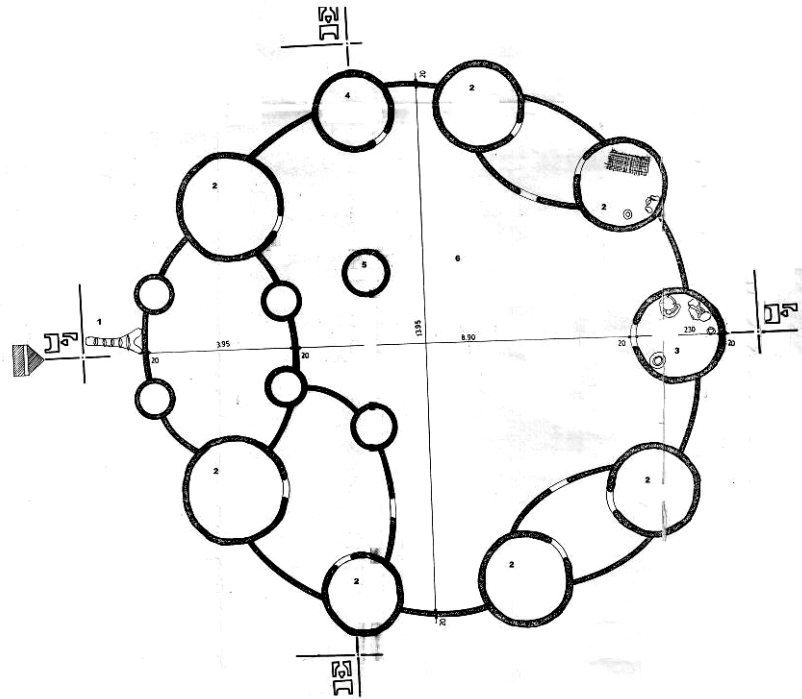
5.1.1 Sketches of Berba house type



Site Plan

Figure 5.1.1.1 Yavo: 2006.

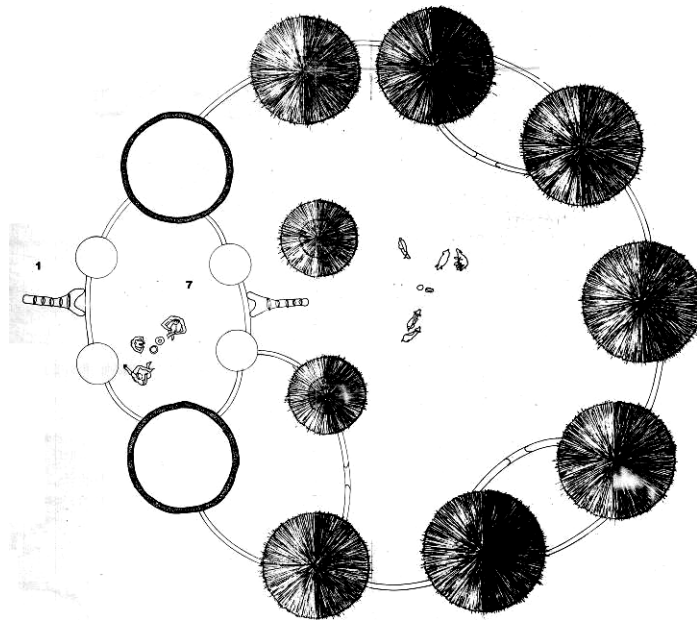
Scale: 1/1000



Ground floor

LEGEND

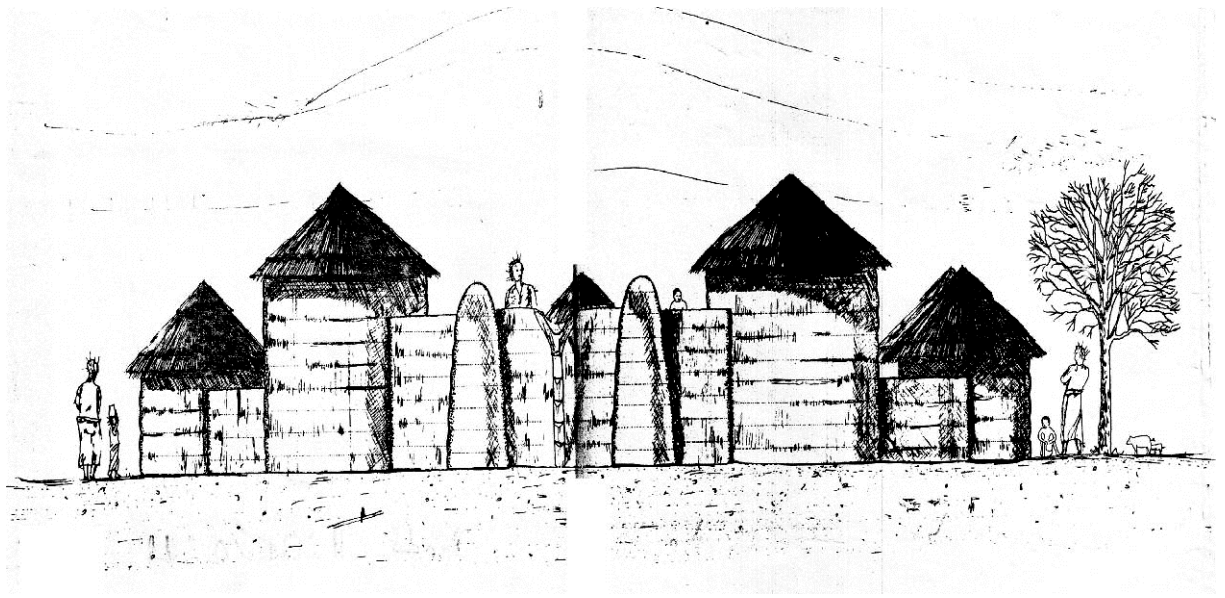
- 1: Main entrance
- Ladder
- 2: Bedrooms
- 3: Kitchen
- 4: Storeroom
- 5: Granary
- 6: Main terrace
- 7: Vestibule



Upper floor

Figure 5.1.1.2: Yavo. 2006.

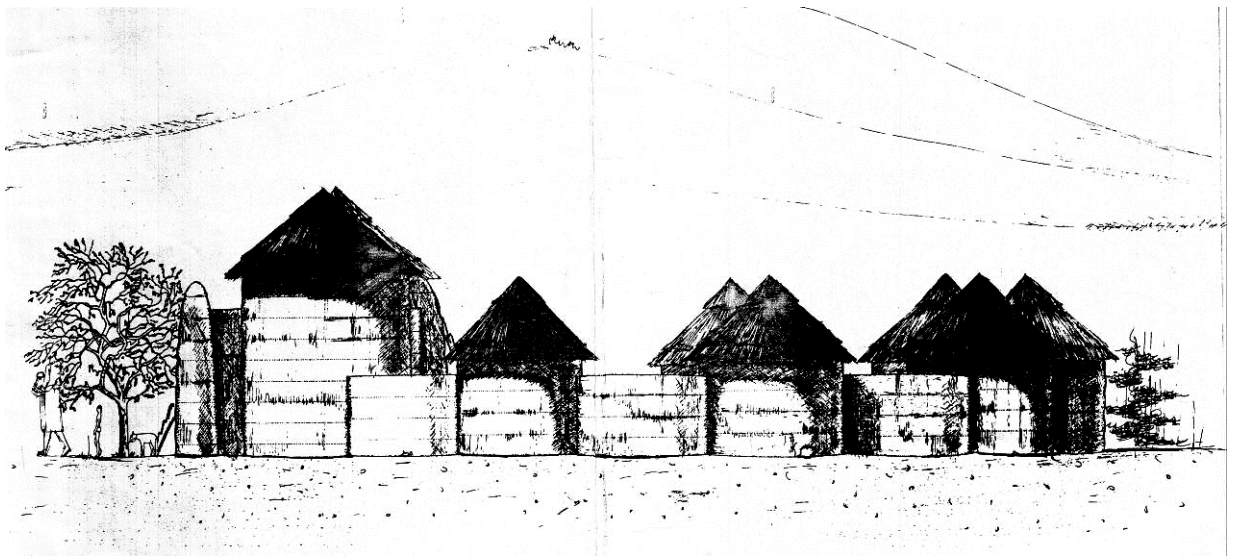
Scale: 1/100



West Elevation

Figure 5.1.1.3: Yavo. 2006.

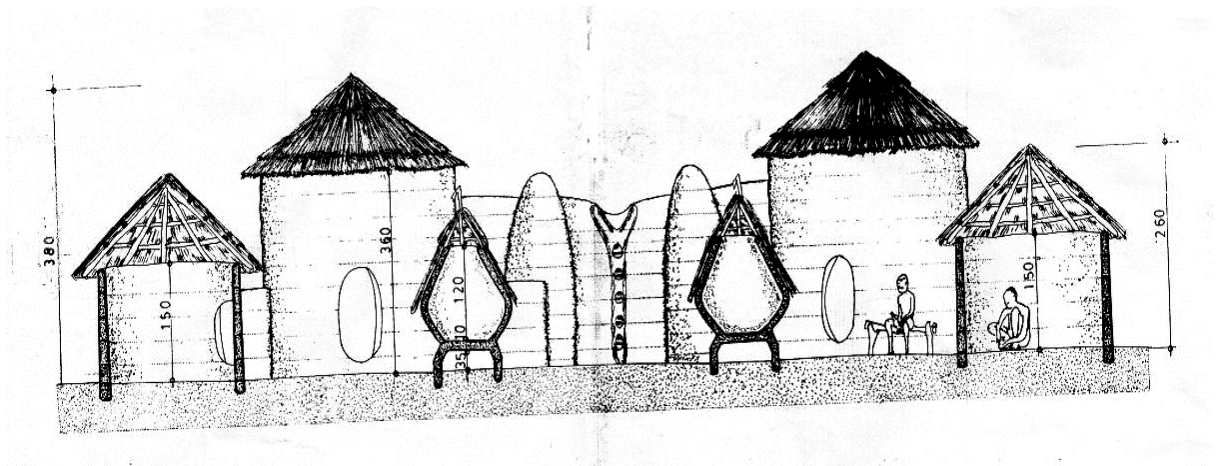
Scale: 1/100



South Elevation

Figure 5.1.1.4: Yavo. 2006.

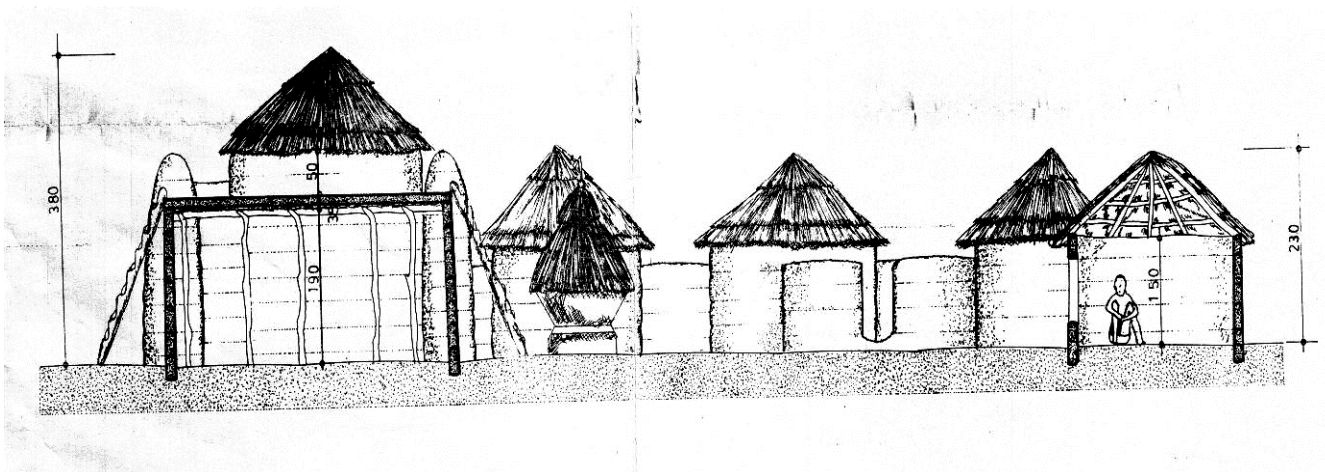
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Section: E – E

Figure 5.1.1.5: Yavo, 2006.

Scale: 1/100



Section: F – F

Figure 5.1.1.6: Yavo, 2006.

Scale: 1/100



Axonometric view of Berba tata in Natta (Benin)

Figure 5.1.1.7: Yavo, 2006.

Scale: 1/100



Figure 5.1.1.8: Berba tata in Natta (Benin), Michalides, 2010.



Figure 5.1.1.9: Another Berba tata in Natta (Benin), Powell, 2011.

5.2 BÉYANBÉ HOUSE TYPE

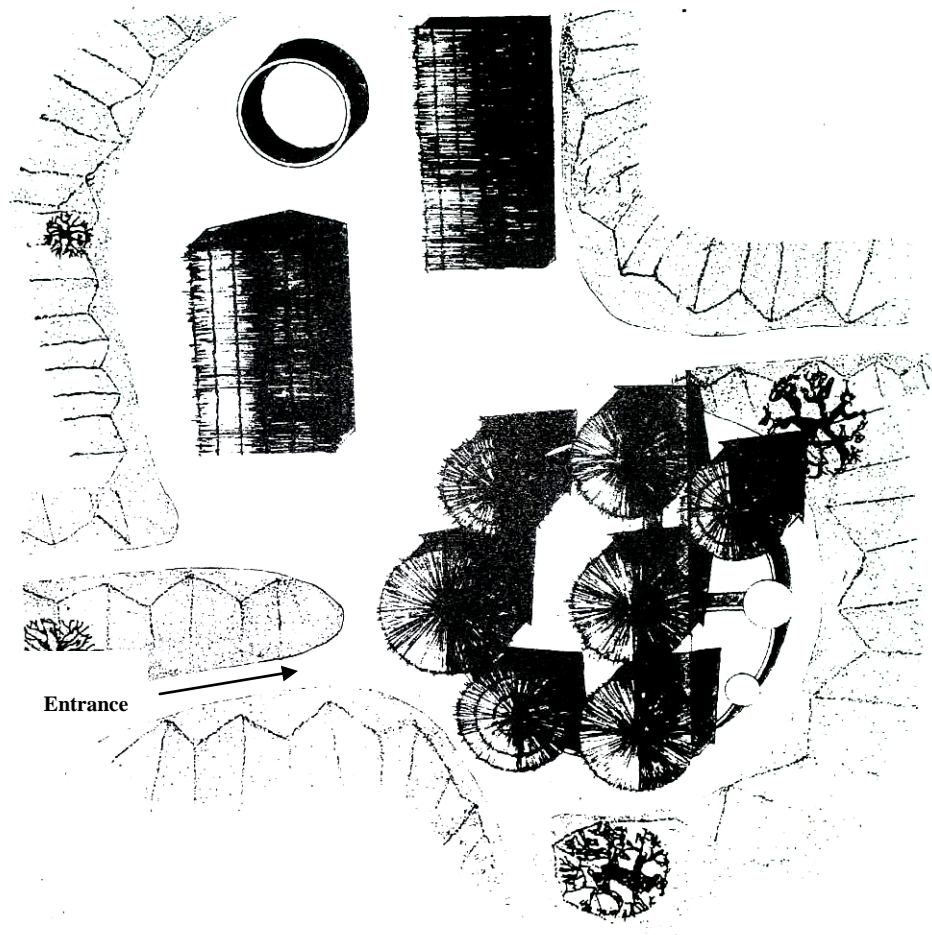
The investigation into the Béyanbé area revealed that in terms of appearance, the Beyanbe dwelling appears to be a combination of the Osori and the Otammari tata (sketches 5.2.1). Its normal features are as follows: a control tower surrounded by two garret corridors which lead to the arch and the staircase. These five towers are connected by the enclosing wall frame to the top floor. Access to this floor is facilitated by an intermediary staircase which runs from the left to the right hand side of the house.

These types of residences are also found in Koutakou, Kougnandogou and Koudogou and their neighbourhoods. In Boukoumbe, the design of Beyanbe houses is modified as follows: a central semicircle is added to the others and this resembles the Otammari type. The intermediate corridor is short, but access to the top floor is facilitated by the wooden ladder. There are few essential differences but an arch is located at each entrance. The external frontage resembles that of an Osori castle.



Figure 5.2.0: Beyanbe tata in Kougnandogou (Benin), Michalides, 2011.

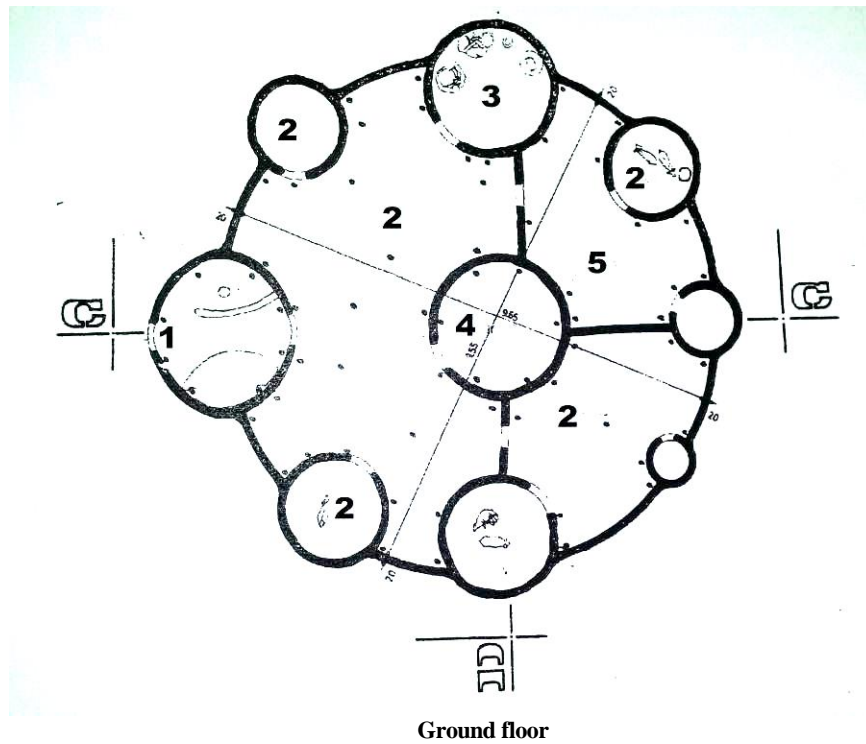
5.2.1 Sketches of Béyanbé house type



Site Plan

Figure 5.2.1.1 Yavo: 2006.

Scale: 1/1000



LEGEND

- 1: Main entrance
- 2: Barn
- 3: Kitchen
- 4: Bedrooms
- 5: Poultry
- 6: Granary
- 7: Big terrace
- 8: Small terrace

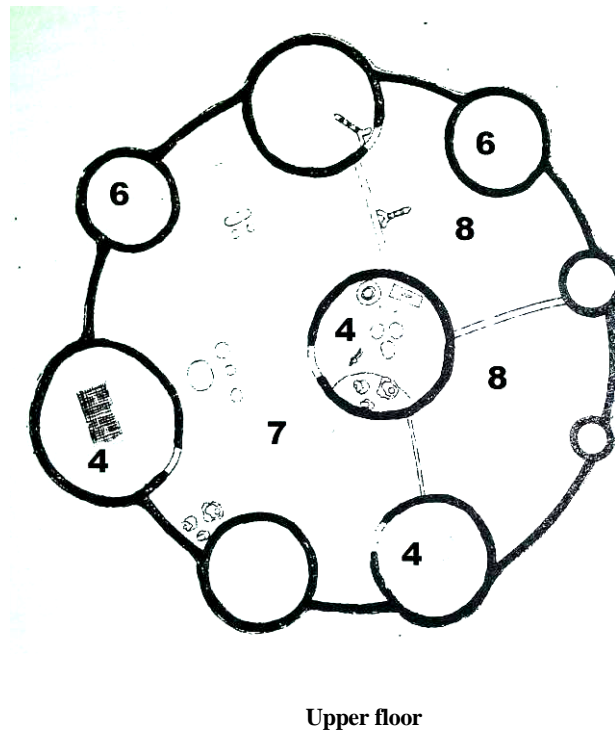
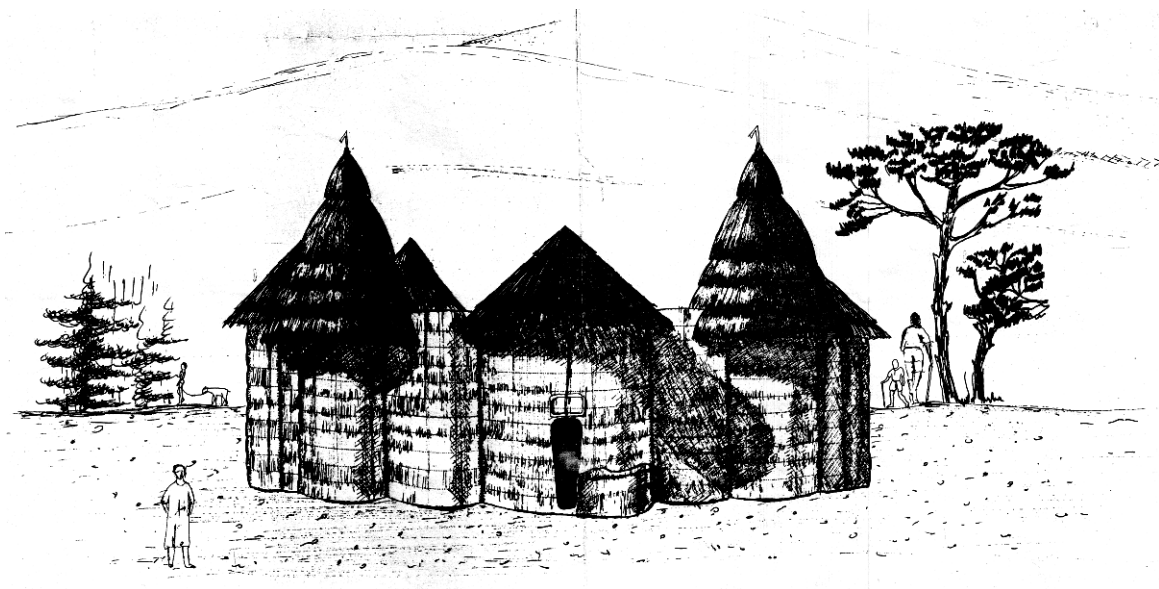


Figure 5.2.1.2: Yavo. 2006.

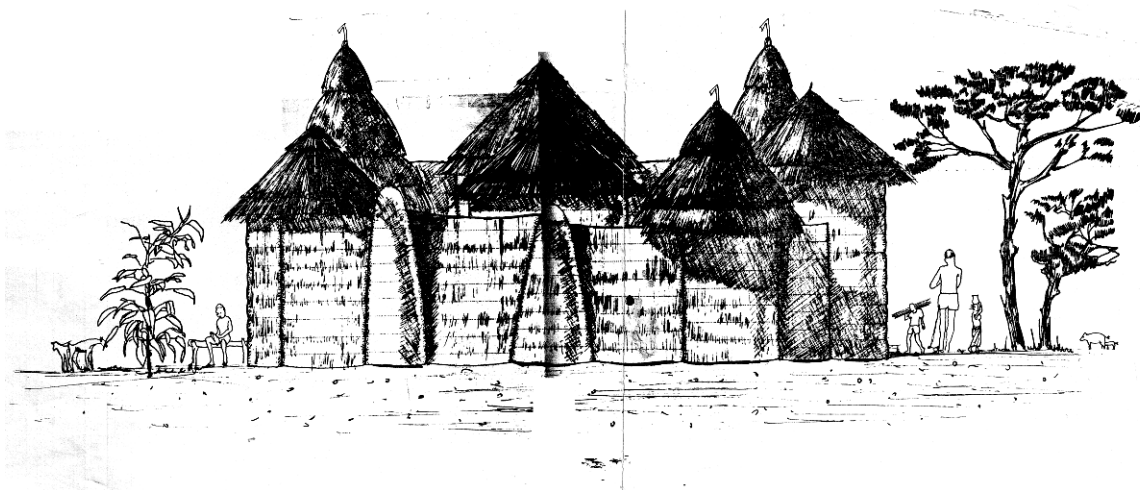
Scale: 1/100



West Elevation

Figure 5.2.1.3: Yavo. 2006.

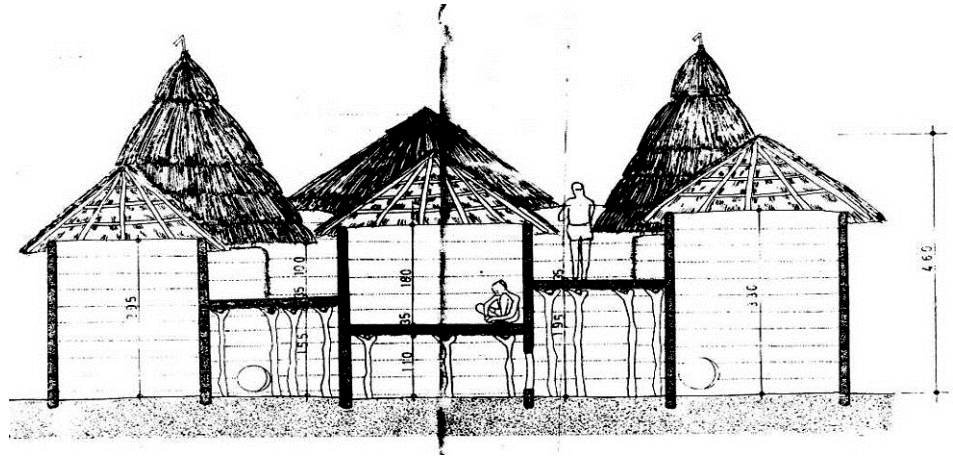
Scale: 1/100



East Elevation

Figure 5.2.1.4: Yavo. 2006

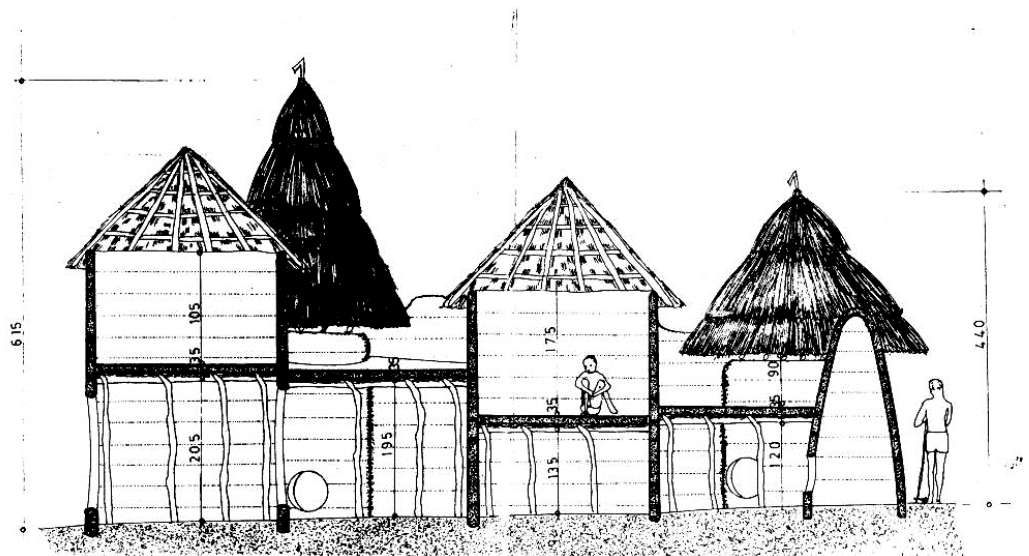
Scale: 1/100



Section: C – C

Figure 5.2.1.5: Yavo. 2006

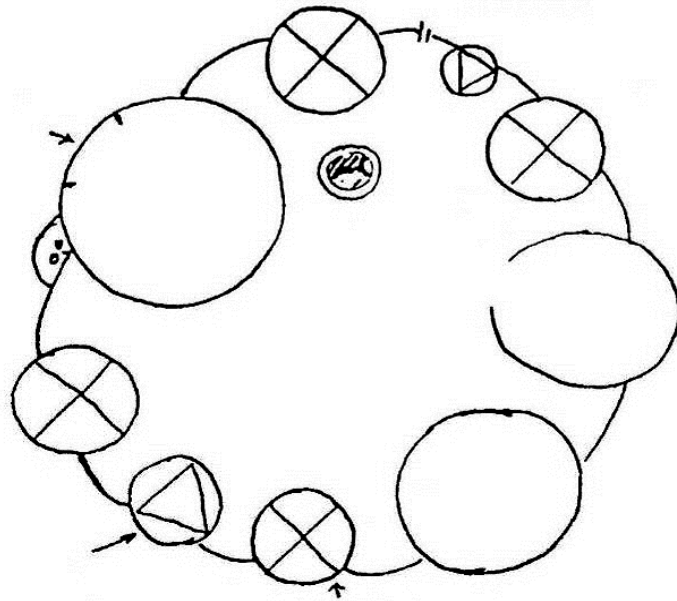
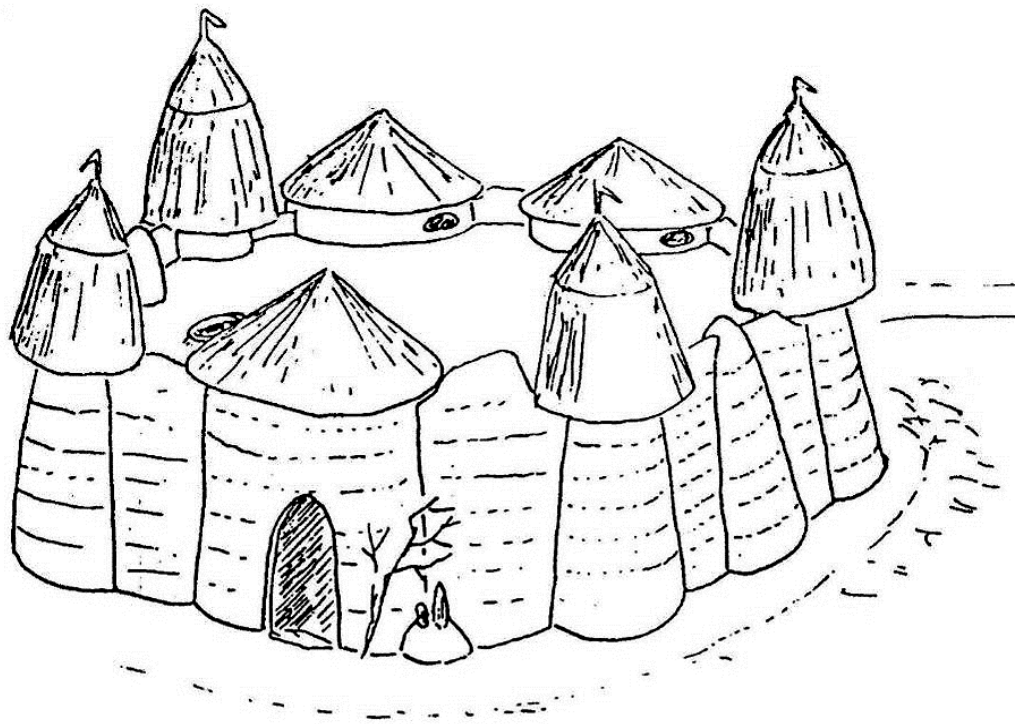
Scale: 1/100



Section: D – D

Figure 5.2.16: Yavo. 2006

Scale: 1/100



Axonometric view of Beyanbe tata in Kougnandogou (Benin)

Figure 5.2.1.7: Yavo. 2006.

Scale: 1/100



Figure 5.2.18: Beyanbe tata in Koutagou (Benin), Michalides, 2011.



Figure 5.2.19: Another Beyanbe tata in Koutagou (Benin), Powell, 2010.

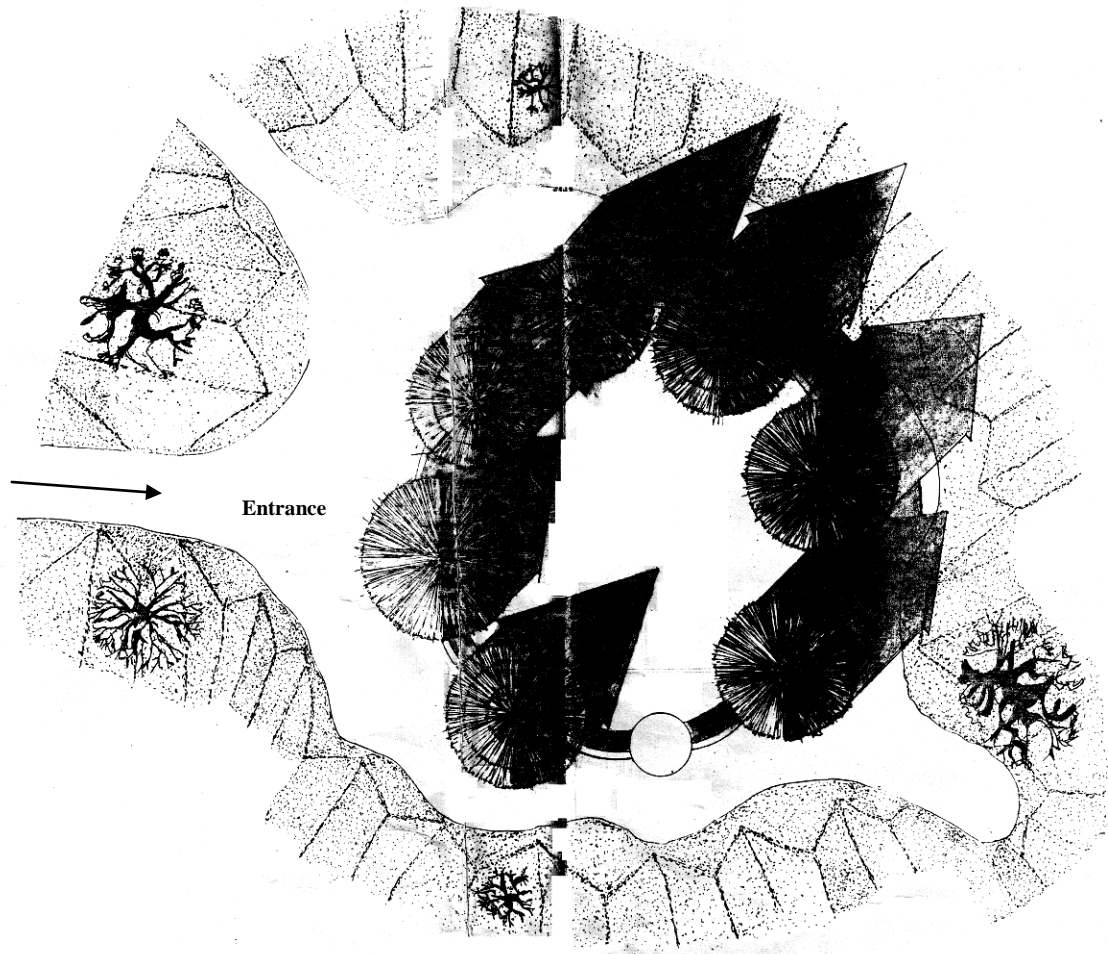
5.3 OSORI HOUSE TYPE

The study revealed that the Osori castle is more or less similar to that of the Otammari, at least with respect to the method of construction (sketches 5.3.1). The essential differences are as follows: the entrance is an encryption of two doors from the courtyard instead of two corridors. There is no intermediate balcony, nor a corridor with a staircase. One reaches the higher balcony through a large tree trunk three and a half metres high, with rough steps ending in a bifurcation: the latter rests on a relatively circular opening at the top of the balcony. This horizontal bull's eye is sealed by a pad in the mortar and prevents rain or dust from falling on the staircase to the balcony. This also prevents the staircase from drifting backwards.

The Osori house is less widespread than that of the Otammari which is common and found even across distant villages. The Béyanbé seem to use various combinations between the balconies, rooms and the garret corridors and the plans of their residences are much more diverse and prevalent in the whole Osori landscape. The functions of the various parts of the house are similar to those of the Otammari house. The ground floor is used as cattle shed and for housing hens and the altar to the ancestors hides within the interior and leans on the first floor with the wall of the principal entrance. The parents sleep in the front rooms and the children in the others.

The grandparents live with other family members, with brothers living together in some cases; this explains the partition dividing certain Osori houses into two parts. In such a case, an entrance passage links the balcony to the back part of the house and another primitive staircase is installed. On the terrace, a small dry stone wall separates the two households' space. However the entrance always consists of a single central tower of the façade. The circular wall and its role are similar to what exists at Otammari, but because of its structure, the Osori tata appears larger.

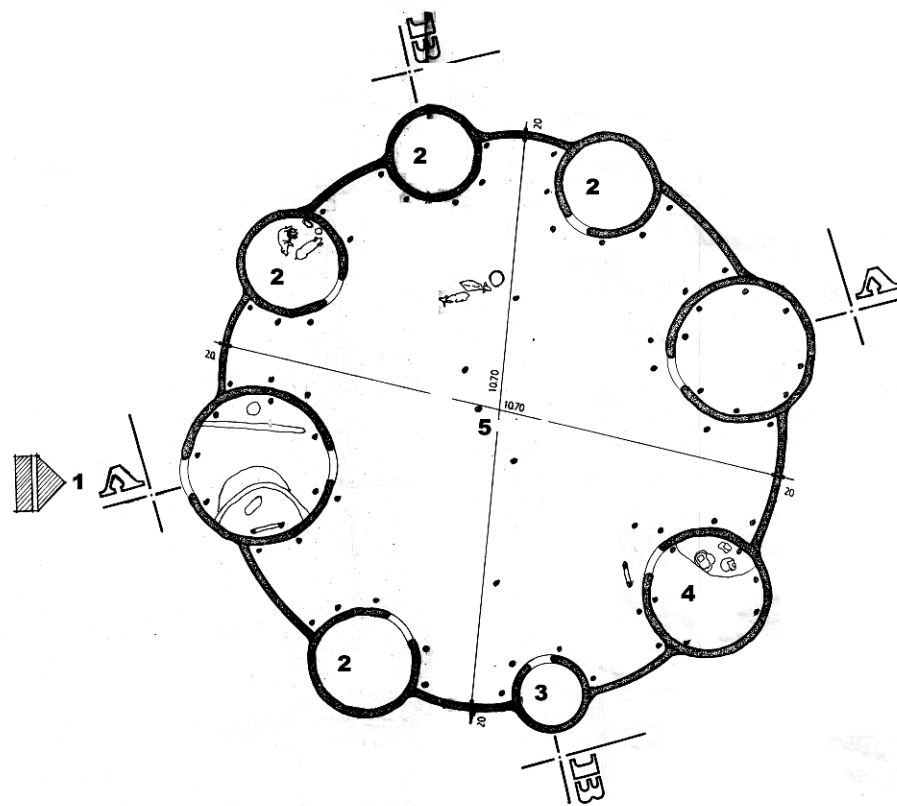
5.3.1 Sketches of Osori house type



Site Plan

Figure 5.3.1.1 Yavo: 2006.

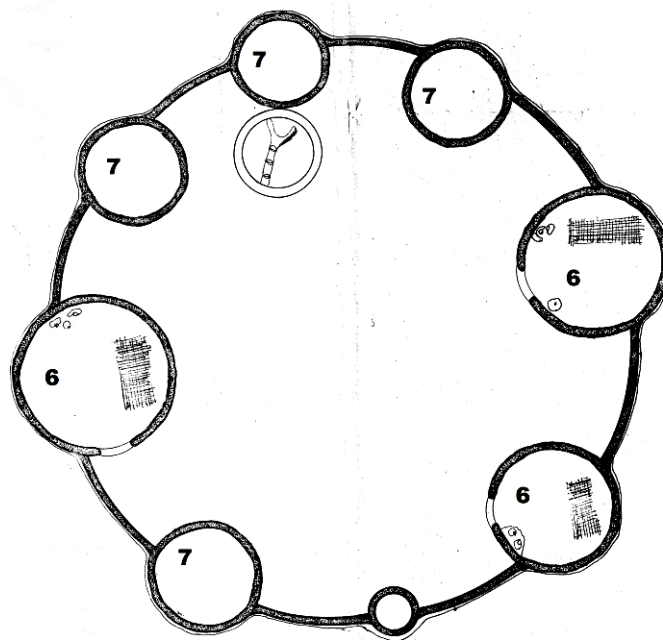
Scale: 1/1000



Ground floor

LEGEND

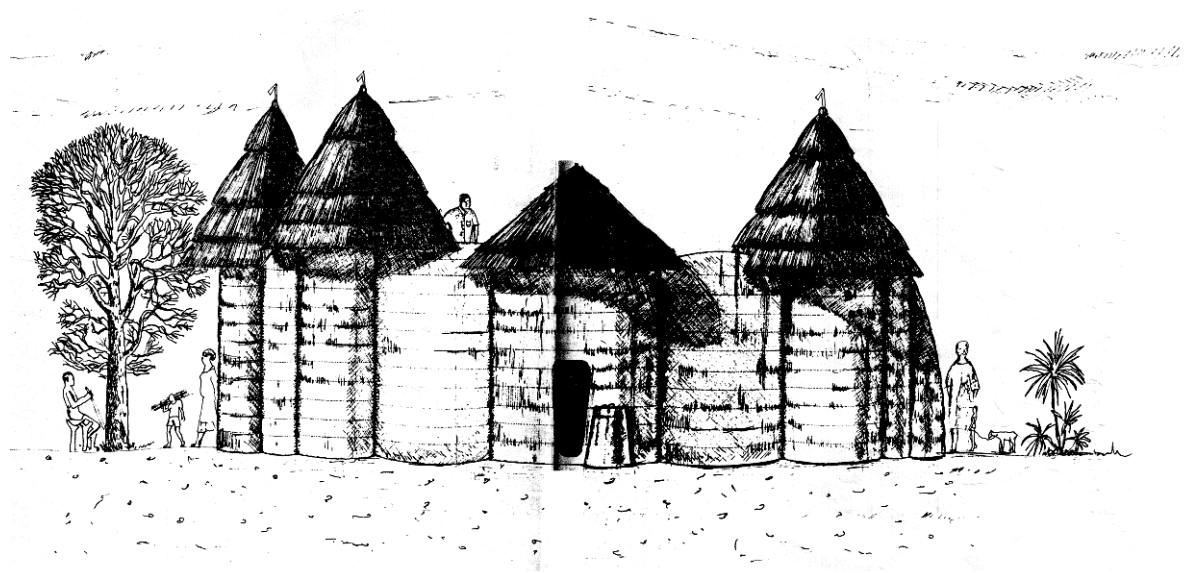
- 1: Main entrance
- 2: Barn
- 3: Atrium
- 4: Shrine
- 5: Corridor
- 6: Bedrooms
- 7: Granary



Upper floor

Figure 5.3.1.2: Yavo. 2006.

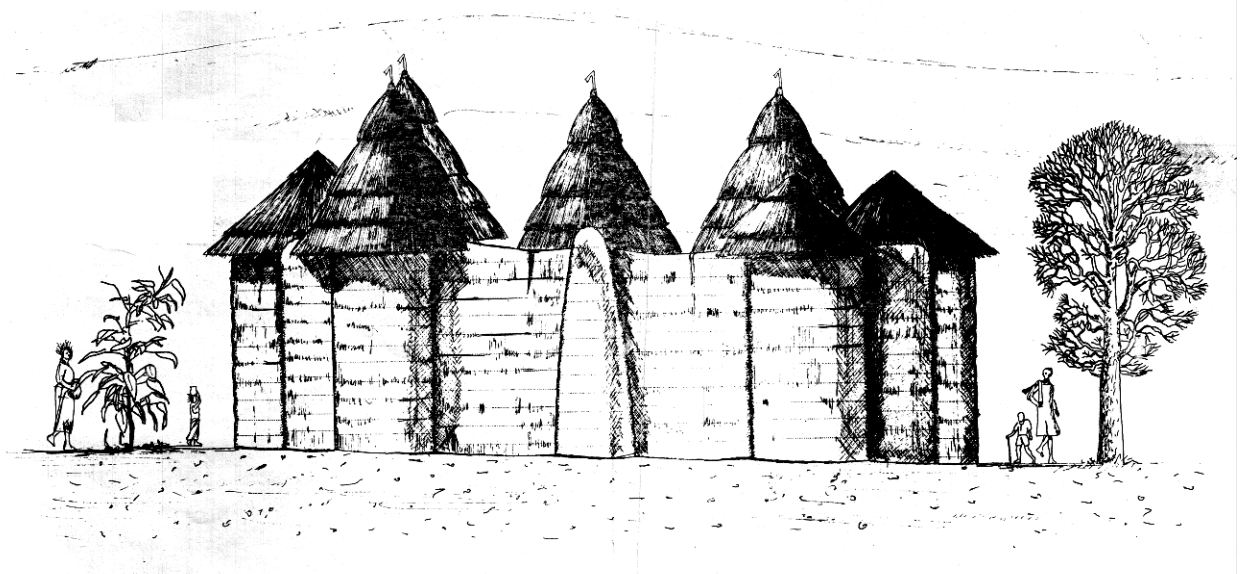
Scale: 1/100



West Elevation

Figure 5.3.13: Yavo. 2006

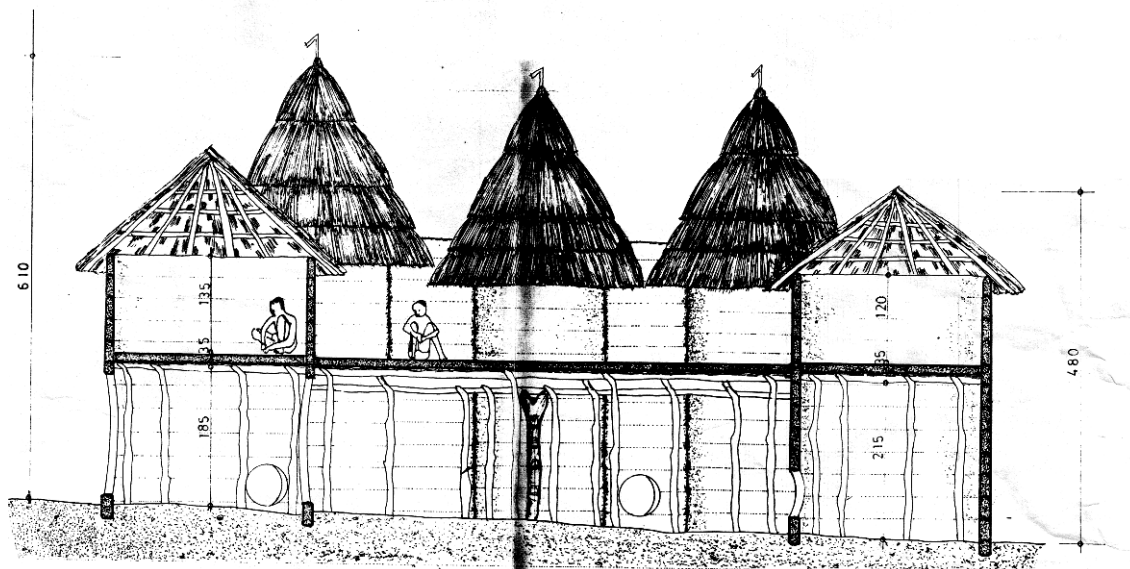
Scale: 1/100



East Elevation

Figure 5.3.1.4: Yavo. 2006

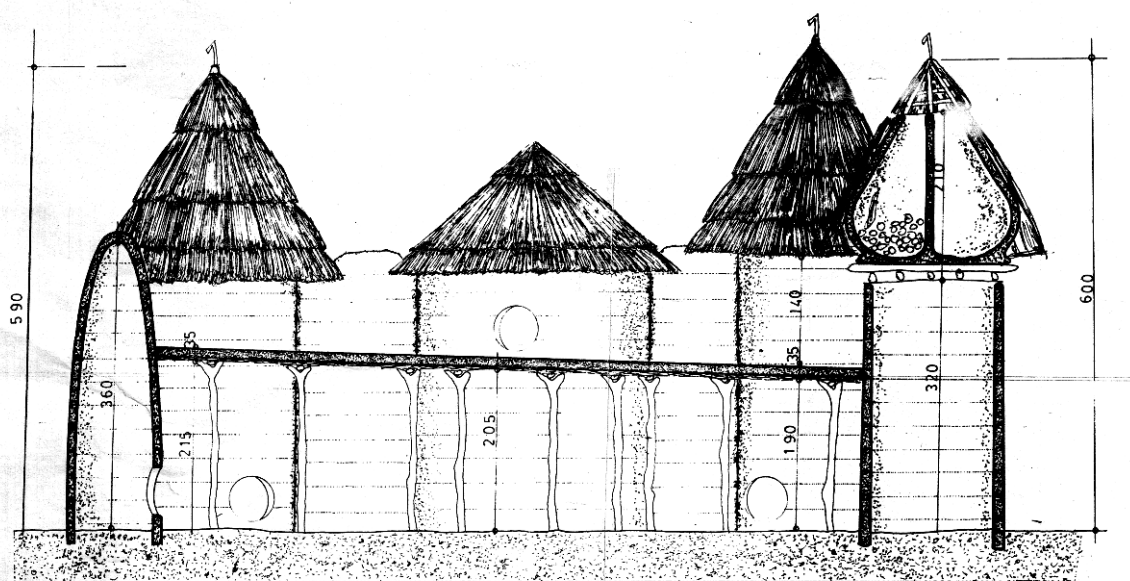
Scale: 1/100



Section: A - A

Figure 5.3.1.5: Yavo, 2006

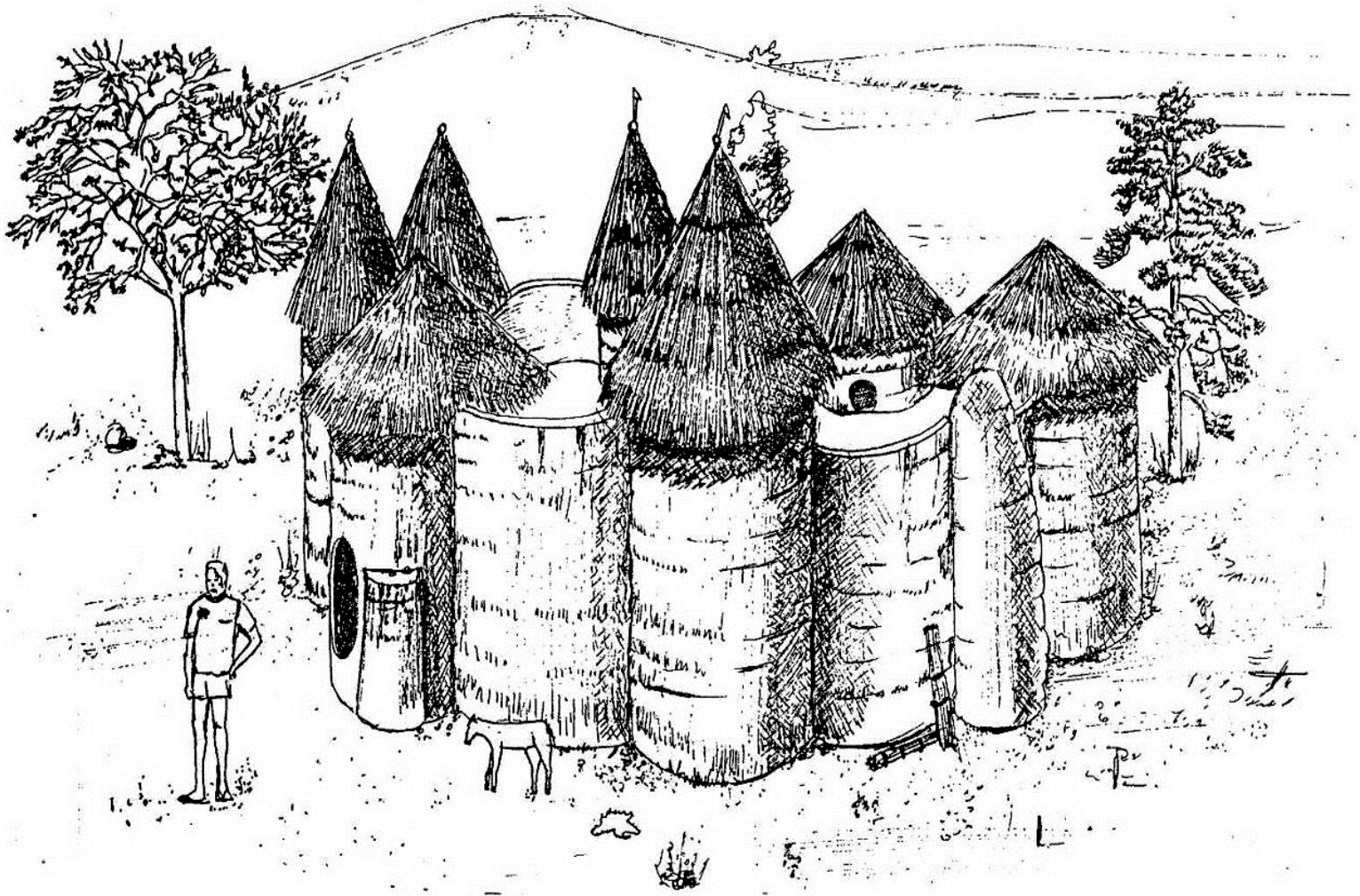
Scale: 1/100



Section: B - B

Figure 5.3.1.6: Yavo, 2006

Scale: 1/100



Axonometric view of Osori tata in Boukoumbé (Benin)

Figure 5.3.1.7: Yavo. 2006

Scale: 1/100



Figure 5.3.18: Osori tata in Boukoumbe (Benin), Yavo, 2006.



Figure 5.3.19: Osori tata in Boukoumbe (Benin), Michalides, 2010.

5.4 OTAMMARI HOUSE TYPE

The study revealed that the Otammari tata is the most common house type in Batammaribaland. The plan of the classical Otammari house can be presented in a precise diagram, although it sometimes exhibits important differences that are the result of material possibilities or of the family situation (sketches 5.4.1).

The analysis of the Otammari tata confirms that nine towers surround the main or central tower. These towers are joined by a wall built in pisé; on the plan a kind of circle is drawn. Inside, very simple roof structures support the floors and terraces. The intermediary terrace is one or one and a half metres above the soil in the northeast segment of the hut and the superior terrace is more than two metres high; it occupies the southeast part and the whole of the western part.

Further investigation established that the sole entrance to the castle is located on the western side between the two main tower granaries. One of the essential characteristics of the tata is that it turns its back on the dry and cold wind of the winter, the Harmattan, which blows from the northeast.

In this way, it also avoids offering its entrances to the furious breezes of the violent storms between seasons; the doors of the rooms facing the terrace overlook the northern side and as the dwelling axis bears slightly to the northwest, certain protection is offered against abundant rains during the Harmattan period (June-September) which generally come from the southwest.

In the region of Boukoumbe, the entrance of the Otammari tatas is mostly in the west. Furthermore, different parts of the house are associated with the different genders; the northern part of the house is feminine and the southern part masculine; this is also reserved

for religious activities. During diverse ceremonies the Batammariba move around their house in an anticlockwise direction.

The ground floor of the tata under the superior terrace forms a dark hall, with light only coming from the door and a little from the intermediary openings of the tower. The narrow openings in the surrounding wall are exclusively for looking outside. The functions of this room are multiple. If a family has livestock, the hall also serves as cowshed. Young people use it as a bedroom when the family has grown and there is no more room on the floor, as do old people who cannot climb up the notched trunks which serve as stairs; all these people sleep either on a piece of wood, or mats made of millet stalks.

Similarly, the analysis shows that access to the intermediary terrace is by means of a passage through the northern tower which is the stair tower. This is generally used as a kitchen; very often, women grind millet there on big stones which are used as fixed millstones. The height of the internal platform of this tower is very variable: a forked trunk on which coarse stairs has been carved serves as a staircase.

The intermediary terrace which follows the stair tower is also used as a vestibule and is reserved for small tasks or for drying grain. It is surrounded by a central tower and one or two granaries. Access to the terrace proper is by means of stairs of the type already described.

The southeast sector is usually used as urinal or washbasin; this consists of one or several flat stones with a calabash full of water along the wall. The pipe for waste water is made of fine, burned sand. This water is collected by a number of stones placed at the bottom of the wall. This area is almost always the same

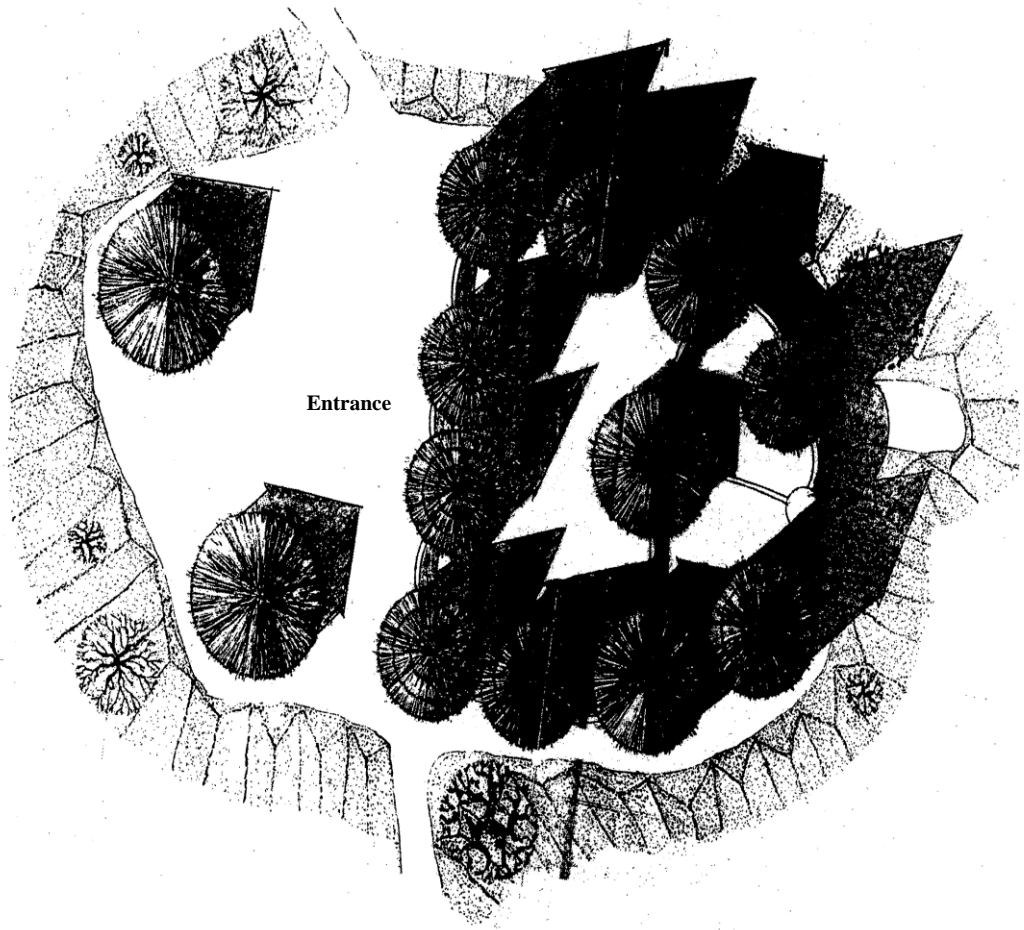
height as the western side of the terrace, but it may be higher, which is infrequent, or lower, which is more frequent.

At Koutagou a terrace was located 50 centimetres above the level of the great terrace to increase the height of the children's bedroom ceiling located immediately below it. The bedrooms normally open onto the west and the upper terraces, that of the parents in the central tower and that of passersby in the south tower. From the parents' bedroom, a very narrow opening leads to the children's rooms. In principle, this room has no opening other than the door; it is thus extremely dark and only lit by a meagre fire.

When children are old enough, they dig a hole in the wall to discretely reach the ground floor. The room designed for guests is also used as a cellar for the fruit of certain crops: karité, tobacco, beans, néré, etc. In general, the granary-towers have no internal platforms, but in large families there are kitchens, or rooms for single persons, this was also the case at the vast castle of Koulangou. The lower parts of the granary-towers, except those of the sacred tower and the south tower have various functions.

Batammariba people store their tools or keep their animals closed in these areas. Sacred drums can be stored in the southern part of the cowshed, as was observed in Warengo. The upper terrace is surrounded in the west by a row of granary towers, with four being the usual number; those of the father in the south and those of the mother in the north.

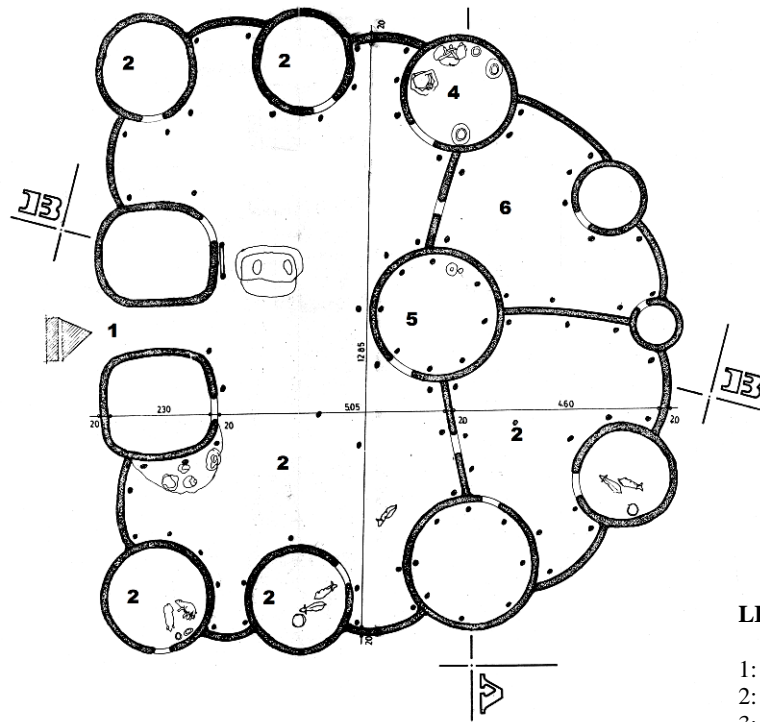
5.4.1 Sketches of Otammari house type



Site Plan

Figure 5.4.1.1. Yavo: 2006.

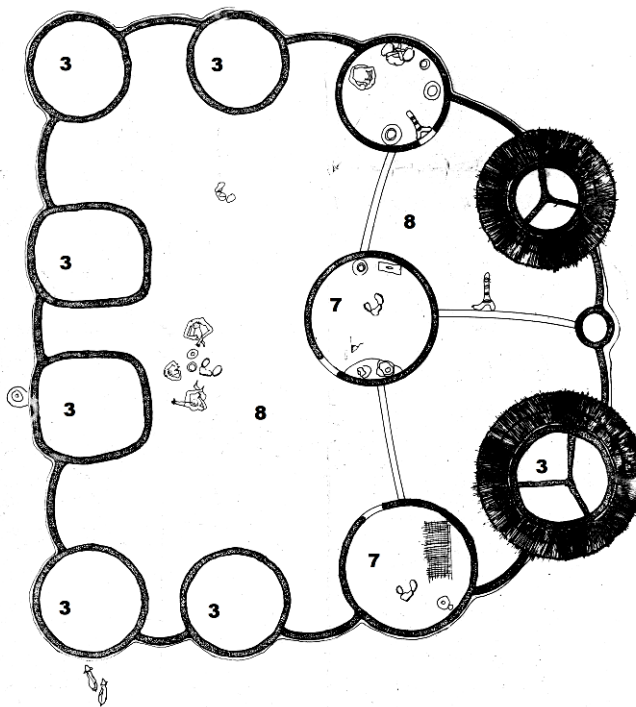
Scale: 1/1000



Ground Floor

LEGEND

- 1: Main entrance
- 2: Barn
- 3: Granaries
- 4: Kitchen
- 5: Elderly Room
- 6: Poultry
- 7: Woman Room
- 8: Atrium

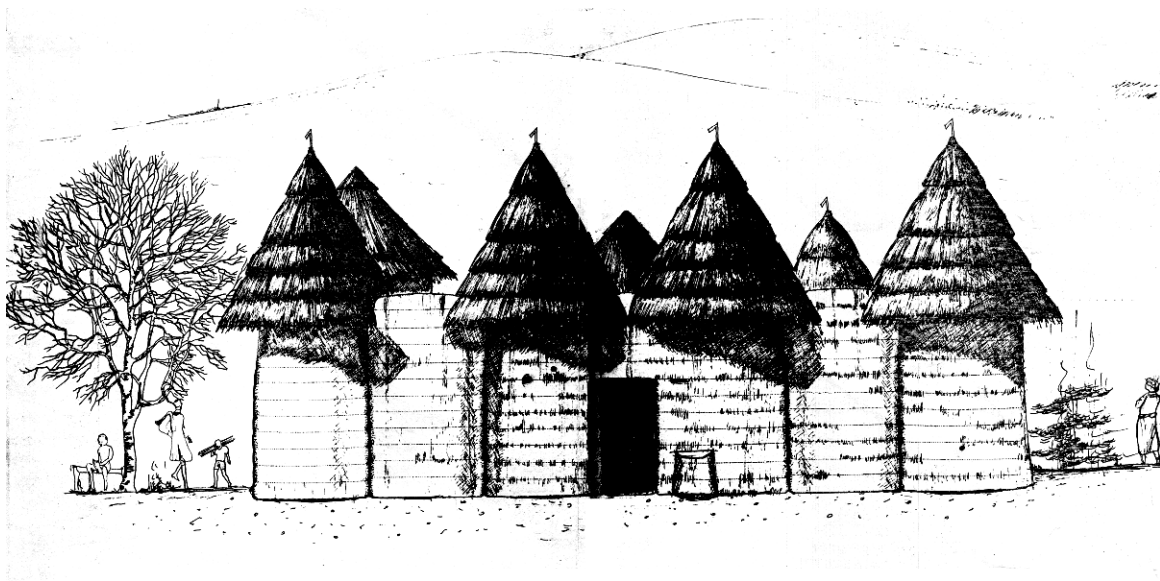


Upper Floor

Figure 5.4.1.2.

Yavo: 2006.

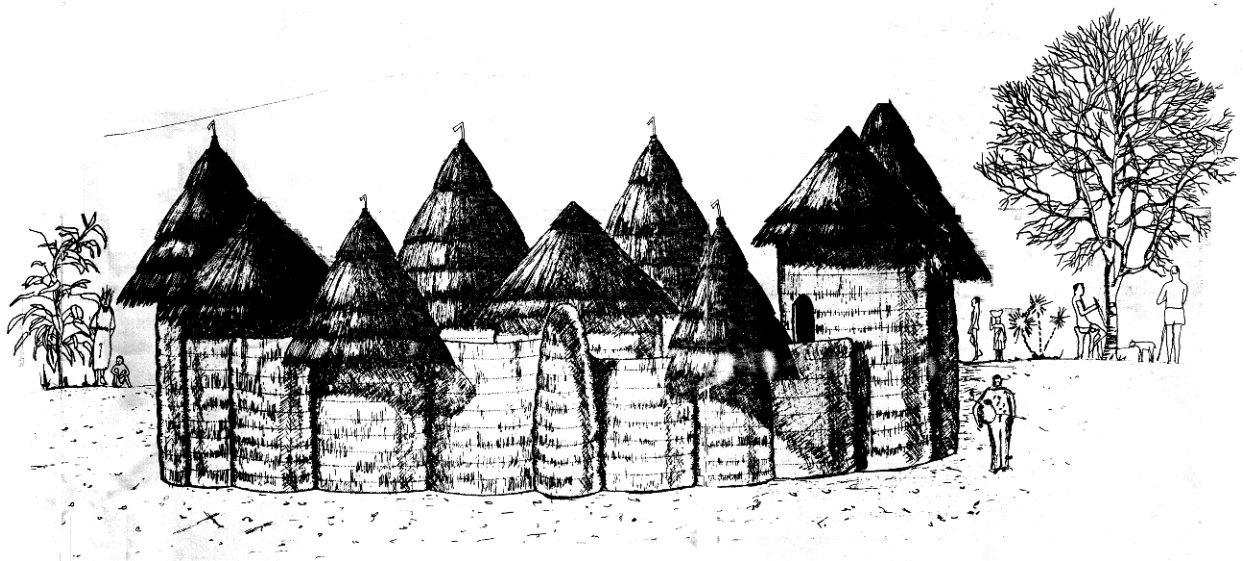
Scale: 1/100



West Elevation

Figure 5.4.13: Yavo, 2006

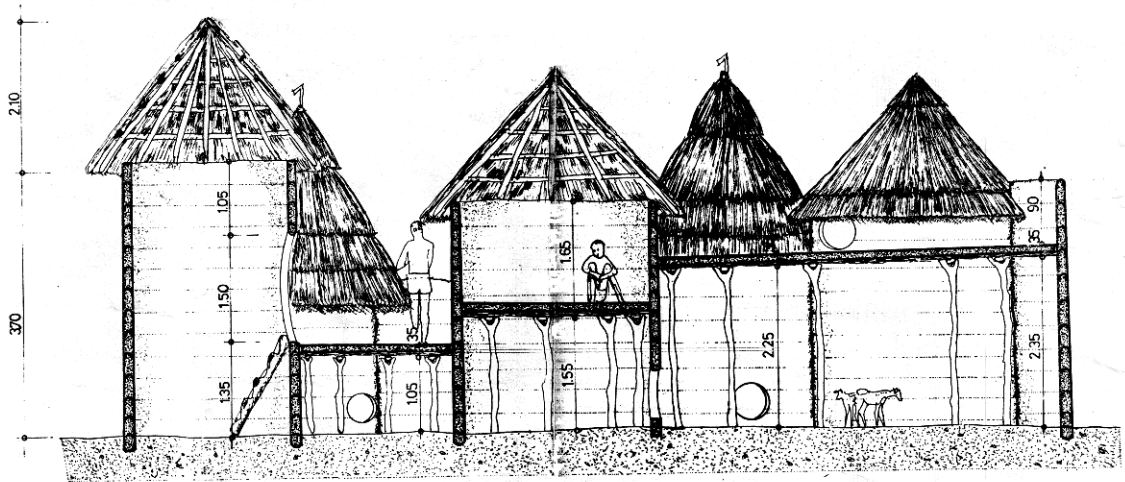
Scale: 1/100



East Elevation

Figure 5.4.1.4: Yavo, 2006

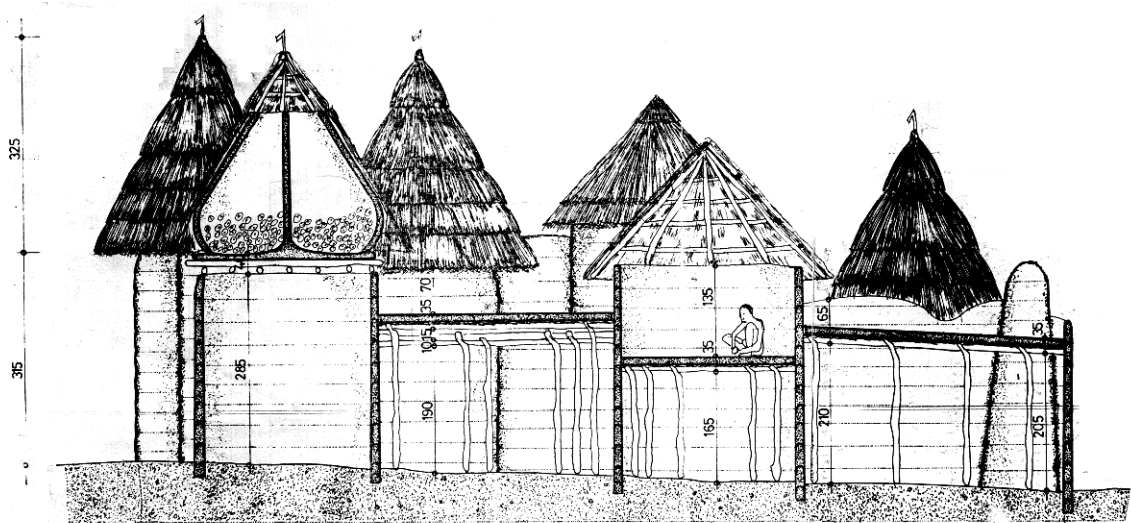
Scale: 1/100



Section: A – A

Figure 5.4.1.5: Yavo. 2006

Scale: 1/100



Section: B – B

Figure 5.4.1.6: Yavo. 2006

Scale: 1/100



Axonometric view of Otammari tata in Boukoumbe (Benin)

Figure 5.4.1.7:

Yavo 2006.

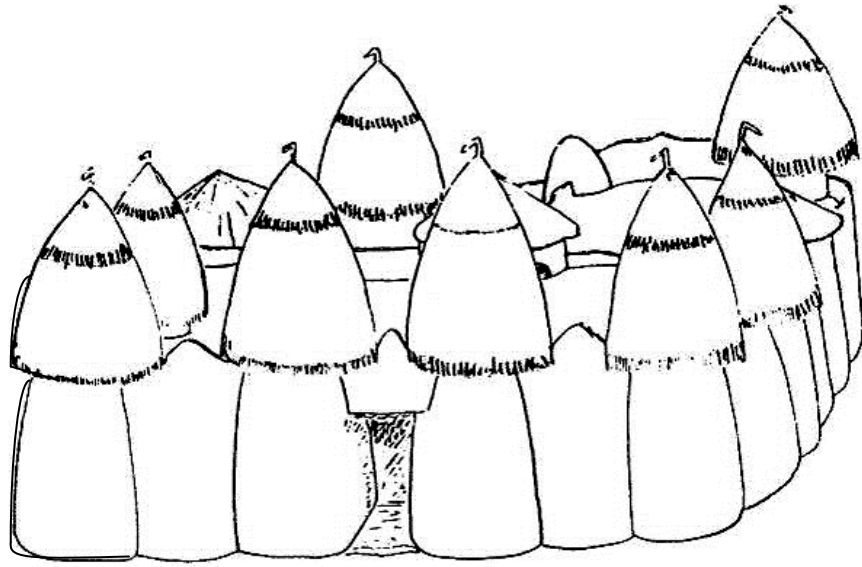
Scale: 1/100



Figure 5.4.18: Otammari tata in Koulangou (Togo). Yavo, 2005.



Figure 5.4.19: Otammari tata in Koulangou (Togo), Powell, 2010.

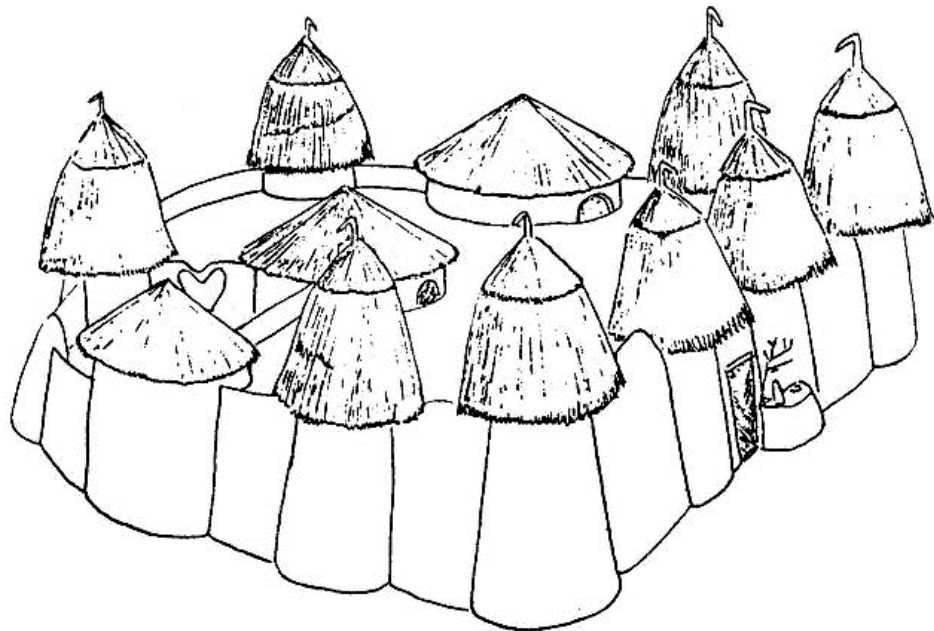


South-west axonometric view of Otammari tata in Boukoumbe (Benin)

Figure 5.4.20:

Yavo. 2006.

Scale: 1/100



North-west axonometric view of Otammari tata in Boukoumbe (Benin)

Figure 5.4.21:

Yavo. 2006.

Scale: 1/100

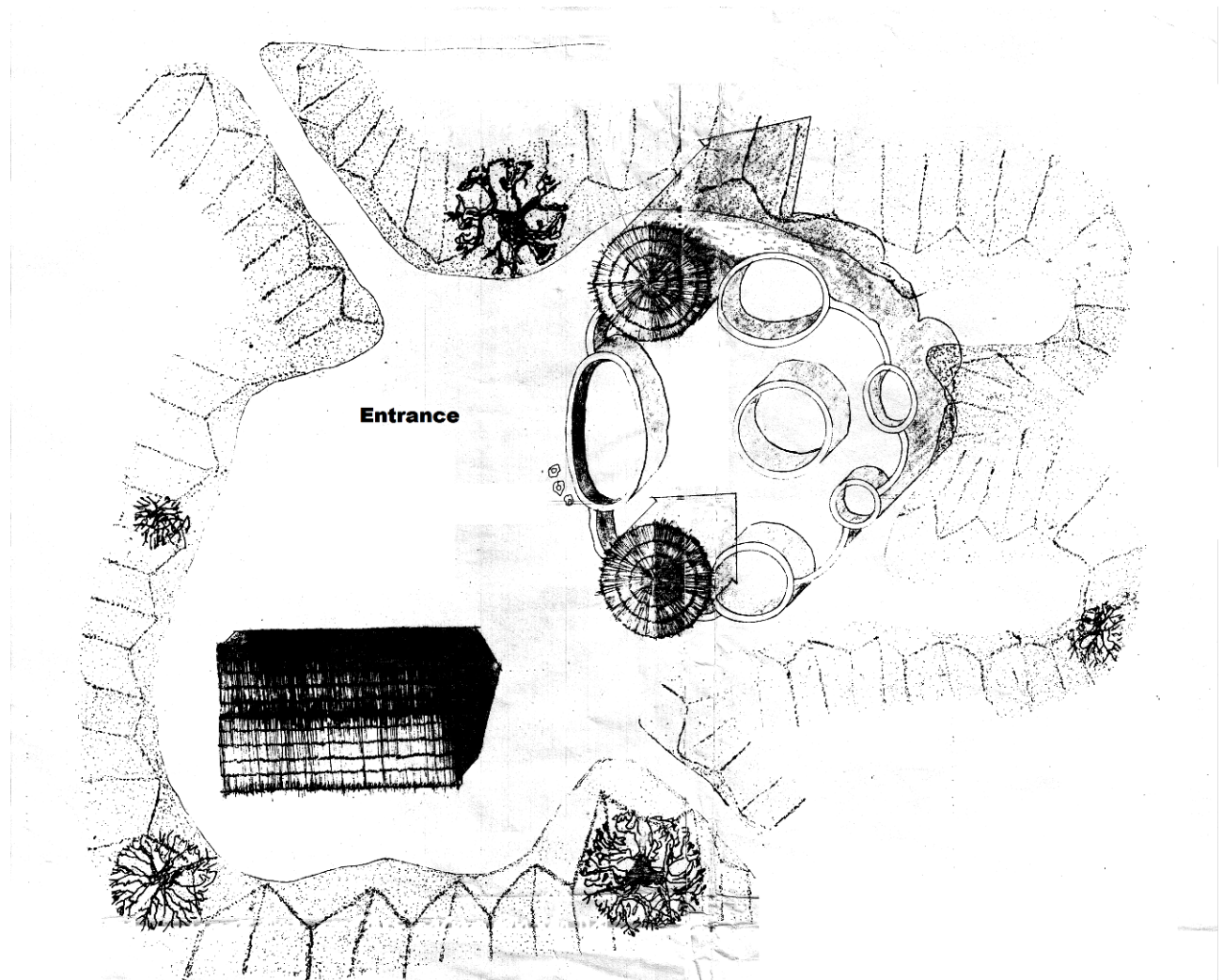
5.5 OTCHIAOU HOUSE TYPE

It was noted that an altar to bridge the gap between the living and the gods is located in front of the dwelling. Two or three yakwankwanyé horns are mounted on the arch at the entrance; these dried mud-made horns, about 20 centimetres high, are intended to support the funeral drums. The existence of these horns seems to relate to the principle that no household should be without a male child. This entrance curve is horizontal with an oval shape (sketches 5.5.1).

The Otchiaou use plywood ceilings in their houses and the oval form is as a result of the fact that the logs support all parts or even the whole of the wall which is laid out adjacent to the small oval base, whose shortness provides strength to the house. In certain houses, the left part is used as a dining room and grinding stones are kept there. The top floor has the parents' room. The roof consists of a balcony whose surface is used like a drier; it also plays an important part in household ceremonies and funerals. The entry semicircle is always divided by two walls: one side of the wall is for men and the other for women. On either side is an additional arch of similar structure and of the same design as those of Otammari.

The top floor's staircase usually leads to the kitchen, but it also links to the ground floor which is seldom seen in Otammari; this controls movement in and out of the house. The chimney is established at the base of the curve and slightly detached from it. In many tata castles there is a kind of chimney called téboté, spread through the entire balcony and making it possible to secure the ground floor. This semi-circle opening would be a loophole through which an attacker could strike with a spear and penetrate the house. The Batammariba seal this opening with a punt stone and no religious or magical connotations are attached to it.

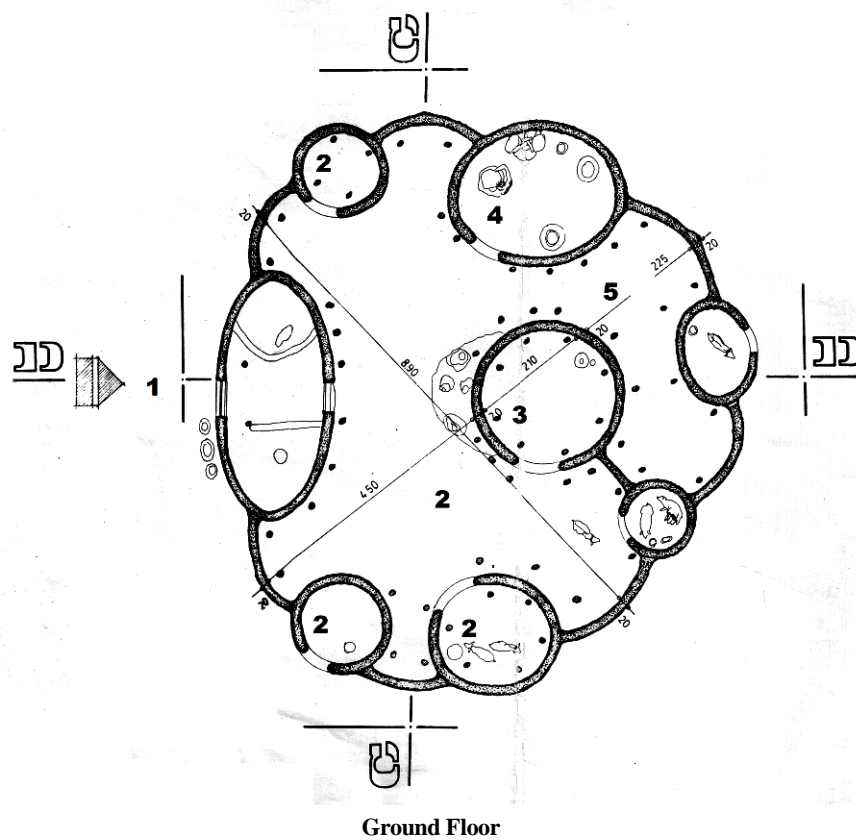
5.5.1 Sketches of Otchiaou house type



Site Plan

Figure 5.5.1.1. Yavo: 2006.

Scale: 1/1000



LEGEND

- 1: Main entrance
- 2: Barn
- 3: Bedrooms
- 4: Kitchen
- 5: Poultry
- 6: Granaries
- 7: Atrium

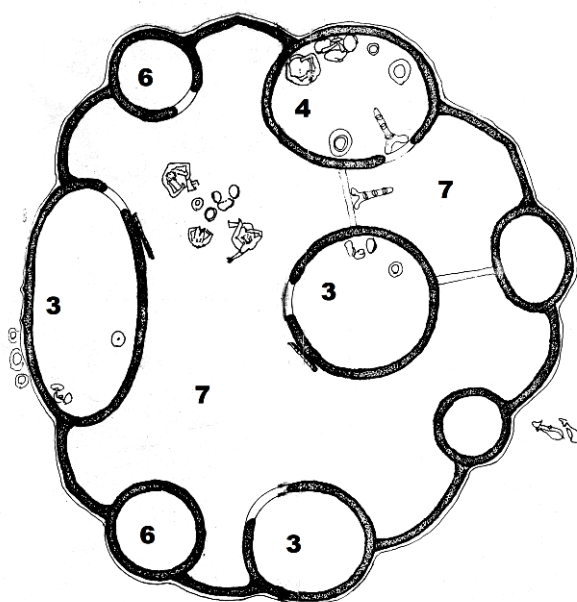
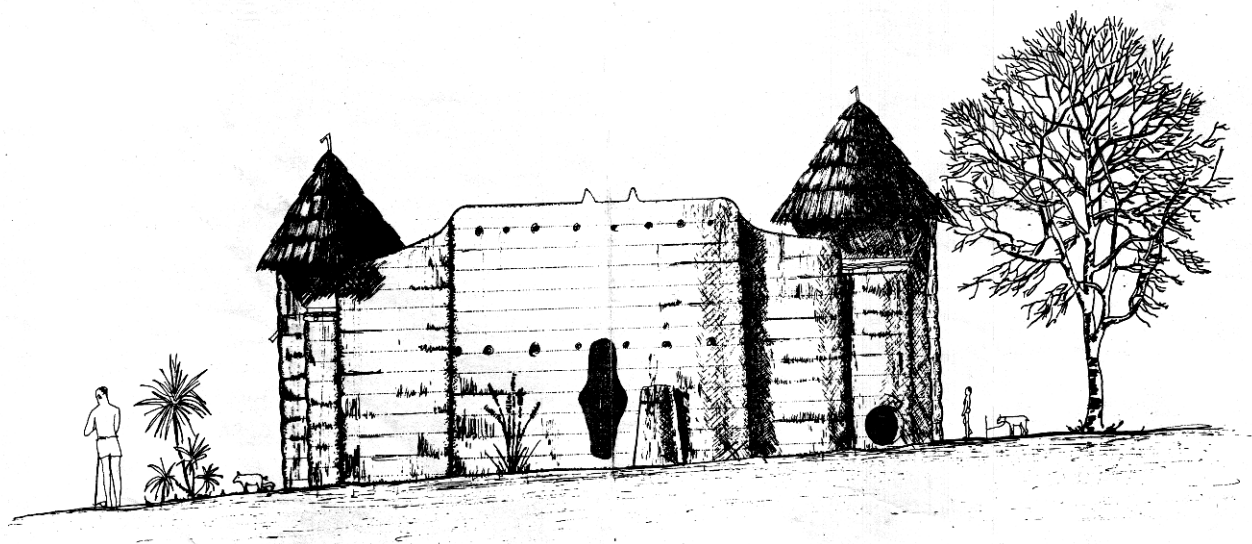


Figure 5.5.1.2.

Yavo: 2006.

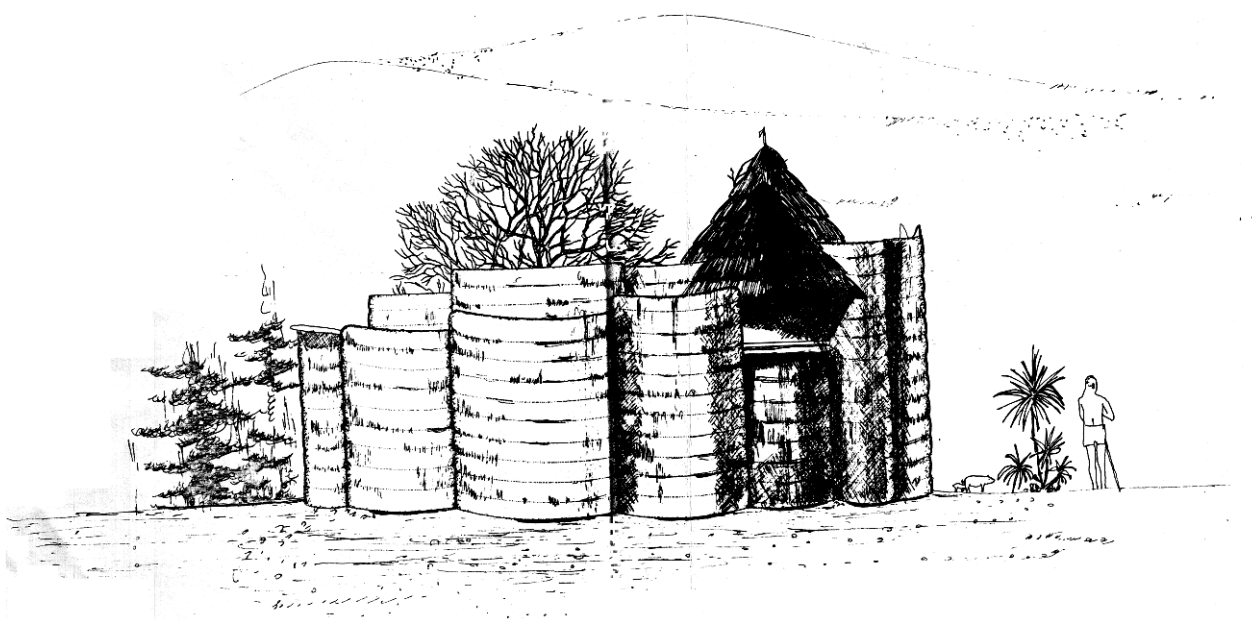
Scale: 1/100



West Elevation

Figure 5.5.13: Yavo, 2006

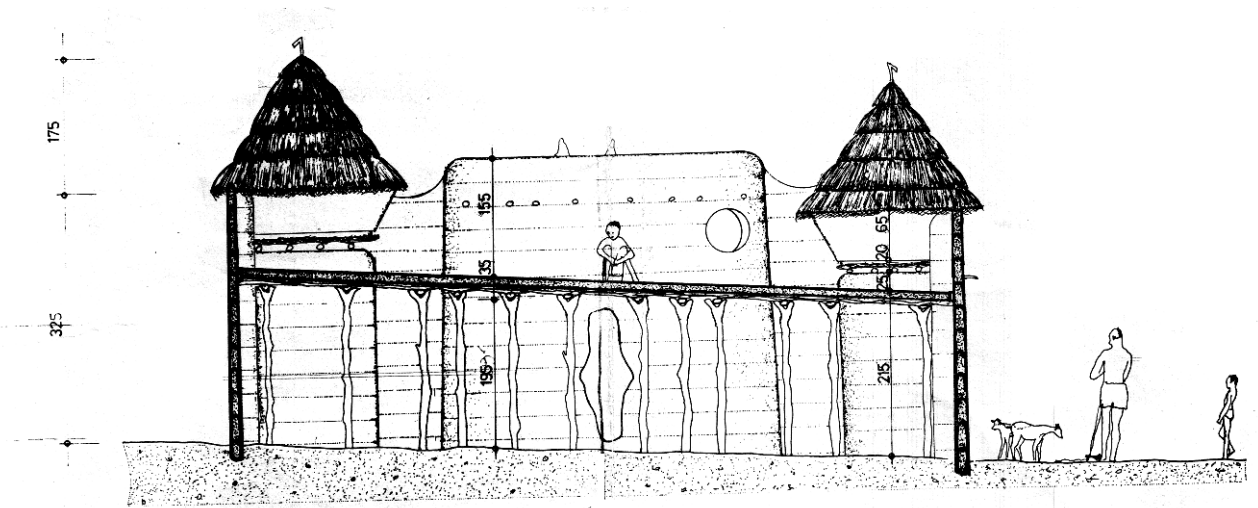
Scale: 1/100



East Elevation

Figure 5.5.1.4: Yavo, 2006

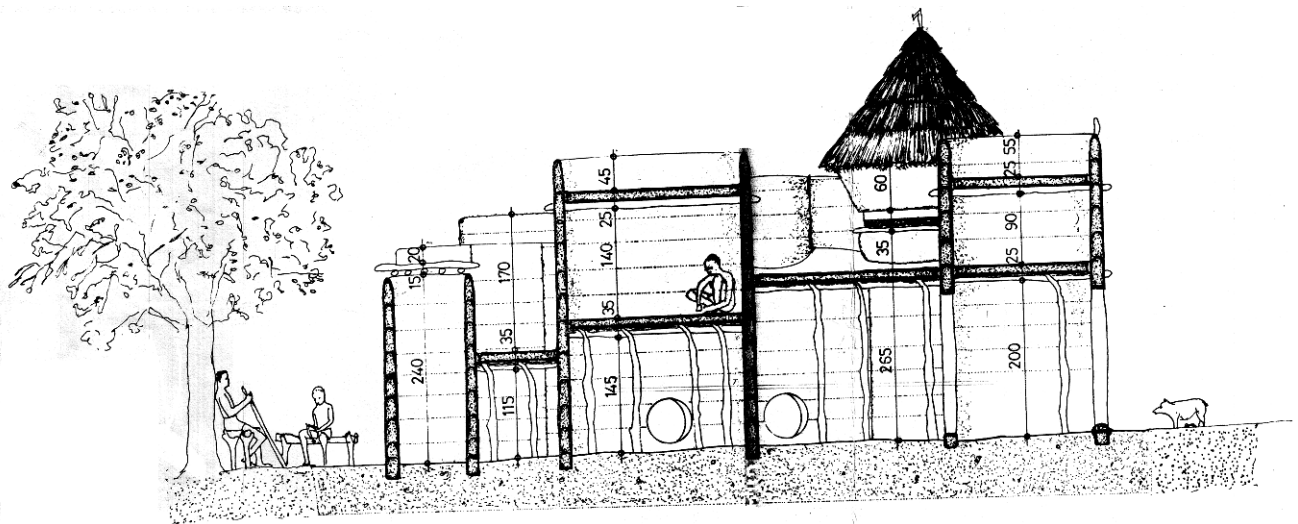
Scale: 1/100



Section: C – C

Figure 5.5.1.5: Yavo. 2006

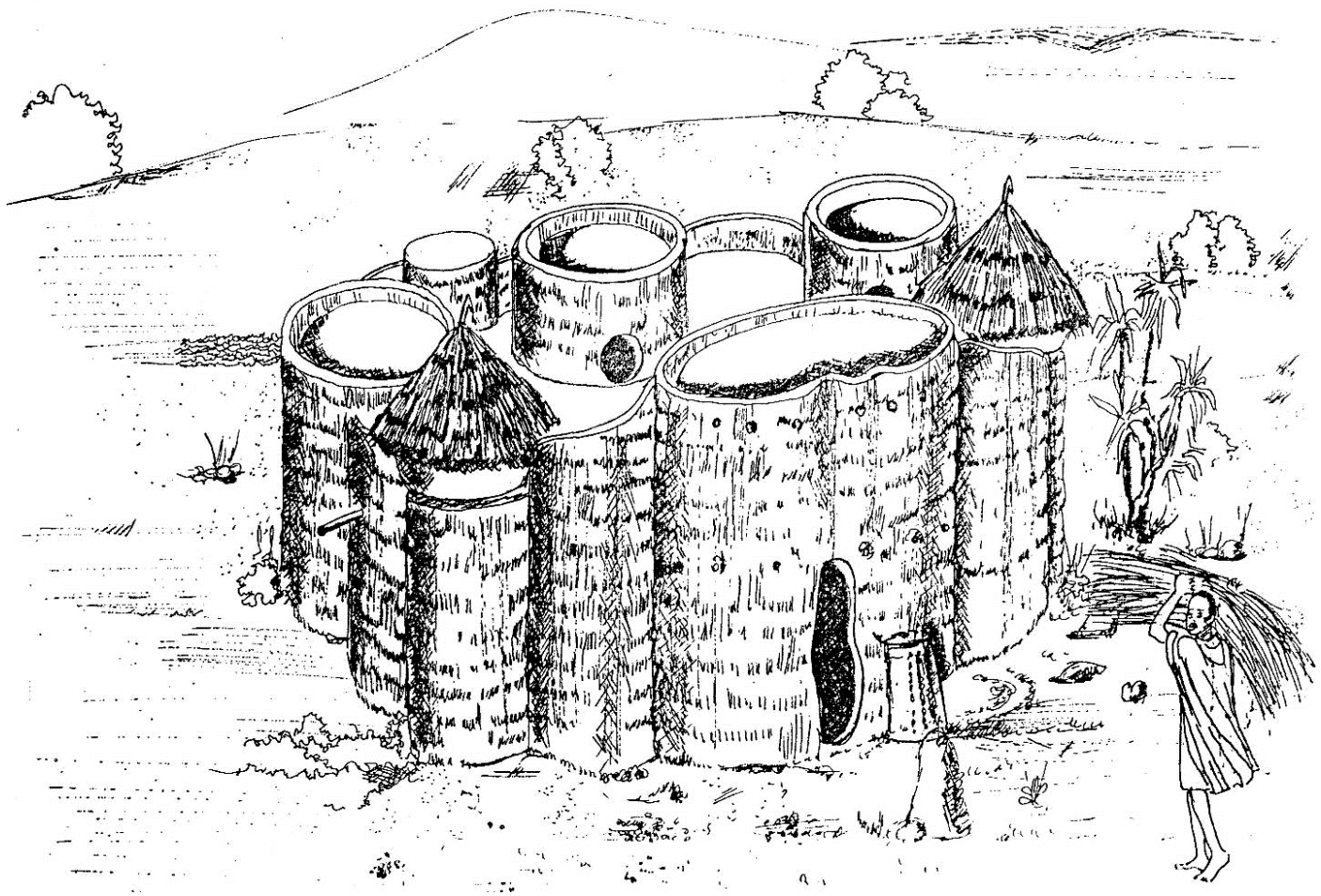
Scale: 1/100



Section: D – D

Figure 5.5.1.6: Yavo. 2006

Scale: 1/100



Axonometric view of Otchiaou tata in Warengo (Togo)

Figure 5.5.17:

Yavo, 2006

Scale: 1/100

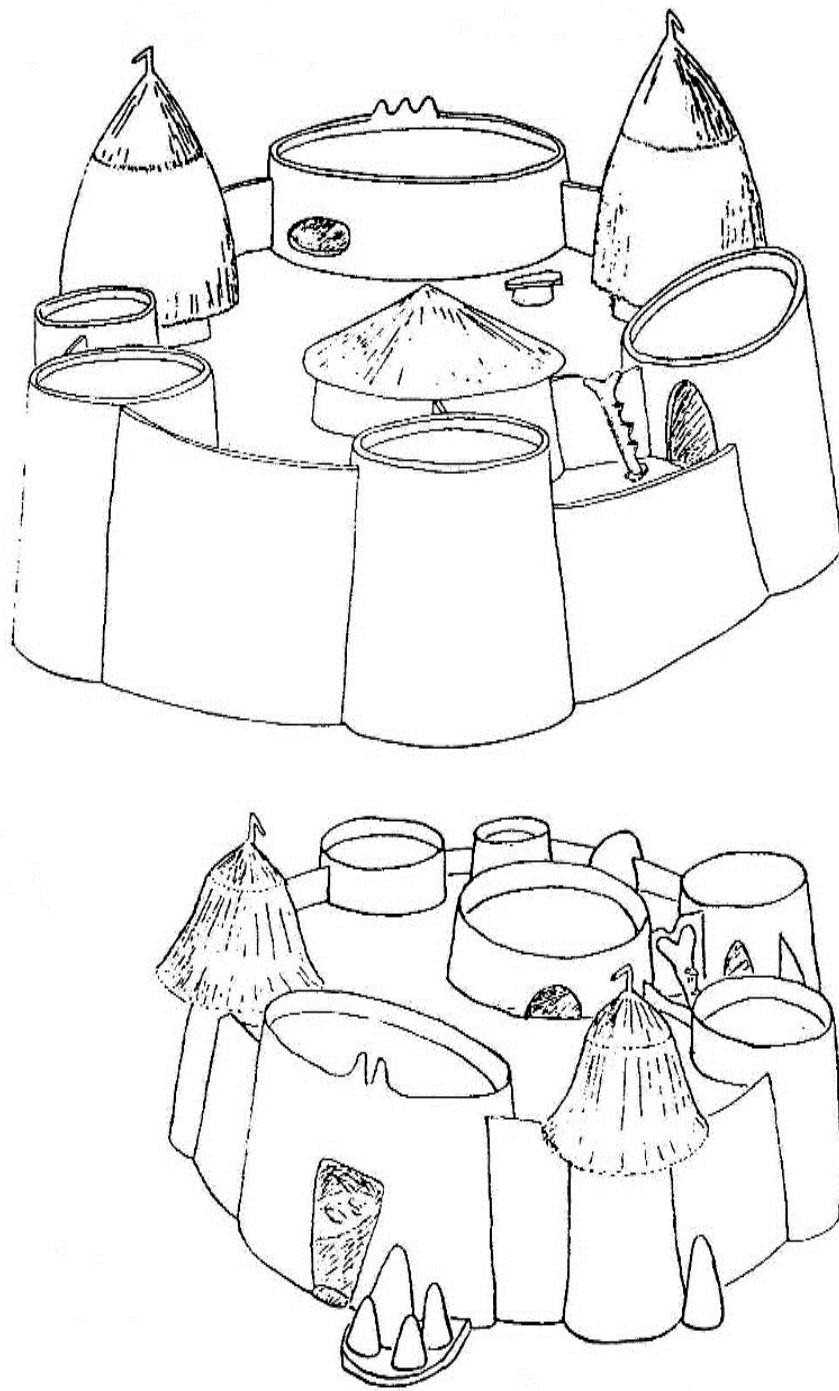


Figure 5.5.1.8: Yavo. 2006. A Sketch of another Otchiaou tata axonometric view of the front and the rear. Togo.



Figure 5.5.1.9: Otchiaou tata in Pimini (Togo), Andi, 2011.



Figure 5.5.20: Another Otchiaou tata in Nandoba (Togo), Powell , 2012.

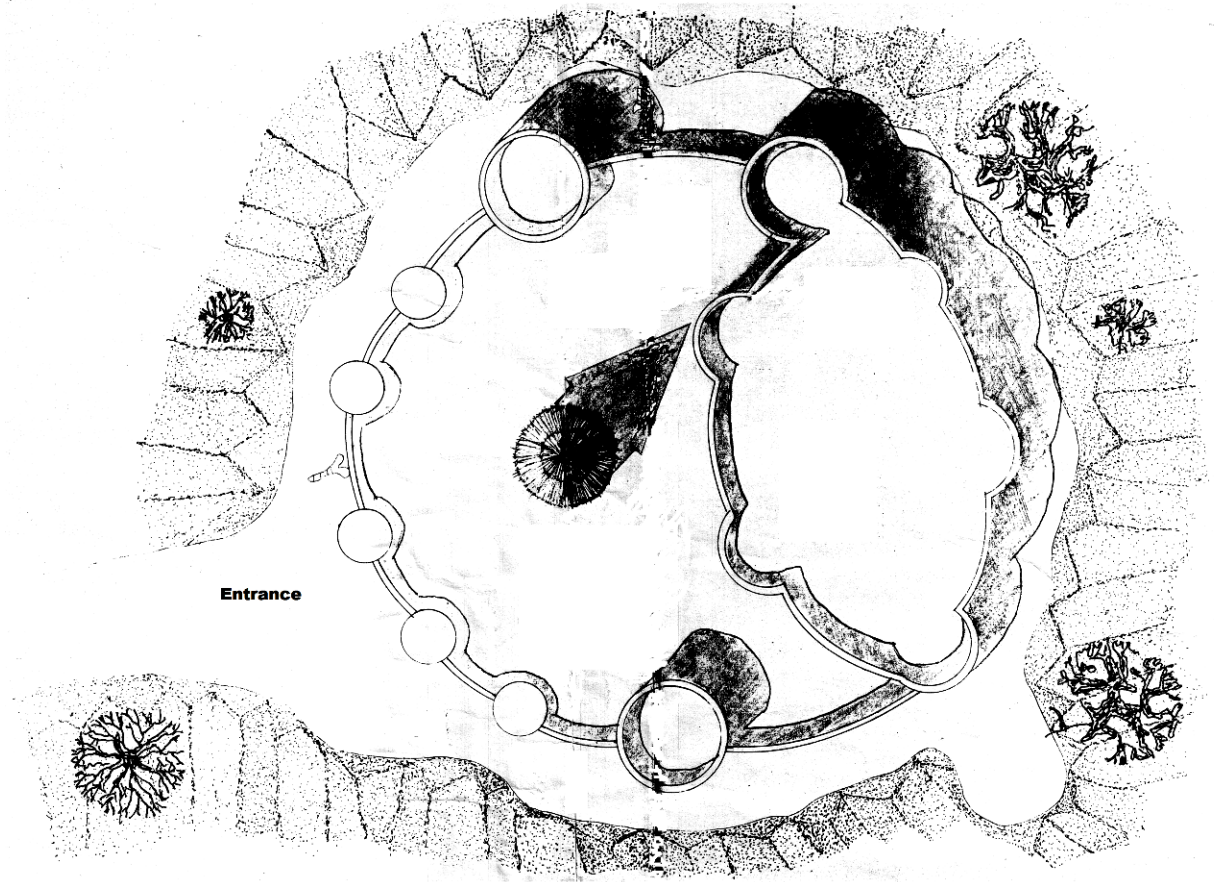
5.6 TAYABA HOUSE TYPE

Mud is a universal building material among the sedentary dwellers of the savannah, but the methods employed to exploit its limited structural properties vary from place to place. The study revealed that Tayaba compounds employ some of the variations already discussed; in addition, they show other variations in circular building techniques which are far more structurally sophisticated than those encountered at either Otammari or Otchaou, their closest counterparts (sketches 5.6.1). The construction, repair and extension of Tayaba compounds take place, as elsewhere in northern Benin and Togo, during the dry season. However, unlike the Otammari, the Tayaba commence building early in the season, immediately after the guinea corn is harvested, when water is still available in the pools and ditches of the low-lying areas adjacent to compounds.

The damage caused during the wet season and the continually changing composition of the local population demand annual attention to the compound structures. The study found that the structure of the circular room units that constitute the Tayaba compound is based on a simple post-and-beam system unique to northern Benin and Togo. The flat mud roofs laid over the rafters are like those at both Otchaou and Otammari, but the unique feature is the supporting system of posts. The mud walls, laid in traditional tiered fashion, are not load bearing, for the roof load is carried by the posts. These screen-walls last longer than load-bearing walls because they are subject to fewer stresses.

Their surfaces show less deterioration than the Osori and Otammari's load-bearing walls. The unique post-and-beam system is utilised in conjunction with more characteristic building techniques.

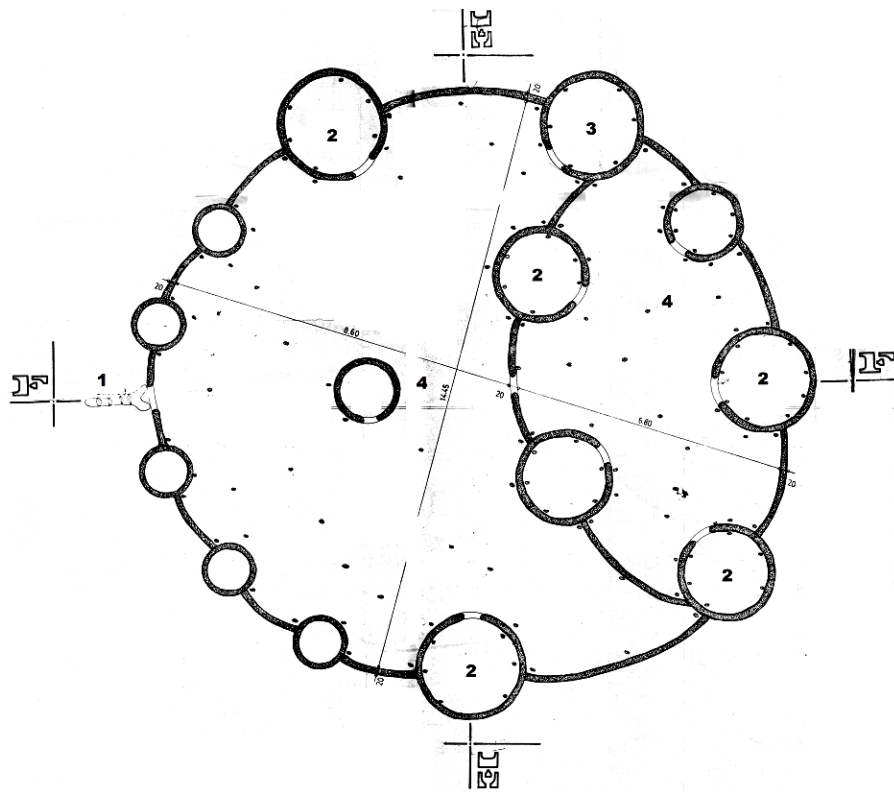
5.6.1 Sketches of Tayaba house type



Site Plan

Figure 5.6.1.1. Yavo: 2006.

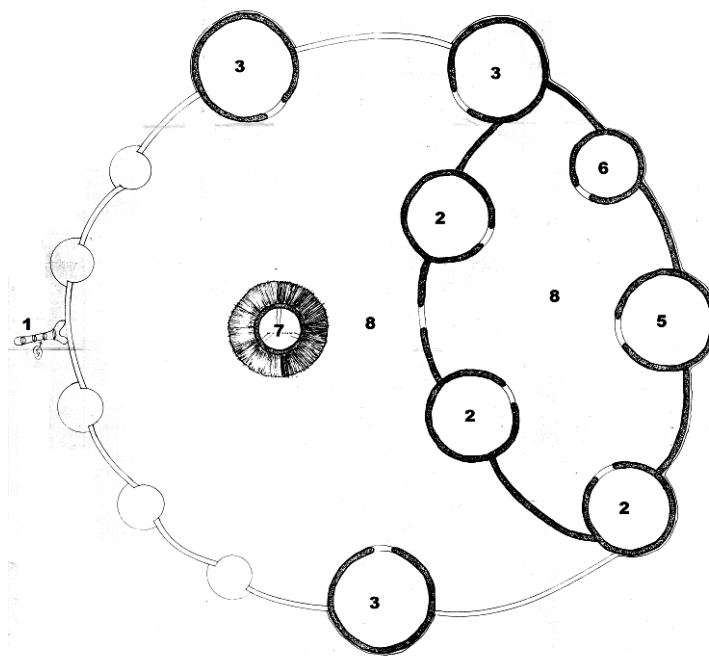
Scale: 1/1000



Ground Floor

LEGEND

- 1: Main entrance
- 2: Storerooms
- 3: Bedrooms
- 4: Barn
- 5: Fireplace
- 6: Oven
- 7: Granary
- 8: Atrium

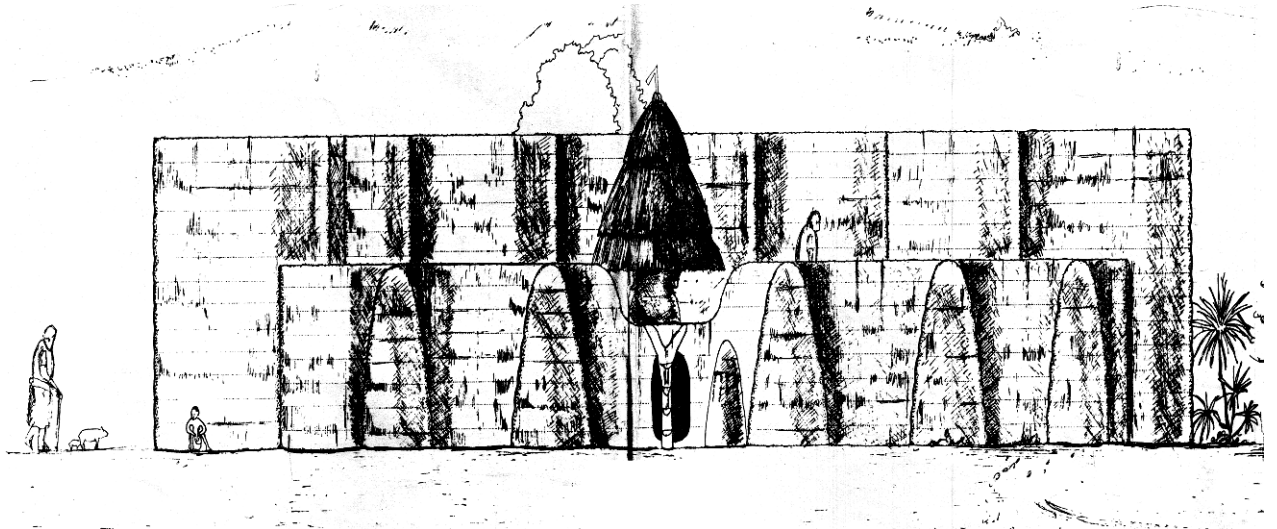


Upper Floor

Figure 5.6.1.2.

Yavo: 2006.

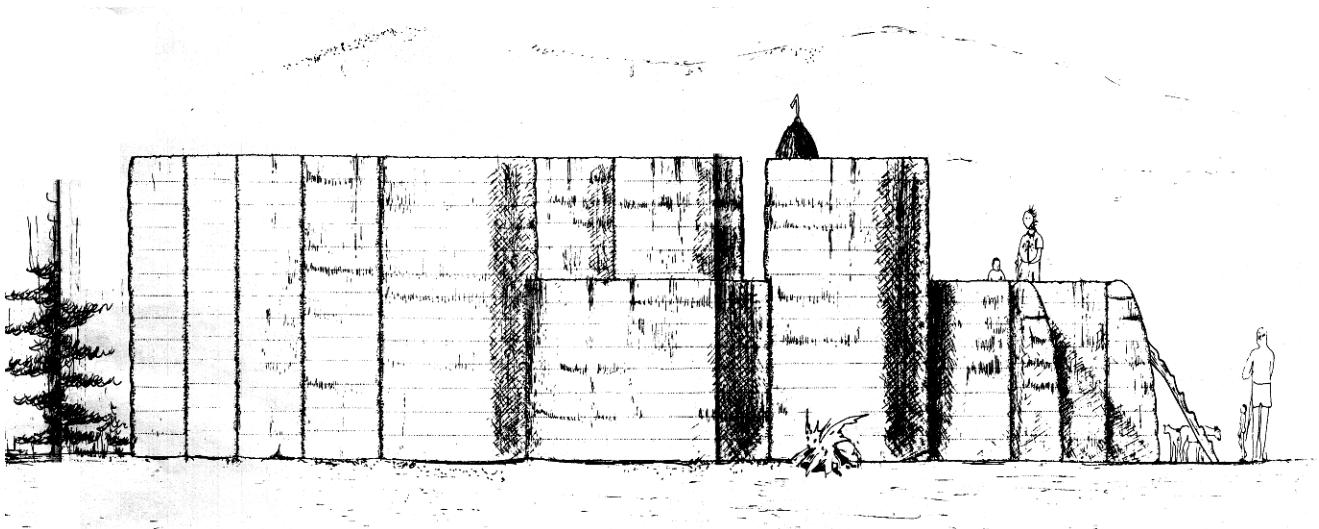
Scale: 1/100



West Elevation

Figure 5.6.1.3: Yavo. 2006

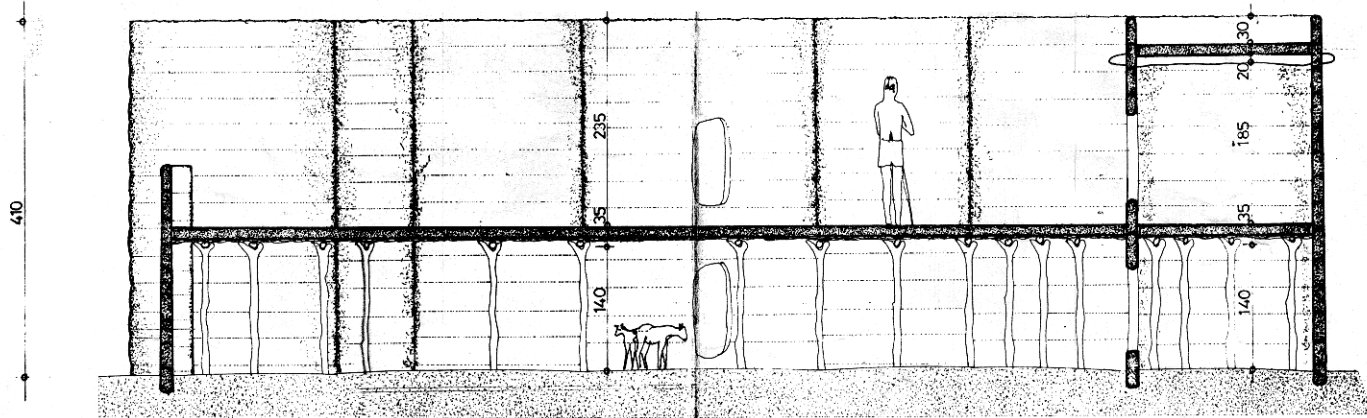
Scale: 1/100



East Elevation

Figure 5.6.1.4: Yavo. 2006

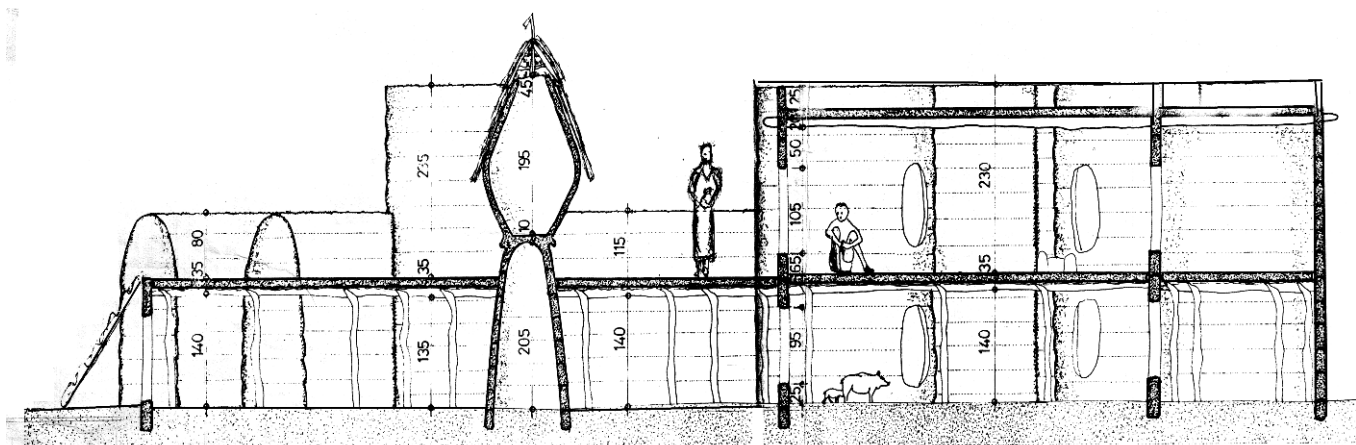
Scale: 1/100



Section: E – E

Figure 5.6.1.5: Yavo. 2006

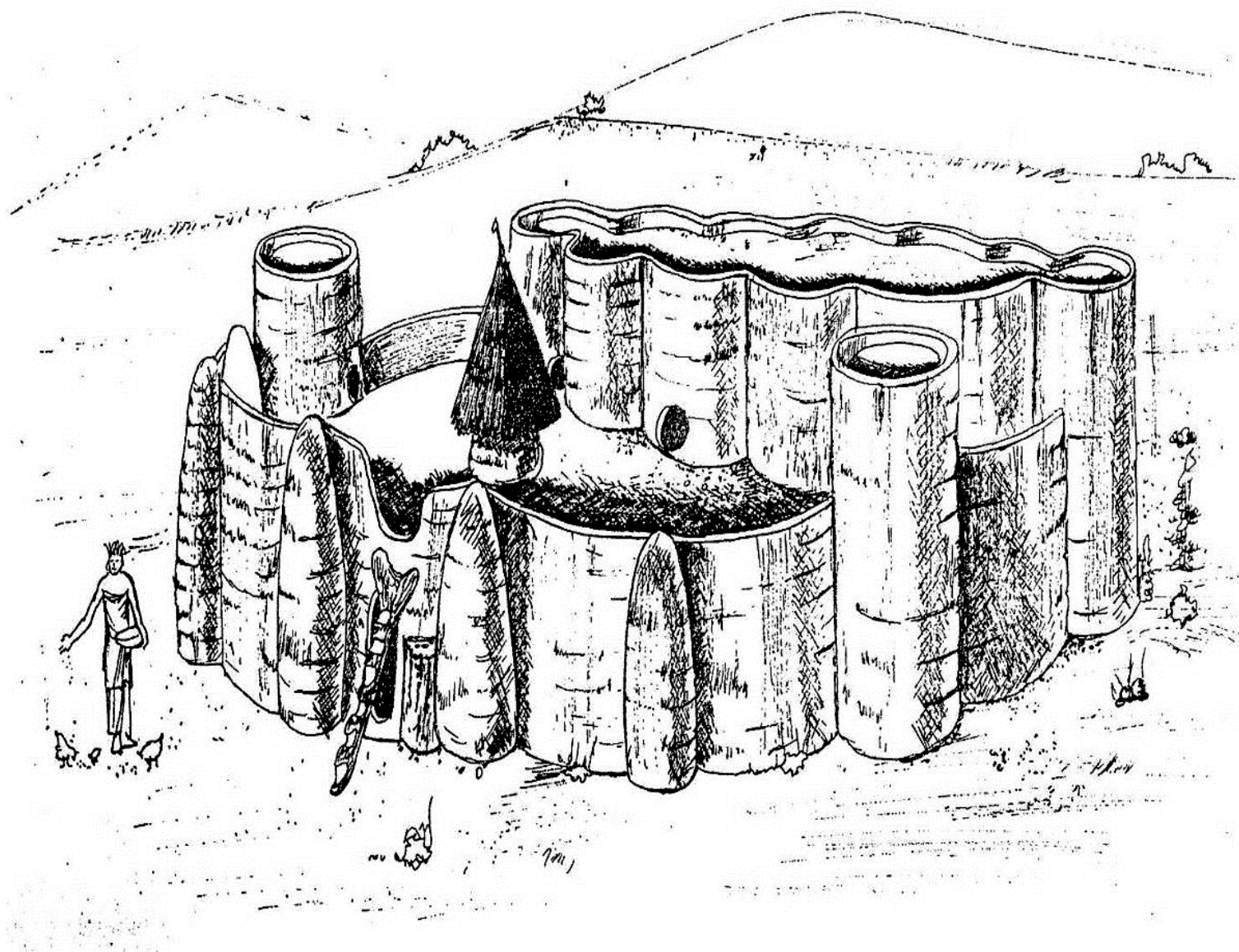
Scale: 1/100



Section: F – F

Figure 5.6.1.6: Yavo. 2006

Scale: 1/100



Axonometric view of Tayaba tata in Koutagou (Benin)

Figure 5.6.1.7:

Yavo, 2006

Scale: 1/100



Figure 5.6.18: Tayaba tata in Koutagou (Benin). Michalides, 2011.

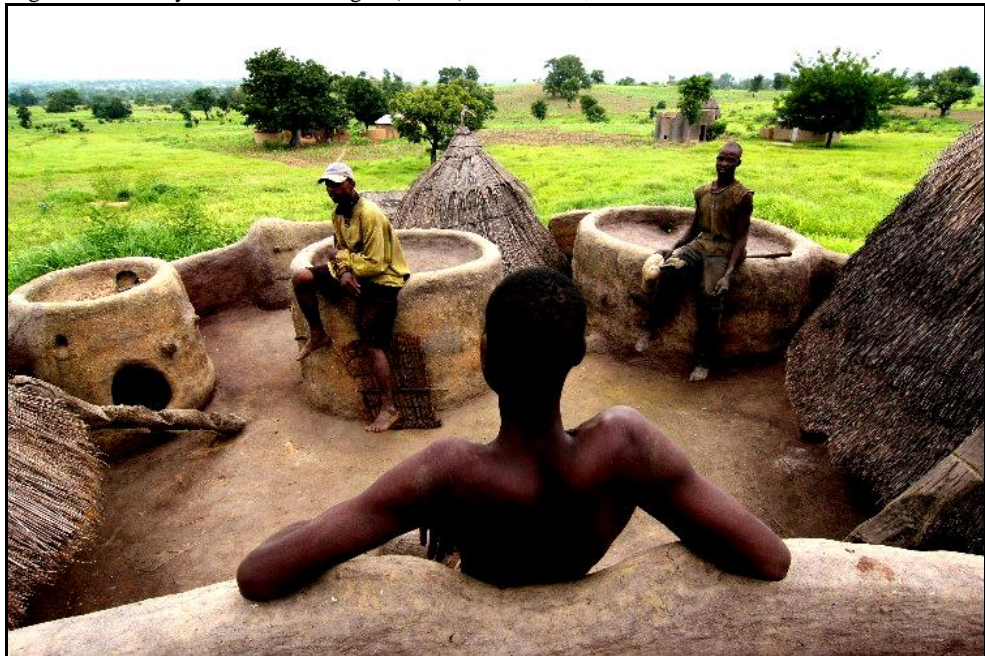


Figure 5.6.19: Tayaba tata in Koutagou (Benin). Michalides, 2011.

The next Chapter Three presents a detailed description of the material civilisation, namely the Batammariba building process.

CHAPTER SIX

THE BATAMMARIBA TRADITIONAL CONSTRUCTION, BUILDING PROCESS AND ECOLOGICAL MANAGEMENT

6.0 INTRODUCTION

Moughtin (1985) stated that earth or mud structures are often described as impermanent and are therefore regarded as an inferior method of construction. Yet unbaked earth has been used for many thousands of years, not only for housing, but for some of society's most prestigious developments (the great ziggurats, the pyramids and religious and public buildings were all constructed from this material). About 9,000 years ago Babylon was composed of earth constructions, and many of its buildings were magnificent engineering accomplishments. The great terraced tower close to the temple of Marduk (Baal), sometimes assumed to be the Tower of Babel, may have been equivalent in height to a 30-storey office block.

Records exist of many great earthworks constructed to defend important cities and even whole civilisations. Great buildings with unbaked earth, have managed to survive since the third century B.C., testifying to the importance of this material in architectural development. This part of the research study outlines the use of earth or mud in the construction of the Batammariba structures.

6.1 PROCESSING A NEW TWO-STOREY BUILDING

While the populations of Batammaribaland adopted simple processes to construct houses, the technology adopted in the Batammariba two-storey building is tremendous. These brilliant edifices are a lesson in structural technology. The buildings are actually clay cylinders with random, built-in spines. This imposing structure could easily be the work of a modern-day master architect using modern design aids such as computers. Symmetry, balance of scale, proportionality and pleasing aesthetics are some of its numerous strengths.

The following pictures show exactly how a Batammariba house is erected. Figures (6.1 to 6.8) are taken in Warengo and Koulangou villages in Togo and illustrate the process of a construction of a new tata.



Figure 6.1: Pictures A and B deal with the preparation of building materials.



Figure 6.2: Pictures C-D-E and F deal with the demarcation, site preparation and setting out.



Figure 6.3: Pictures G-H-I and J deal with laying out foundation.



Figure 6.4: Pictures K-L-M and N show the construction progress of a new tata.

The researcher in action in Koulangou village (Togo)



Figure 6.5: Pictures O and P deal with the preparation of the soil for mud balls.

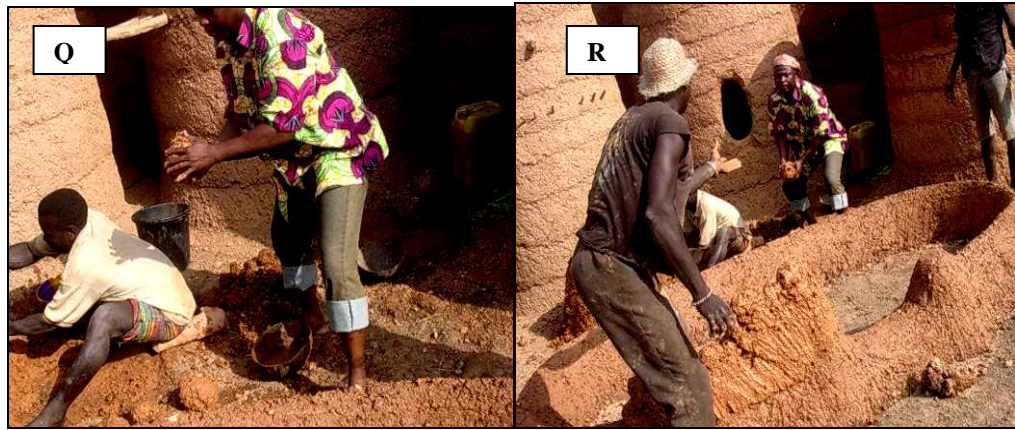


Figure 6.6: Pictures Q and R deal with the the making of mud balls and interaction with Master builder Tapiba.

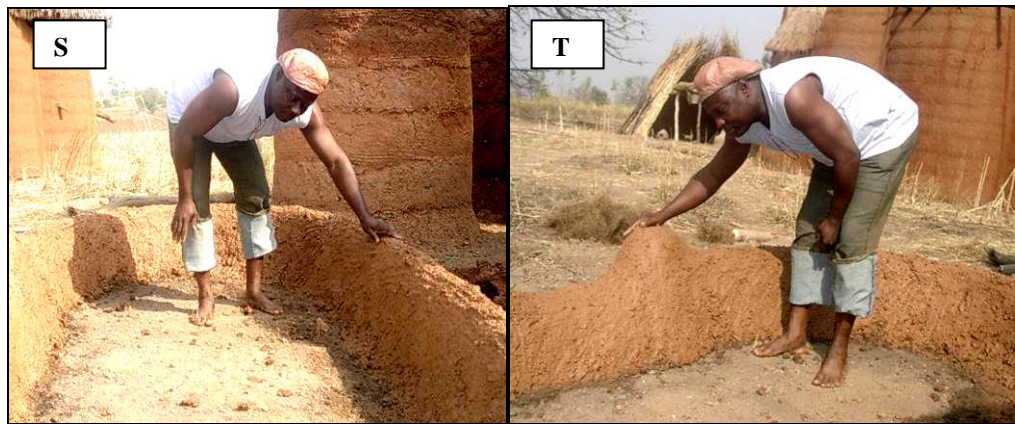


Figure 6.7: Pictures S and T deal with the researcher erecting a mud wall.



Figure 6.8: Construction of a new tata in Koulangou, Togo, with Master builder Tapiba. Yavo 2006.

6.1.1 Traditional technologies and alternative materials in Batammariba architecture

There are many wonderful building styles and technologies worldwide that can inform designers and builders through their shape, materials, arrangements, decorations, etc. Some of the most wonderful indigenous building forms originated on the African continent. African design sense is often more than pretty; it has a social meaning that can be read by those who understand its symbolic meaning and subliminal cosmological and other cultural characteristics.

A wide range of alternative/appropriate/natural building technologies is available. This section of the thesis covers the most well-known materials and technologies relevant to Batammaribaland. While materials do not necessarily determine the form and content of architecture, it is obvious that the form of any art is conditioned, to a greater or lesser degree, by the medium through which it is expressed.

Culture, tradition and innovation, as well as the craftsman's response to his material of expression have to blend harmoniously before great architecture can result. A European journalist visiting Boukoumbe at the beginning of this century, just after the French had completed their occupation of Northern Benin, made a perceptive remark about the use of natural materials by Batammariba builders: "There is a right and wrong method of doing most things and Boukoumbe people know the correct method of building with natural materials".

6.1.1.1 Earth materials

Earth has been used in building construction for thousands of years and is still used today. It is estimated that more than one-third of the Earth's people live in earthen structures (Eisenberg, 2002). Earth is composed of stones, gravel, sand,

silt and clay, in decreasing order of particle size. Although earth is widely available, versatile and highly workable, it is not as strong as other materials, especially in tension, and must be protected from water and earthquakes (Kennedy, 2002).

- **Clay**

Clay is an essential ingredient in any earthen building system. Cracks in the ground are usually a sign of soil with high clay content. Some types of clay shrink considerably as they dry, making it essential to add sufficient amounts of sand or fibre to prevent cracking (Kennedy, 2002).

- **Gravel**

It is useful for filling drainage trenches and rubble ditch foundations, as it is strong in compression and allows water to flow through. This type of foundation prevents water from reaching natural materials such as adobe or straw bales, which can easily be damaged by moisture (Kennedy, 2002).

- **Sand**

Sand is smaller than gravel. It is an essential ingredient (mixed with clay and/or other fibres in a variety of proportions) in cob, adobe, plaster, rammed earth, etc. Angular sand is best for most purposes but is often created by destructive mining practices. Well-graded (a variety of different grains) sand is the best for building purposes. Rounded sand found in streams or riverbeds is not as strong, but can be used and in some cases may even be preferred – for example for plaster (Kennedy, 2002).

- **Mud ball (*tabodi*)**

The basic building element, the mud-shaped (Fig. 6.9), moulded *tabodi* is the primary unit for most construction work in Batammariba architecture. This important element goes by several names such as, *dibbo* and *kentegé*. Another technique of wall construction still popular in the rural areas is what Prussin (1986) terms, "pottery techniques". This technique employs a wet mud *tabodi* with prior moulding.

The builder's term for this method is *butiesimmu*, literally, "building-by-squeezing" which paints a vivid picture of what happens. It is a pottery technique par excellence. It is possible to achieve wall thickness of only three or four centimetres using this technique. The granary *dibbo* resulting from this method of construction often has a bell-roof section, which is enclosed in a thatch of grass as protection against the heat of the sun and rain. However, the interior has a smooth clean shell ceiling, with a high reflectivity.



Figure 6.9: The researcher showing mud balls ready to be used for construction in Koulangou, Togo. Yavo 2006.

Of paramount importance to the builder are the correct sizes and shapes for his *tabodi*. To the untrained eye, all *tabodis* look alike, a conical or egg-shaped lump of mud. For the builder, the *tabodi* has a face, the more flattened face that looks towards him as he lays his courses; a back, the roundish hunch that faces away from him; a bottom, the flat base of the cone; and a head, the apex of the cone. These features guide him in aligning the *tabodi* as he builds.

A *tabodi* that is too squat would require more daily courses to achieve the desired height of wall, while a *tabodi* that is too slender will adversely affect the thickness of his wall, unless he decides to compensate by increasing the number of *tabodi* in a row. For example, he could use four *tabodis* where he would normally employ three.

With these stringent specifications from the *otammali* it is therefore not surprising that *tabodi* making has grown into a speciality in its own right. Warengo's builders spoke of a *tabodi* maker at Natta who is so agile when he moulds his *tabodi* and who produces such a perfect finished product that when he is employed to work on a site he is paid the same amount of money *per diem* as the top master *otammalimwas*.

One of the greatest present day master builders who lives in Nandoba (Northern Togo), Mr Tapita Mouna, said that whenever he had an important job to do he would travel kilometres to recruit *tabodi* moulders. He lamented the fact that *tabodi* making as an art has migrated to the urban areas.

6.1.1.2 The making of straw

- **Straw**

Straw can be used full-length, or chopped fine as an ingredient in cob, straw clay, and plaster. If the straw (Fig. 6.10) is particularly long and strong, it can also be used for thatching (Kennedy, 2002).

Mr Lapoili, another renowned Koulangou builder, explained the technique of making straw: first, the craftsman places the well-aligned stems of the *mutieremmu* straw which will be useful to him close to him on his right hand side. Seated with the braid already elevated, and the tablecloth on his left, he picks out bits of the straw with the right hand, while the left hand holds the braid. The left foot also works, but passively.

Mr Mpo had already had started work when the researcher arrived. He took a small bunch of straws, assembled them by letting them slip vertically into his open-hand pointing at the ground then adjusted them on the tablecloth (C) so that (D) was perpendicular to the braid.

The stems protrude by a few centimetres. The left big toe holds the new sheaf and the edge of the tablecloth. The left hand then divides A into two parts (A1 and A2); and B, with a light, counter clockwise torsion, is placed flat between A1 and A2. A2 is then folded back into B1 with a light, clockwise torsion and is held by the left big toe. A1 is twisted moderately in a clockwise direction and, over B1, is passed under the tablecloth (C). Finally, D and B1 are joined together out of A1 by extending the braid, reforming the initial figure and allowing the insertion of a small new stack. Figure (6.11) below demonstrates the process of straw making.



Figure 6.10 (A and B): The researcher scrutinising bundles of straw in Pimini, Togo. Yavo, 2006.

Sketches of the making of straw

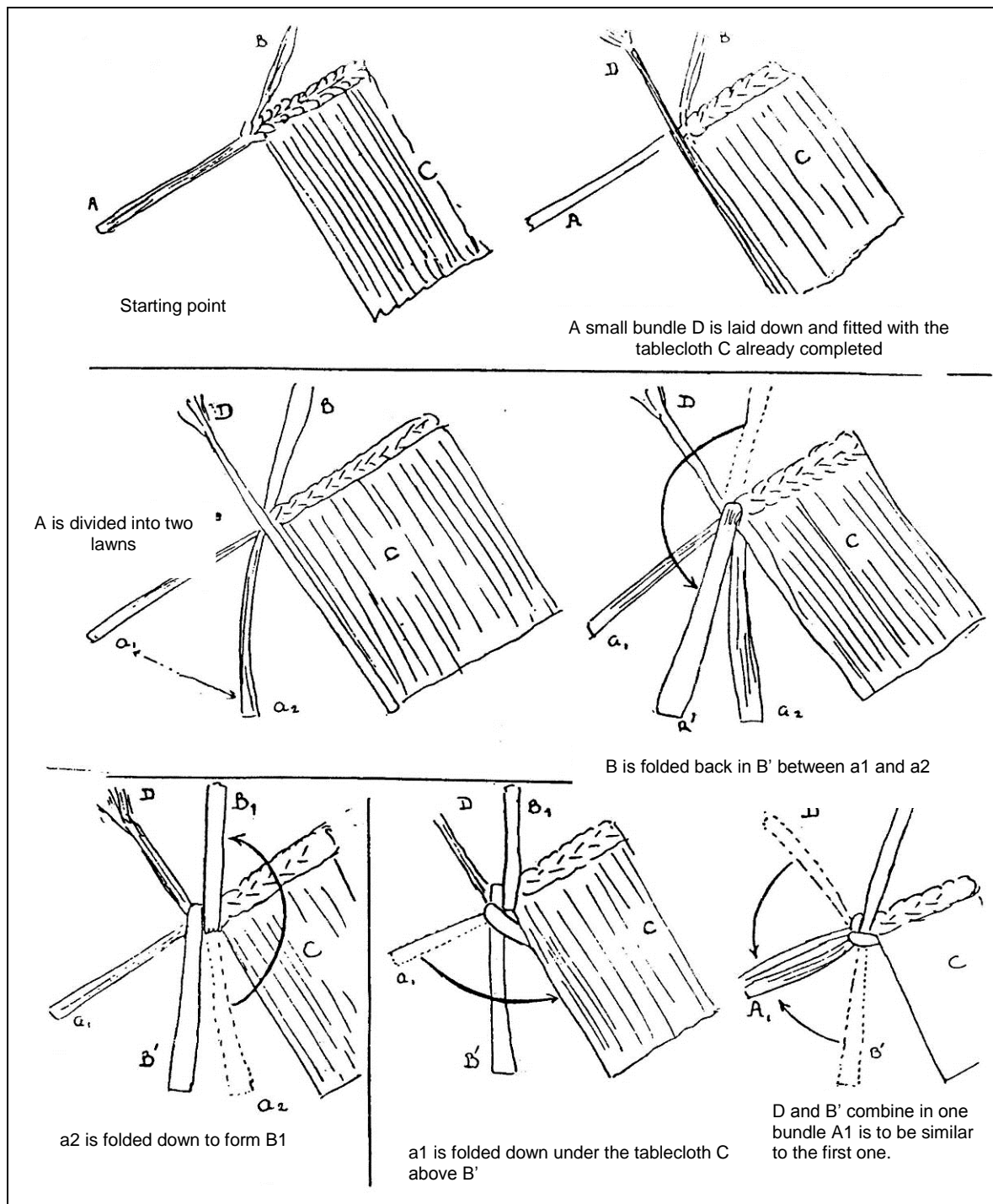


Figure 6.11: Sketches of the making of straw. Yavo, 2006.

6.1.1.3 Construction of the roofs

There are two main types of traditional roofing in Batammaribaland. The cheapest and most common is conical and thatched, while the other type is the flat, mud roof.

- **Conical thatched roofs**

Whenever possible, the conical thatched roof is made of straw. For small huts, the whole roof is generally created on the ground then elevated into place the mud walls. The wall for the roof is made first, with the thickest ends of the palm stalks at wall level and the thinner ends meeting at the top where they are securely bound with rope. Bands of corn stalks are tied around the sloping rafters between 0.2 m. and 0.3 m apart.

Thatch is brought up to the site in bundles of about 8 m. long and up to 1.5 m. wide. The grass is held together in bundles by ropes and laid with the thick ends of the grass at the bottom. In addition to walls, larger spans/posts are often used as intermediate supports (Figures 6.12 and 6.13).

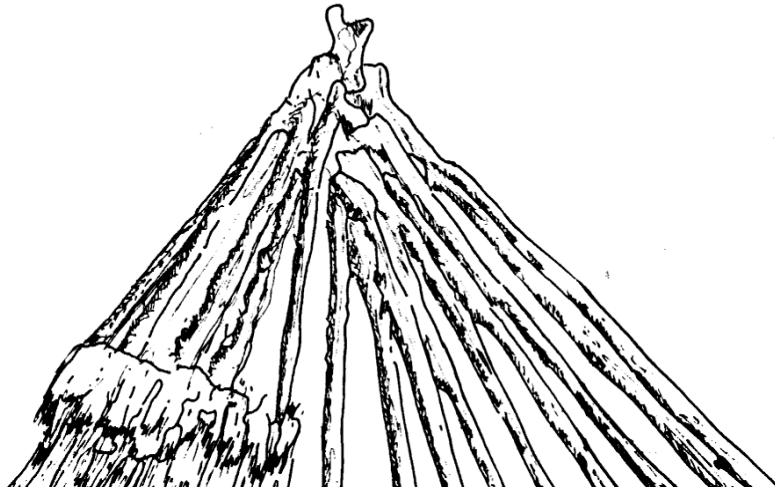


Figure 6.12: Room roofing structure. Yavo, 2006.

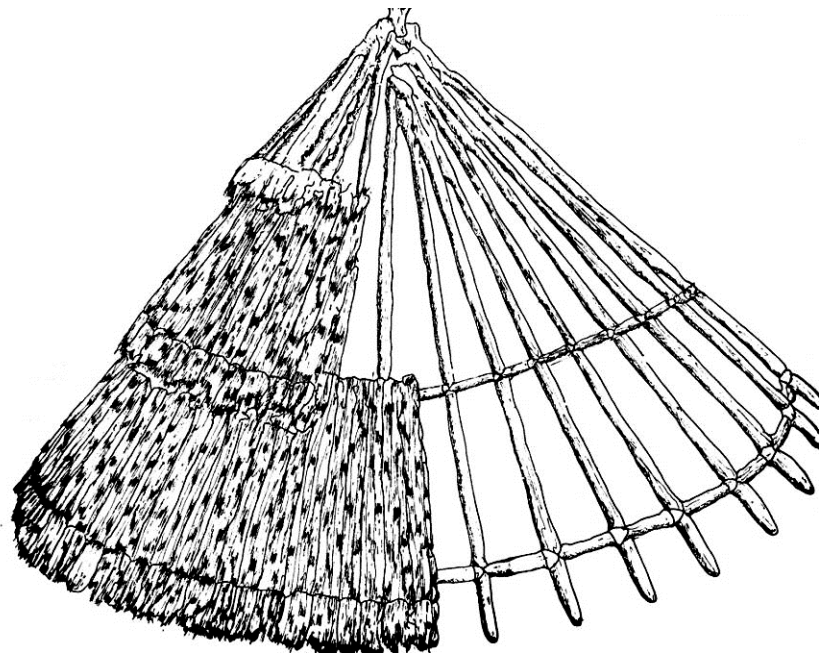


Figure 6.13. Room roofing structure with straw. Yavo, 2006.

The builder starts by positioning four branches with bifurcations (6.14, 6.15, and 6.16), one on the edge of the tower and the others by their breach ends which are tied with hemp, *titonti*. If one does not have a proper bifurcation, one forms a "V" with two sticks facing each other at opposite ends; at the point and in the interior of V, one places a short small stick which will thus be perpendicular to fit into the V and to which the other braces of sticks will be attached to form the roof. These poles thus form a cone which constitutes the shell of the roof. The lower ends can be sealed with the clay from the mortar. Finally this reinforcement is supported by tablecloths of straw braided and arranged spirally in ascending order.

- **Flat roof**

Spanning a space with joists forms the simplest mud flat roof. The economic span is about 1.8 metres; in other words, closely spaced beams can hold the weight of the usual thickness of mud required to waterproof the roof without intermediate support over a space of just under two metres. The joists are normally placed less than 2.5 centimetres apart, but for the sake of economy they may be at intervals of 15 to 30 centimetres, with sticks placed over them at right angles to the main span.

The whole structure is covered with grass matting on which the mud roof rests. An understanding of the way the builder works with the structural limitations of this plain roof form is the key to interpreting the form of Batammariba architecture. Using this constructional syntax the Batammariba builder creates the simplest mud cell with an elaborate roof pattern. Spaces larger than the economic span may be roofed with a complex system of corbelling and coffering, the division of the space by pillars. Sometimes a combination of such devices is employed. When corbels are used they are reinforced with several layers of joists projecting 0.45 m. from the face of the wall at about 2.1 m. The space between the corbels is spanned by a beam made of several layers of joists from which the joists span across to the other wall in the usual way. This extension of the system allows a room to be increased in width from 1.8 m. to 2.7 m.

Details of the flat roofing system

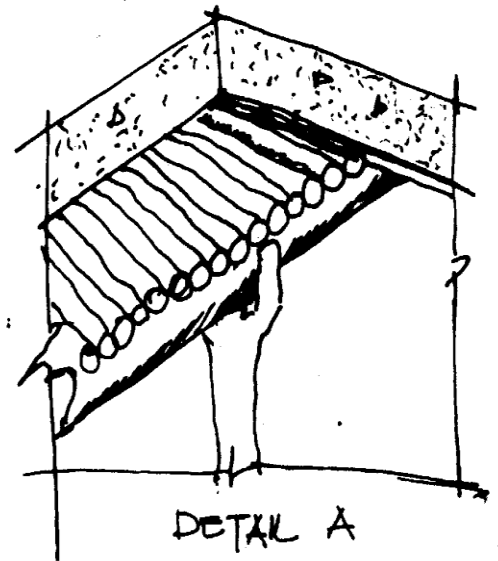
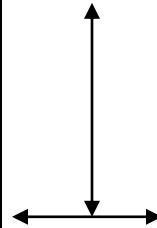
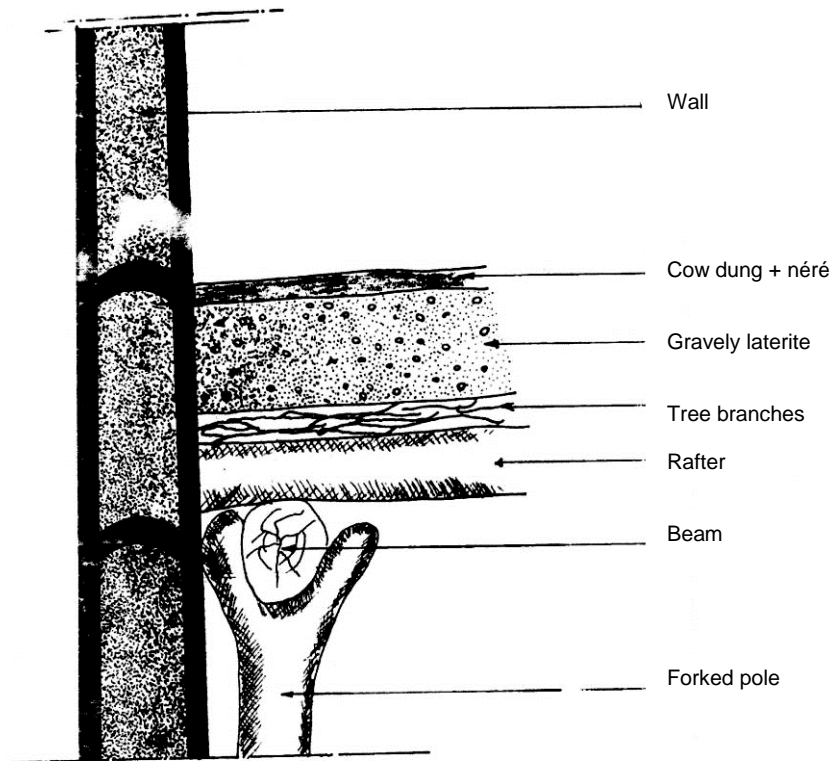


Figure 6.14. Section of roof and picture of tata ceiling. Yavo, 2006.

Functional assemblage of the flat roof (A)

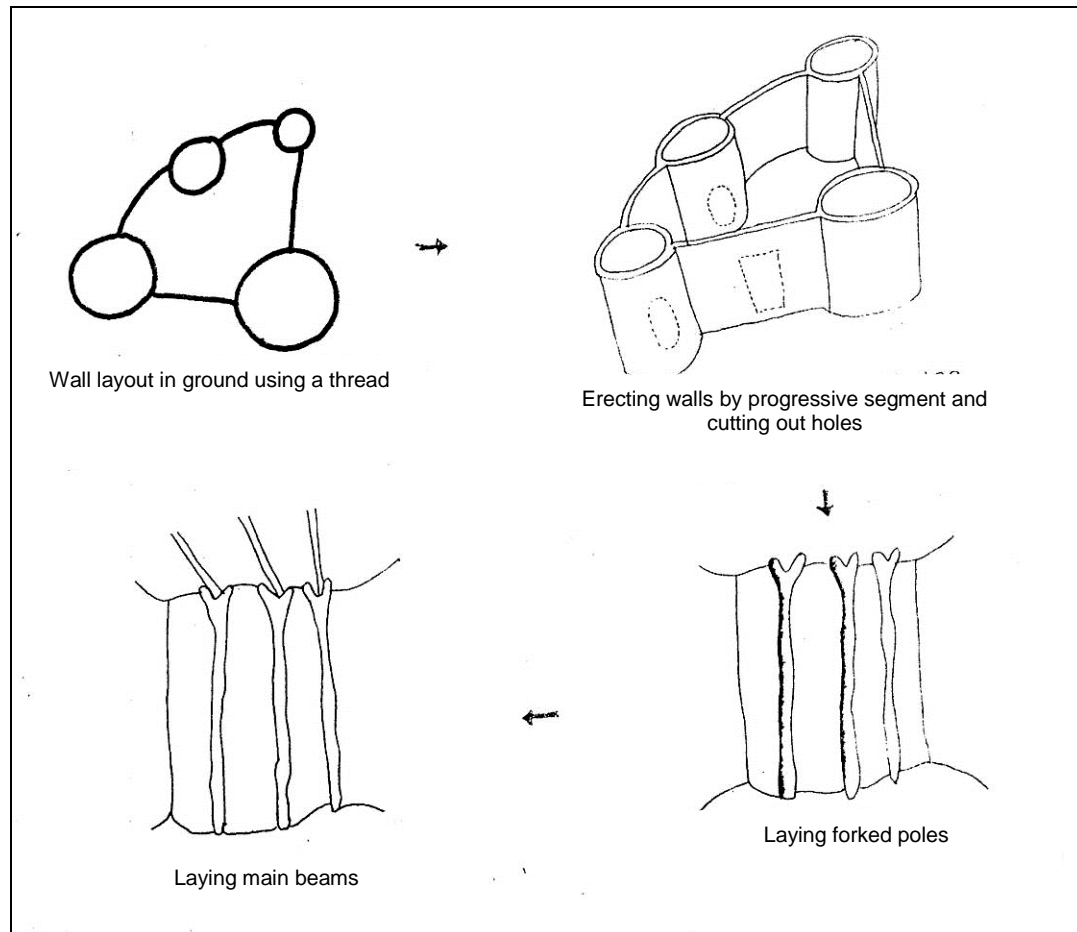
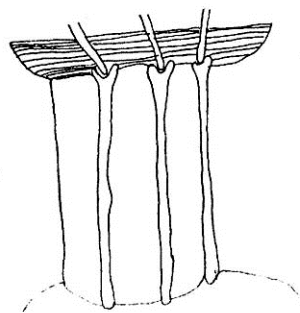
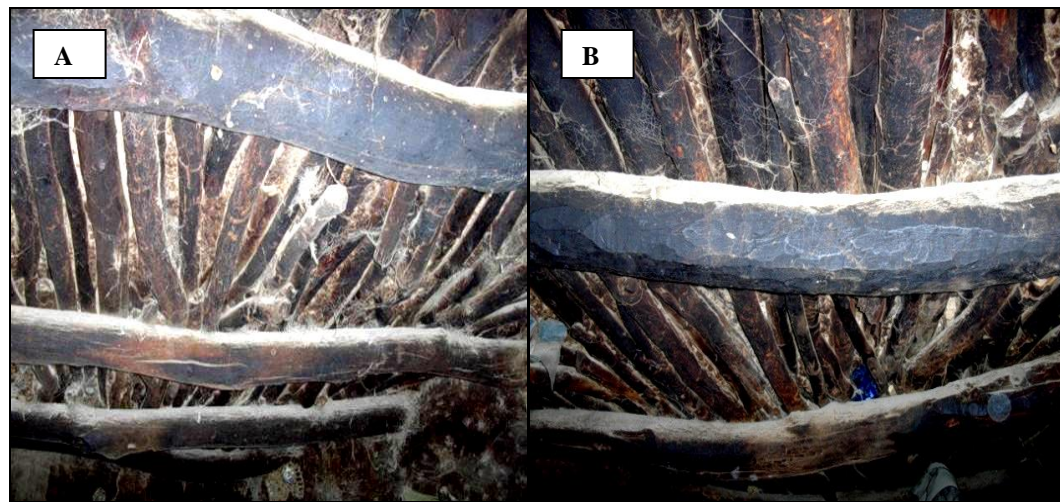
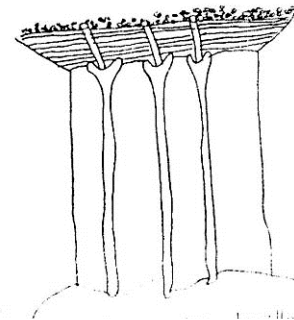


Figure 6.15: Sketches of tata roofing system and picture showing a roofing ceiling in Nandoba, Togo. Yavo, 2006.

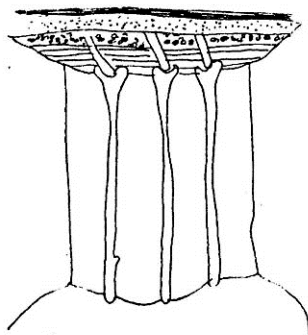
Functional assemblage of the flat roof (B)



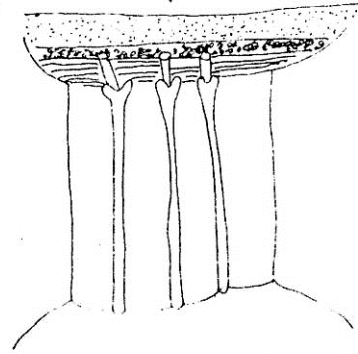
Erecting the rafters



Placing a layer of vegetables on top of the rafters



Putting up the waterproofing



Putting up the earth layer

Figure 6.16: Pictures showing a roofing ceiling in Nandoba, Togo and sketches of a roofing system. Yavo, 2006.

6.1.1.4 The granary tower and the granaries

The study revealed that the arches used to support the granaries tower are similar to the structures used for the tower blocks (Fig. 6.17, 6.18, 6.19, 6.20 and 6.21) but they are smaller in diameter and their height depends on the place they occupy in the unit; the front median towers on the edge are thicker and broader; those on the southeast are lower with an intermediate terrace.

Once the tower is finished, one or more broad punt stones are “stuck” on the circumference of the top; their number will depend on how many are necessary to support the logs. These logs allow for the superimposition of a bed of branches as jointed as possible; this is called *tifiti*. The large amount of pottery which makes up the granary tower will rest on these branches. It requires very careful preparation: the paste is made of earth, broken down into fine particles, kneaded and mixed to facilitate reinforcement. Batammariba often recover pieces of old demolished granaries and incorporate them with this mixture.

The study shows that in the dry season or winter, during the period of the Harmattan, one can work three times in the same day. In contrast with the construction of large apartments or castles, the walls are made as smooth as possible; in order that the new sections blend with those already constructed, the builder does not wait until the surface of the blocks is completely dry. After completing the bottom layer, the craftsman uses mud to fill the gaps and smoothes the wall gradually, stretching it to the top in order to obtain a height of 20 centimetres, with the thickness remaining approximately three centimetres. This process is then repeated.

Details of a granary tower

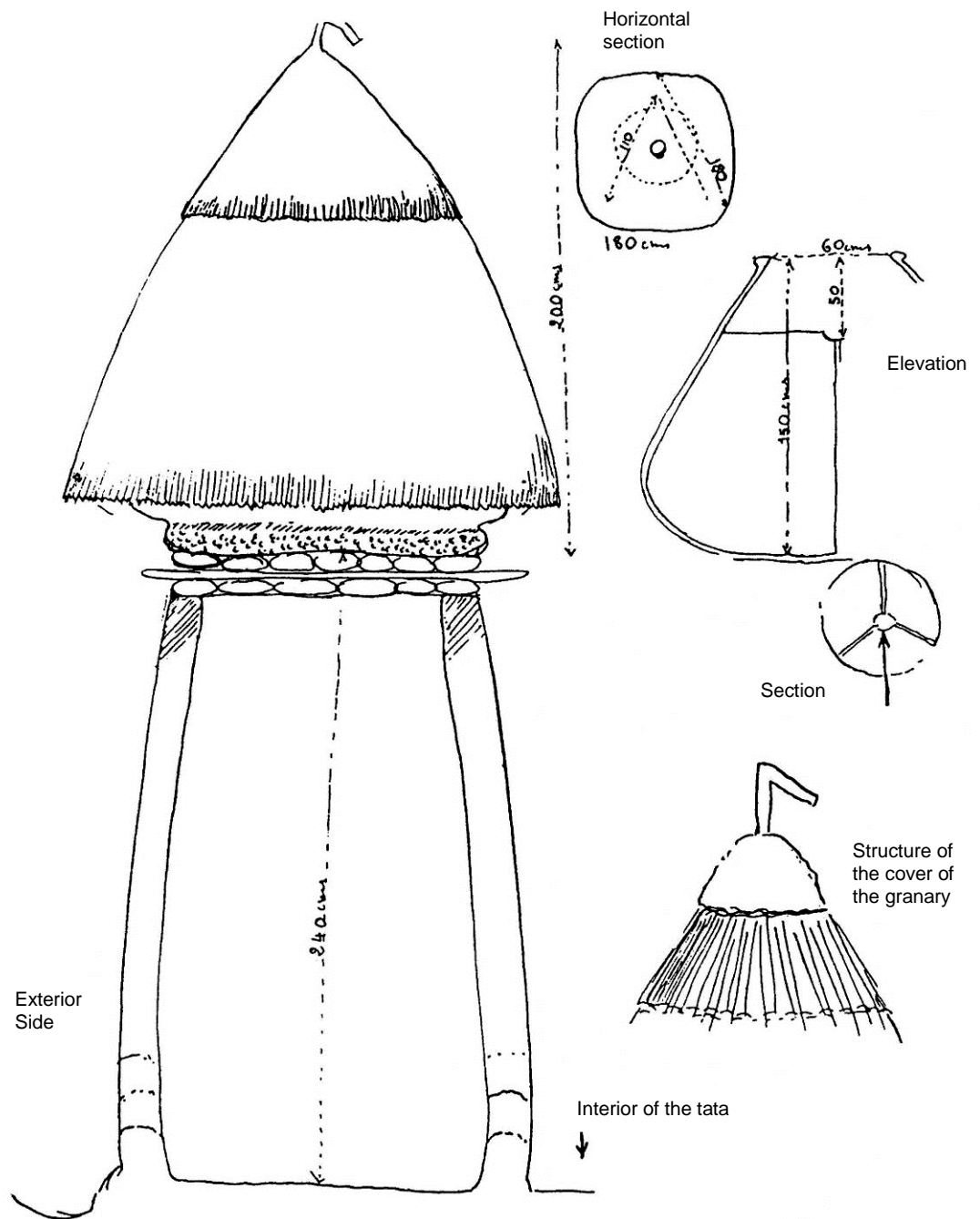


Figure: 6.17 Elevation of a granary tower. Yavo, 2006.

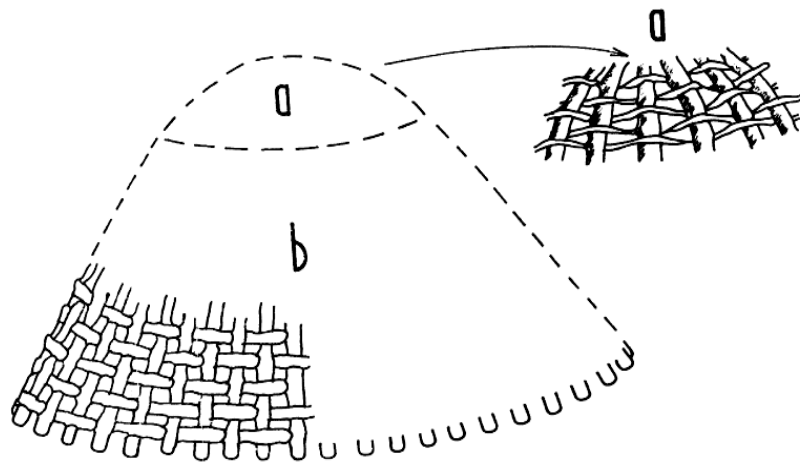


Figure 6.18. : Granary cover structure. Yavo, 2006.

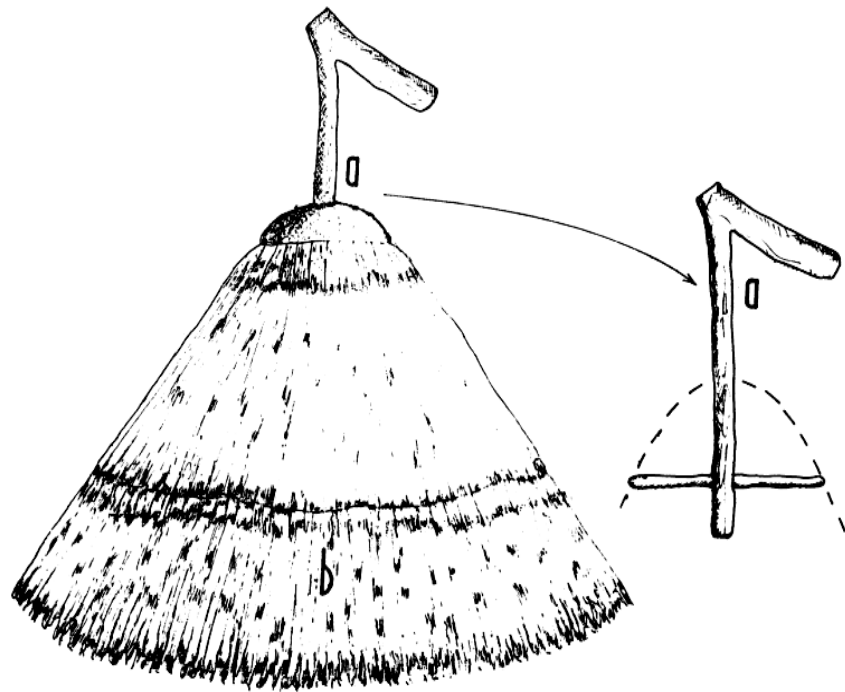


Figure 6.19: Granary cover with straw and clutch. Yavo, 2006.

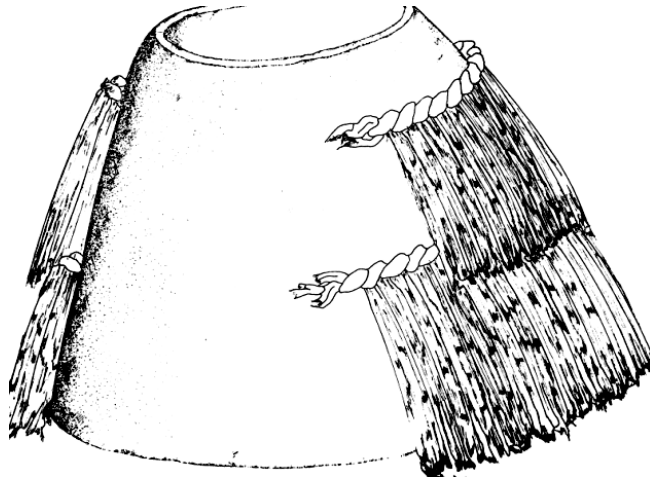


Figure 6.20: Granary's lateral cover. Yavo, 2006.

Sketch of an outer completed granary tower

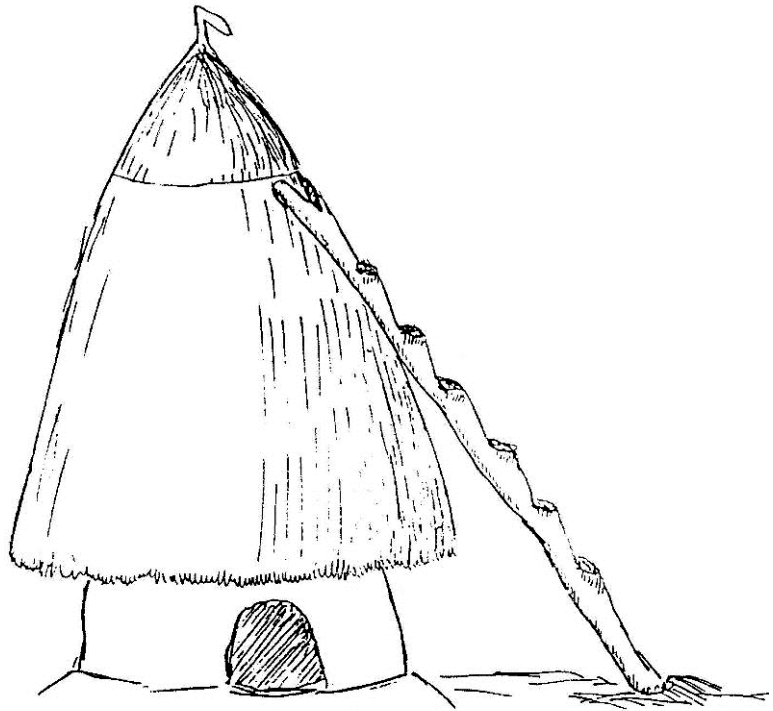


Figure 6.21: Sketch of an outer granary tower. Yavo, 2006.

A picture of an outer granary in Nandoba, Togo



Figure 6.22: An outer granary tower in Nandoba, Togo. Yavo, 2006.

When the height of this pottery (Fig. 6.22) reaches about 50 centimetres, an edge called *kubokanku* (plural, *ibokanka*) is fashioned above and below the wall to make the granary slightly thicker: the purpose of this edge is to hold the straw which will cover the granary and also to make it possible for the builder to easily assemble the higher part of the granary.

The *kubo-kanku* is very often decorated with marks made by the ends of fingers inserted into the soft ground. The granary is thus assembled spirally in a clockwise direction; the principle is the same as for the direction of construction of

the circle: one says “*befiriba teyota*”. The person on the left can however build his granary in the opposite direction without any fears, and then one says “*befiriba teniyanta*”.

Above the edge, the granary whose initial form was rather cylindrical is designed in the shape of a cone up to the kubodaku opening bordered by a yabobia protuberance. The interior comprises three equal arcs of 120 degrees separated by partitions similar to the wall and meeting in a small central column. This dimension is peculiar to the Batammariba and Bésuribé, but, with the Bétiabé, a kubono median partition runs through the interior and one of the halves is merged with a perpendicular partition directed towards the outside.

It is common to find granaries built outside homes on small cylindrical bases. This is one of the safety measures currently employed in Batammariba. The surface of the granary can be hardened through a coating made of a decoction of *néré* (*Parkia biglobosa*) thimbles. This tree plays the same role in Batammaribaland as in all of French Sudan (it is called *munuhan*). Its fruit is used to manufacture mustard, while its dried pulp is sought after and the empty pods release a type of glue when exposed to water which is used in the mortar to compress it and make it weather resistant.

A cover of straw protects the granaries. These are supported at bottom of the edge. As noted, the plaits of straw are laid out in a spiral formation in a clockwise direction, with bits of the higher pieces attached to the lower levels with bonds of *badaba tommé*. This cover of straw stops three or four centimetres from the opening; it is a kind of conical hat which closes at the opening of the granary. The kubooku roofing consists of a cone of straws of wood traversing one another.

One of the branches of these crosses is cut to provide a sharp top from which the roof will be lifted and allows adjustments at the edge of the opening: this handle is said to be tébodaté. To access the outlet which is most often about 2.5 metres above the ground, it is necessary to use a flying scale: this is simply a large branch with sharp ends as described above. It is only placed on the terrace, but a punt stone encrusted in the mortar of this terrace will often be used to support it.

The study confirmed that granary models (Fig. 6.23) are remarkable uniform in Batammaribaland; however, in neighbouring ethnic groups one finds triple or quadruple granaries; these are common throughout Sudan. Each set of grains is stored in various sections of the granary.

Generally, one section is set aside for sorghum, another is filled with fonio and the last will be filled with groundnuts or small millet. The height of the granary itself varies between 1.5 to two metres, and the maximum diameter is almost equal to the height (Fig. 6.24).

The Batammariba evaluate the total capacity of a large granary at 120 large baskets, tammammanta, each with a capacity of 16 to 20 litres. The volume of a small granary is approximately 80 tammammanta; each section of the granary thus contains between 27 and 40 baskets in this model, which is equivalent to between four and eight hectolitres.

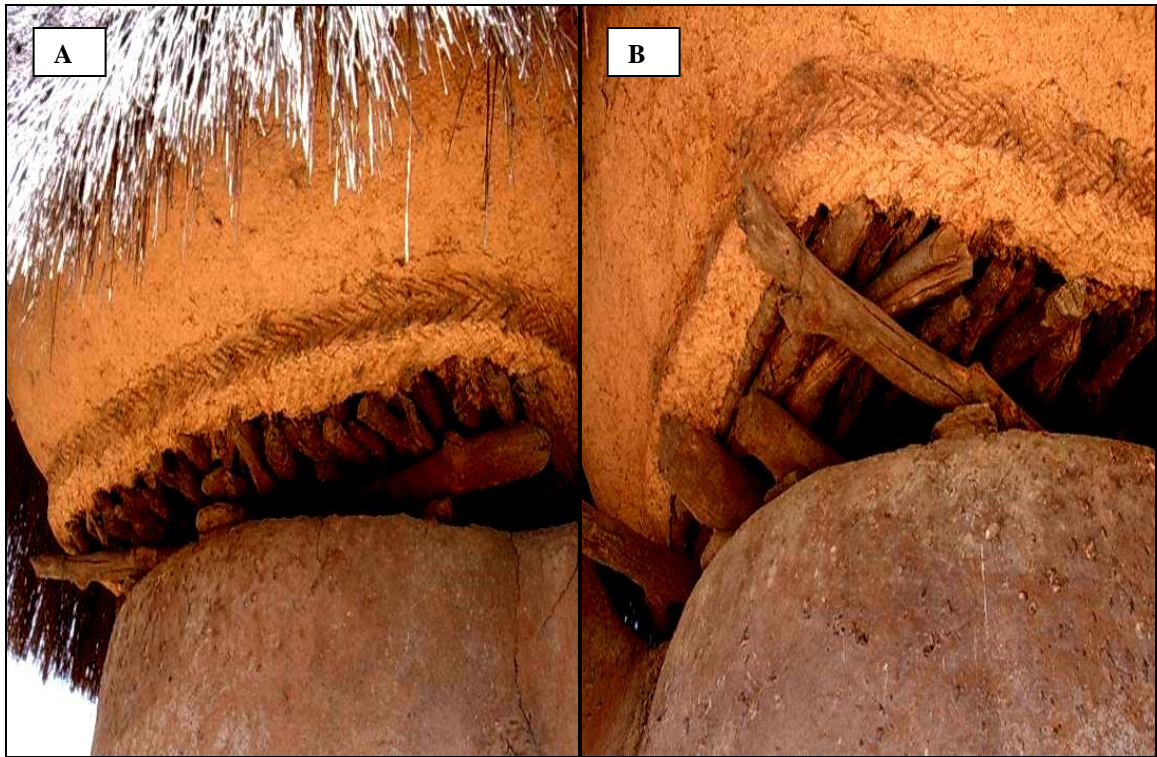


Figure 6.23. : Pictures of granaries in Nandoba. Yavo, 2006.



Figure 6.24: Picture 4, interior of a granary, Reyboz, 2004, Togo.

- **Some rituals relating to the granary**

It was noted that the surface of the sharp end of each granary is modelled in a small basin called tabofwonta (plural, sibofwu in the Otiau native language). Apart from its practical use, the deposit of some trifles, it is intended "to receive the canary crowns" tedouta, which contain the crowned roots, ditakon - plural, yatakwon (Appendix E: Glossary, page 280). When the host's granary is finished, a small feast is organised the following morning. Adjacent to the granary, the family head offers a sacrifice of a chicken; while reciting a short prayer he spills some of the blood of the chicken on some feathers and lays them on the wall of the new granary. This ceremony is called tadoukota, which means "chicken of the crowned pot".

The roots disposed of in the tedouta are those of the trees or plants indicated by the soothsayer. In Kukwangu Boukoumbé, the eldest Dukuannawé undertakes these functions and generally sends his clients to gather plants on the banks of the Kumagu; an old man who can't have any more children is charged with bringing back these magic items. One morning, without saying anything to anyone, but without performing any routine activities either, he goes away; cuts and digs, and uproots the necessary plant. On his return, he hides them close to the house; seven days later, he leaves all of them in one place, then he uproots them the following morning. Corn beer is prepared and served to the old man in new pottery.

He then sacrifices a guinea fowl on the tedouta while making a solemn prayer. This ceremony takes place on the lawn of the house in front of the new granary. Pulling feathers off the belly of guinea fowl, he wraps them to form a kind of titamaduti string; he attaches two to a kauri and makes two or three similar packages of the crowned roots. They must be deposited in a new granary. When something has been broken, it can be fixed with a similar ceremony.

The liver of the guinea fowl is put aside; it is mixed with butakontia paste, a special dish composed of millet and fonio which can only be consumed by the family members living in the house. Reciting a prayer, the family head places a little food on the roots placed in front of the pottery. At the end of the prayer, the officiating officer places some crowned roots in the tedouta pot which is finally put in a place in the granary determined by the soothsayer. When the crowned roots of a man, i.e. those of a family, are mistaken from a distance to represent somebody else and the magician unveils the mystery, a sacrifice, tetakdnbwota, of appeasement is necessary with a small amount of fawn (red) paste of fonio.

6.1.1.5 The completion of the tata as seen by the researcher

A specific ceremony takes place at the time of the completion of the tata: this occurs on completion of the construction of the crowned wall or wall of the kudati daku men: this is a hole made in this part of the enclosure used to dig up the mortal remains of a man who killed another man or an onitido, panther in his lifetime. At the time of the inauguration, women are sent fishing for the tisanoti fish and to find bits of a very sharp grass called tétaoti, which grows in moist areas and a small fena-sienfé insect, which lives in water. The small piece of grass is the symbol of young people during hunting, the edge evoking the cutting-up of game. The fish symbolises the fruitfulness of the men of the house and the aquatic insect could symbolise womanhood. These three objects are joined together and incorporated in a mortar circle which will be placed at the edge of the wall between the two male granaries' corridors at the door; this wall is built higher than everywhere else.

In his prayer the pater famillias asks that the boys are successful in their hunting and that they marry many women. The Bésuribé observe similar rites. Certain clans replace the fish with an egg. There is a special meal of a paste of millet and

the fish caught for the ceremony, or some dried meat. Regarding the crowned wall, it worth noting that previously, tradition prohibited young people from hanging around or looking at the kudatidaku, but this is losing its influence.

- **The entry into the new tata**

Among many other groups, the Batammariba consider entering a new house a dangerous act. Fear of defying the gods or a mere fear of the unknown explains this timidity. If the soothsayer says: "You cannot settle in this place, you occupy such genius place or you are heading for the wrath of the Divine" the head of household, fearing his disappearance in the near future will abandon the house and leave it unoccupied and incomplete. We did not witness such superstitions.

The new castle, with its beautiful red laterite colour, at least in the villages of the plateau, is regarded as a kind of imitation of the red ground of a freshly dug tomb. Thus a sick man will generally abstain from changing residences and if his family has to move, they will remain with him until he is well again. In the majority of the clans, the testing of the new castle is entrusted to the poultry: chickens or guinea fowls that spend the first night there before the head of the household moves in. In the case of the Bétiabés, this is not necessary, as the termites would abandon the place when humans built there.

If the father finds his chickens in bad condition the next morning, he consults the soothsayer. If a malevolent sage opposes the move, there is nothing to worry about. Furthermore, a later invasion of termites would not have a harmful effect. The soothsayer will explain the supernatural reasons for the events which have occurred and he will prescribe the sacrifices necessary to appease the gods. With the Bétiabé, as part of the experiment, one of oldest family members will spend the night in the house since he is no longer scared of death: the same obtains for

the Nkué of Kukwangu. The old one will spend a night or two in the room and if it something happens to him or he dreams at night, the soothsayer will be consulted. When a forge grinder is built in the new residence, the head of family will be the first to spend the night there together with some pots.

- **Use of the rooms**

Having identified the principal uses of the various parts of the house, it is pertinent to clarify certain issues. The ground floor of the crowned tower is reserved for the objects used during ceremonies, or for those in charge of supernatural power, for example the accessories used to decorate or equip young people during festivals: small bells, thin straps of the skin of various animals, war helmets, the dead remains of hunted animals which were not deposited in the altar to the ancestors and various family amulets.

The altar of the *békiribé* or the ancestors occupies the most important place, from a mystical point of view, in the house. This altar, slightly high and almost 20 centimetres above ground level in the cattle shed, forms a kind of half-circle, which is joined to the crowned tower. Only heirs of the male ancestors of the paternal line can sit there. The ancestors of the maternal line are represented in mother's room in the majority of the clans. No profane object can be placed on the altar or in its vicinity.

There is always a tower, and consequently a room for the wife. The first woman always occupies the principal tower. Each wife displays the successors of the ancestors of her mother on the right of the door and those of her mother on the left. Old men who have difficulty climbing onto the balcony will remain on the ground floor and will take a room under the principal room. This is also the case

with young people who have undergone various initiation rituals but who are not yet married or have not yet built a house.

The animals are located in the house according to how much care each set or species requires compared with the others. The oxen are near the right entrance and this place is called the *dinanfontiri*. The sheep and goats are held in the space under the intermediate terrace called *kupedengu*. The guinea fowls have their house in the courtyards of the women and above them the chickens live closer to the ground floor of the space/room or under the grinding, *dikoto* stone.

The dogs do not have a well defined place; they sleep with their owners, either in the rooms, or on the balcony or even in the cattle shed. A mortar with *folio* is sometimes placed in the hall to the left of the entrance with a small hemispherical excavation 20 centimetres wide. The hall also contains a hole for refuse and sweepers often cover it with a *punt* stone.

When there is a forging mill in the house, which is rather rare, it is built between the two roof space courtyards of the women, which could seem to be an anomaly, as forging is a male activity, but this mill has symbolic significance. Ordinarily, the arch should not be on the balcony. Its place is on the ground floor, above the altar to the ancestors.

The illustrations (Fig. 6.25, 6.26, 6.27, 6.28, 6.29, 6.30, 6.31, 6.32, 6.33 and 6.34) below show some detailed elements of the *Batammariba* house and materials for its process.

Tower room

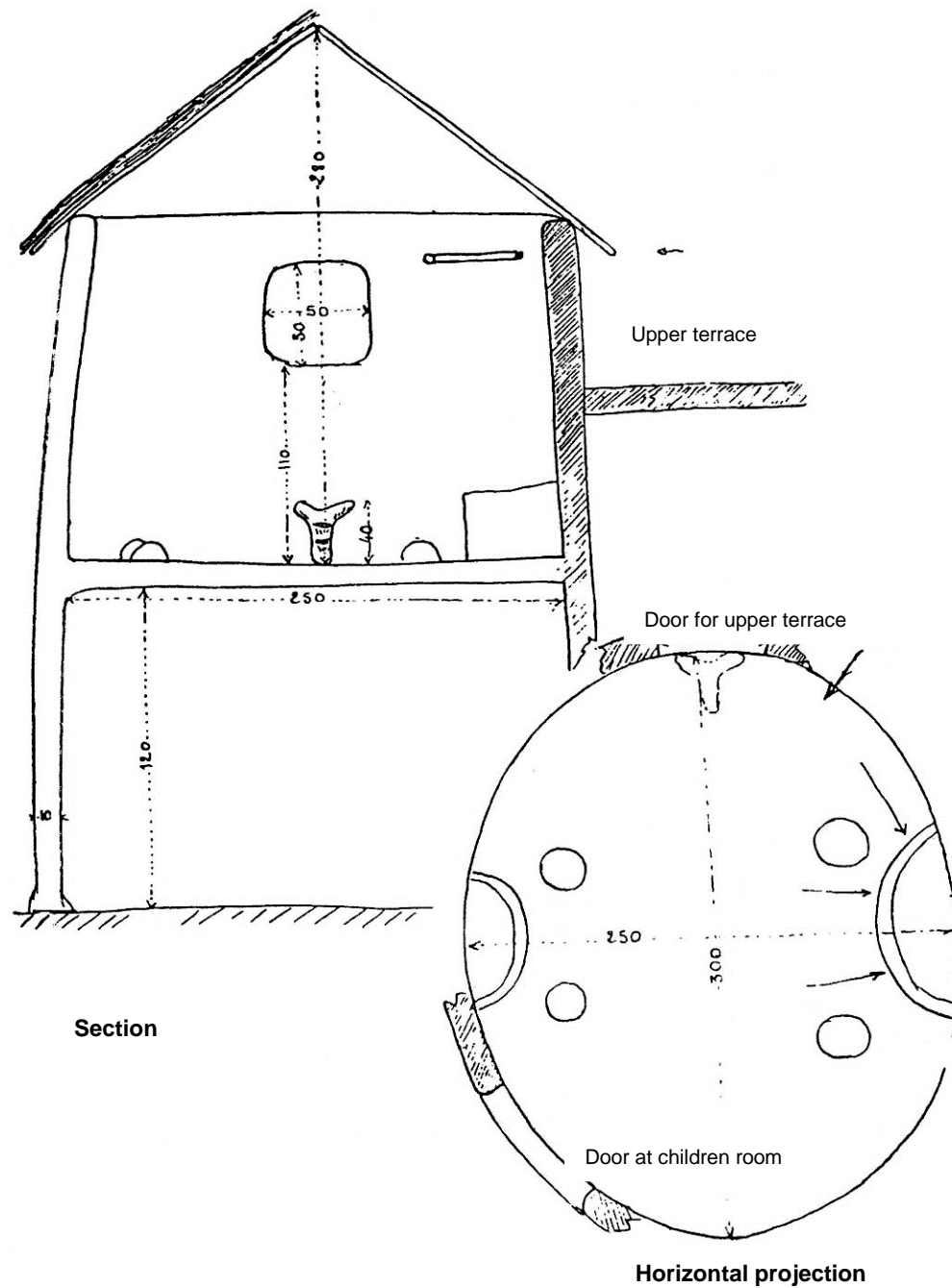


Figure 6.25: Interior layout. Yavo, 2006.

Sketch of a Batammariba shutter

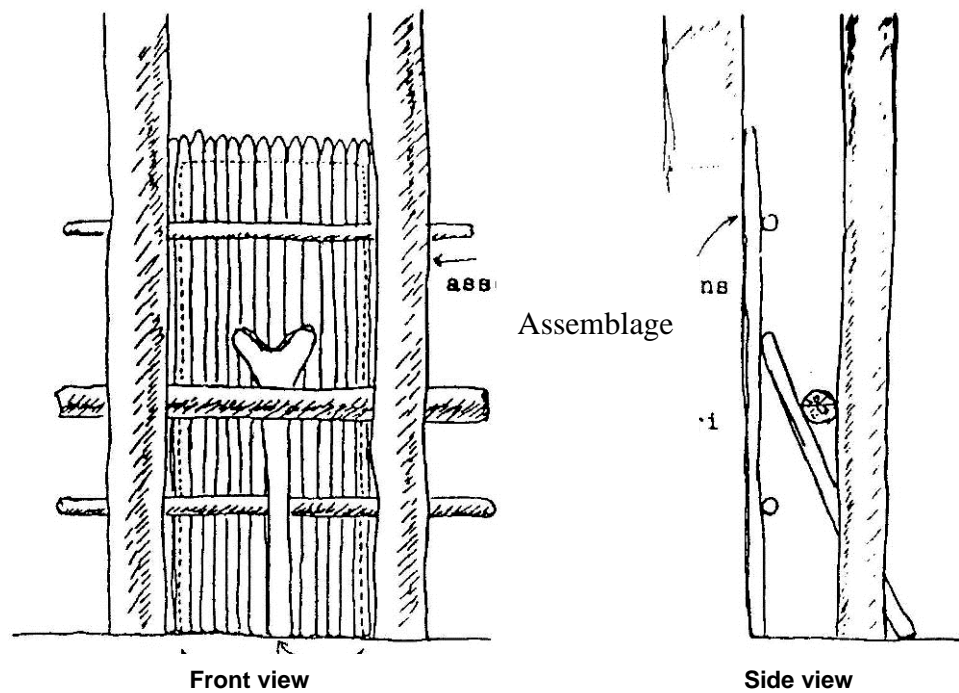


Figure 6.26: Sketches of an Otammari shutter. Yavo, 2006.

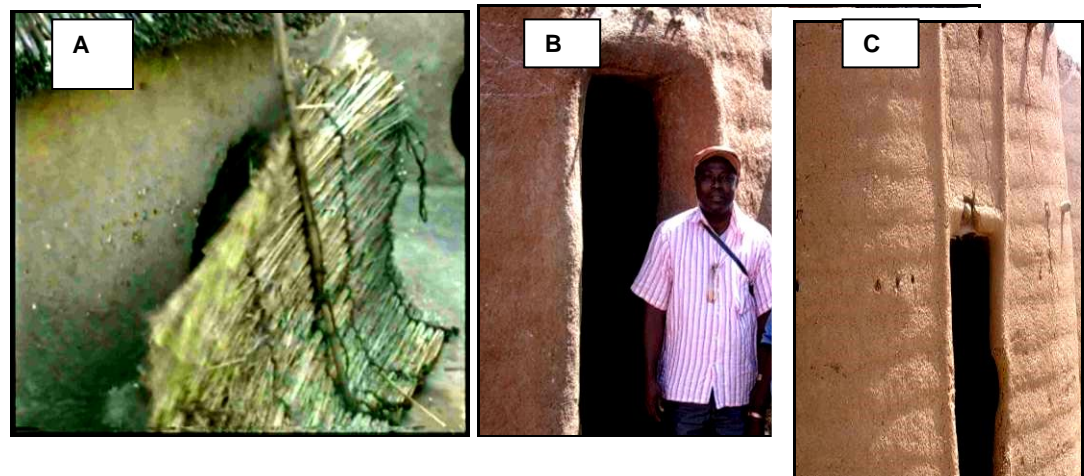


Figure 6.27: A, straw shutter in Natta, Benin. B, the researcher in front of an entrance in Watema, Togo. C, another entrance in Koutagou, Benin.

ELEMENTS OF A TATA AND TOOLS AS PART OF MATERIAL CULTURE

Illustrations of elements of a tata and tools (A)

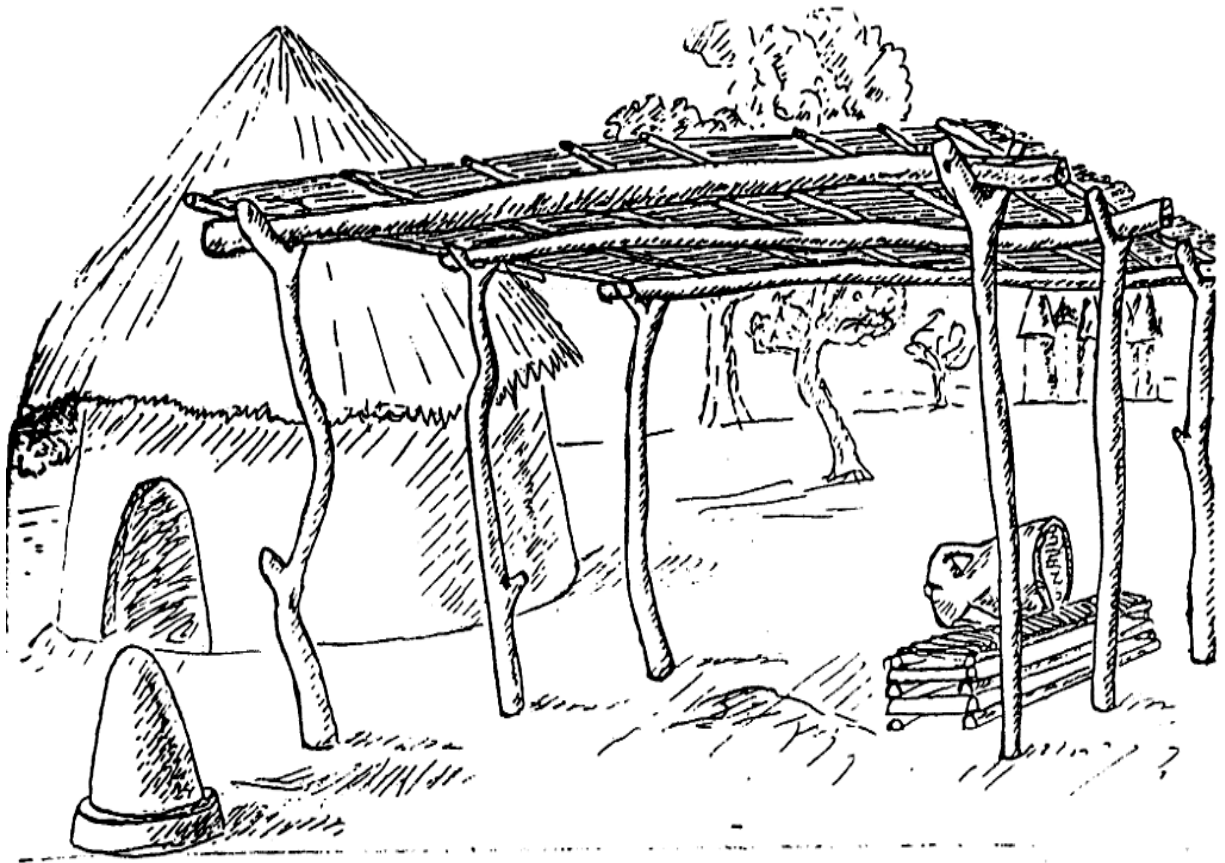


Figure 6.28: A shelter outside a tata and a round hut. Yavo, 2006.

Illustrations of elements of a tata and tools (B)

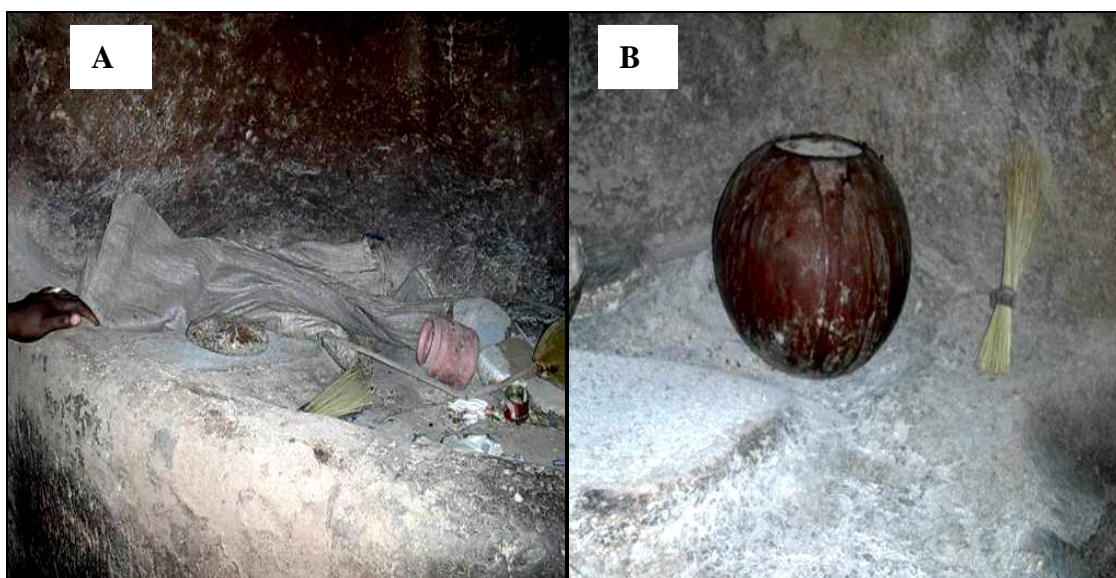
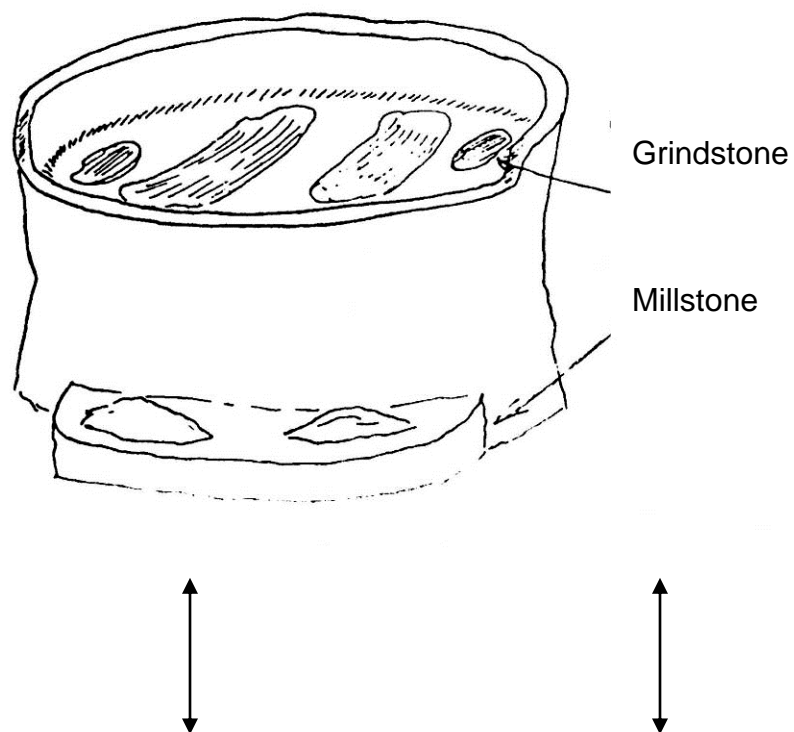


Figure 6.29: Pictures of a tata grinding stone in Pimini, Togo, Yavo, 2006.

Illustrations of elements of a tata and tools (C)

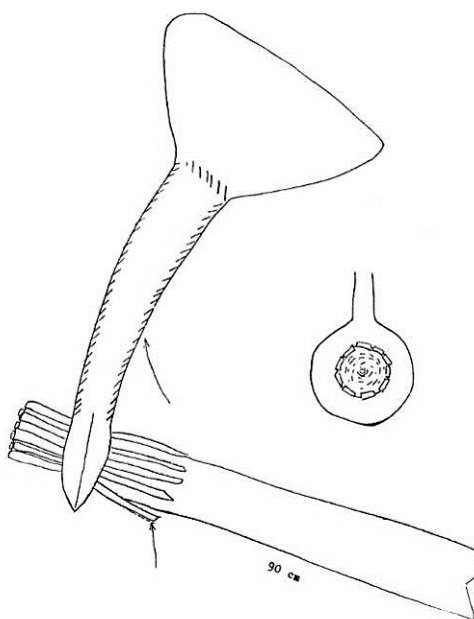


Figure 6.30: Sketch of a Batammariba axe. Yavo, 2006.

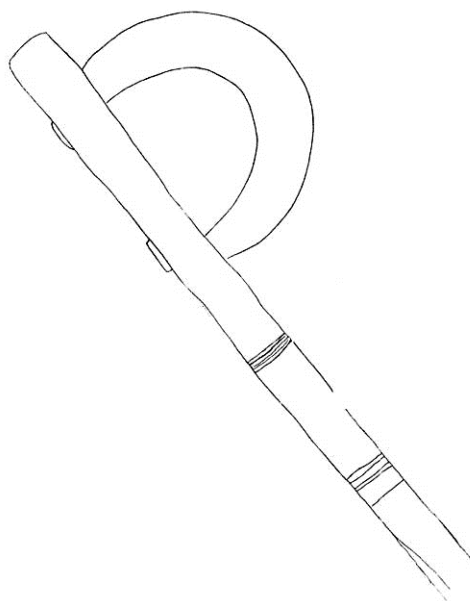


Figure 6.31: A Sketch of a Batammariba waxing axe. Togo, Yavo, 2006.

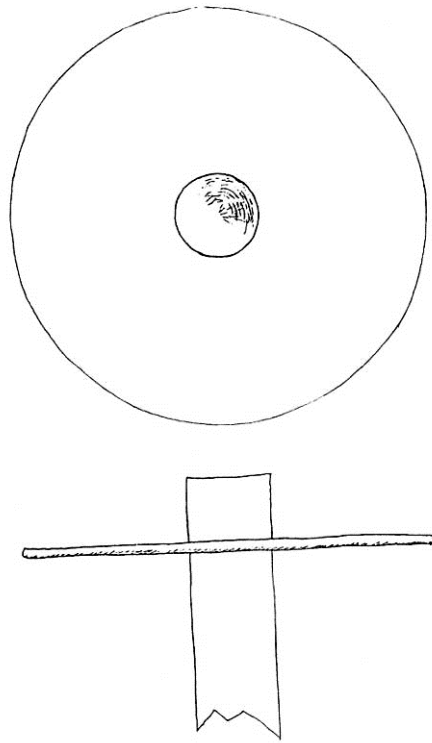


Figure 6.32: A Sketch of a Batammariba plate axe. Togo, Yavo, 2006.

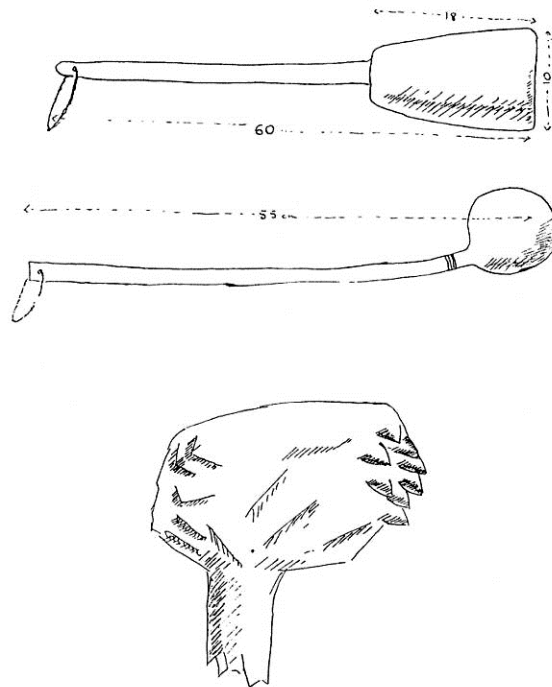


Figure 6.33: A Sketch of Batammariba wooden hammers. Togo, Yavo, 2006.

Illustrations of elements of a tata and tools (D)

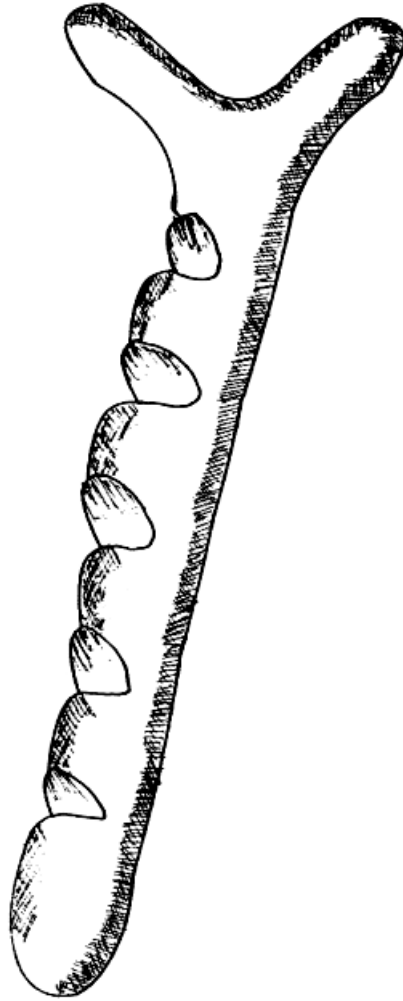


Figure 6.34: A Sketch of Batammariba trunk stairs. Togo, Yavo, 2006.

6.1.2 Maintenance of the tata

Each year the house must withstand an average 1.300 millimetres of rain (Section 4.3.3, page 89 on Batammaribaland Climate) and irrespective of the care taken, the various rough coats applied to the external surfaces erode and end up disintegrating. The damaged parts are fixed with a mixture of clay and cow dung. The women and girls smooth the rough, new coat with their hands or with the aid of a punt stone called *fénafé sampofé*. Despite their protective layers of *néré* thimbles and the barks, the walls tend to crack.

The damage can be extensive, with whole set of walls between two corridors breaking down, without, however, damaging the whole wall, since the balcony rests on many pillars. This opens up the ground floor. The Batammariba are sometimes negligent and leave a broad bay open while refurbishing the wall only half way up. In such a case, all or part of the house can be demolished and a staircase is constructed to provide access to the upper levels.

If the linking walls are maintained, the building can last between five and 15 years. With no maintenance, its life span is reduced. However, for the first two years following construction, little maintenance is required. The roof of the tata is replaced every two years. The terrace roof is also maintained (Fig. 6.40), with a clay-cow/sheep dung mixture used to fill holes and cracks.

This is usually done during the dry season. As discussed earlier, the *nere* tree bark is used to produce a paste which is used to construct the tata as well as for waterproofing (Fig. 6.35 and 6.36). A fire is regularly lit in the hallway not only to dry the inner wall, but also to protect the floor beams from insects. A number of products derived from animals and plants are used for maintenance.



Figure 6.35: Fresh néré nuts ready to be transformed into viscous paste for wall roughcasting. Yavo, 2006.

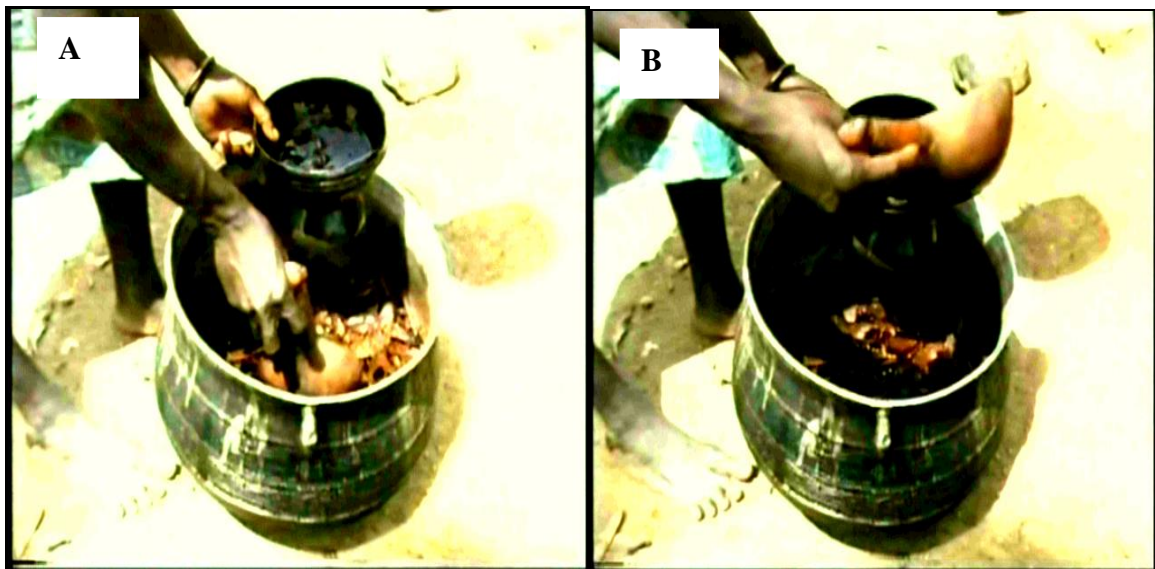


Figure 6.36: Preparation of the néré viscous paste.. Yavo, 2006.

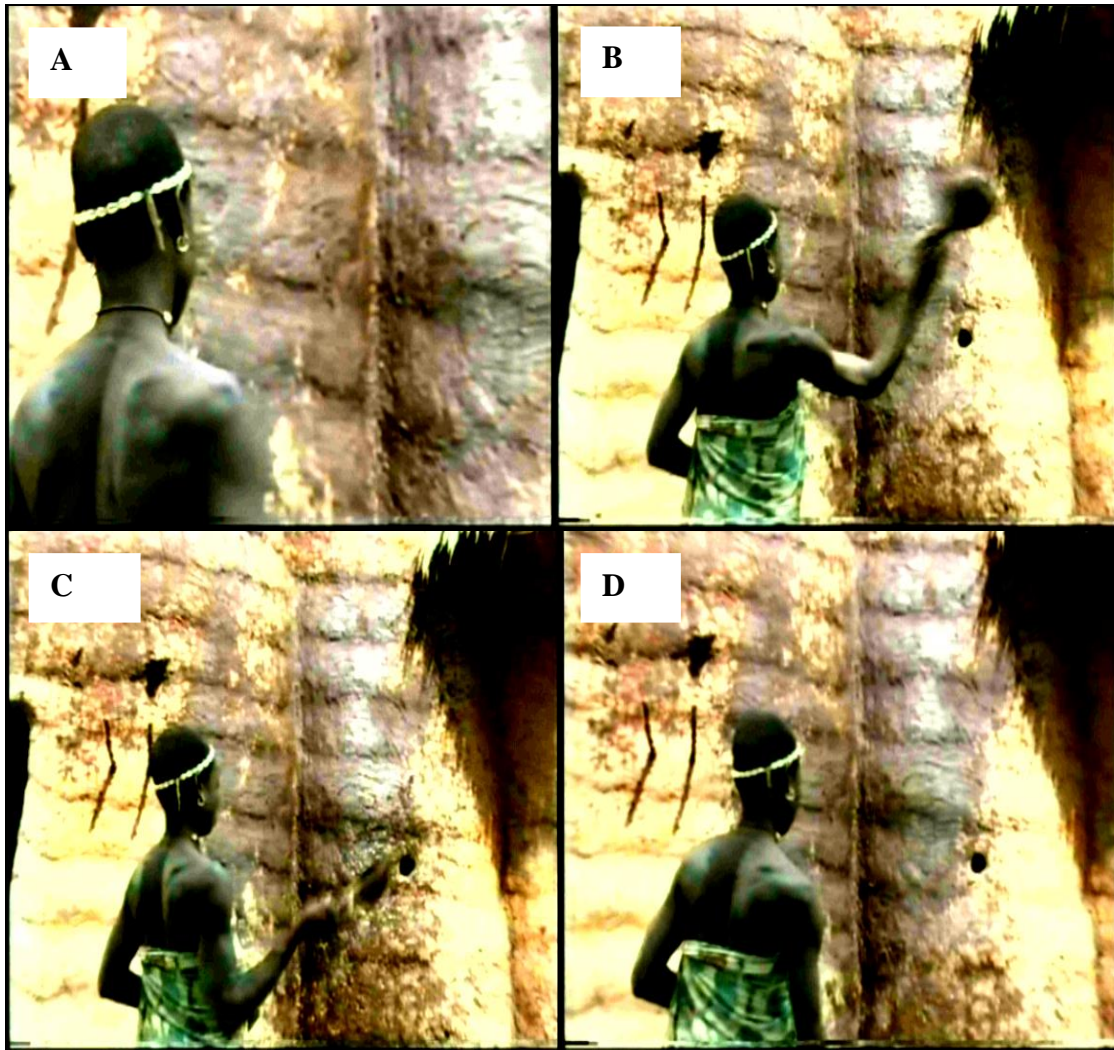


Figure 6.37: A woman plastering the wall with the néré paste in Koutagou, Benin. Yavo, 2006.



Figure 6.38: Mrs Kounde Lapoili plastering a tata wall. Togo, Reyboz 2004.

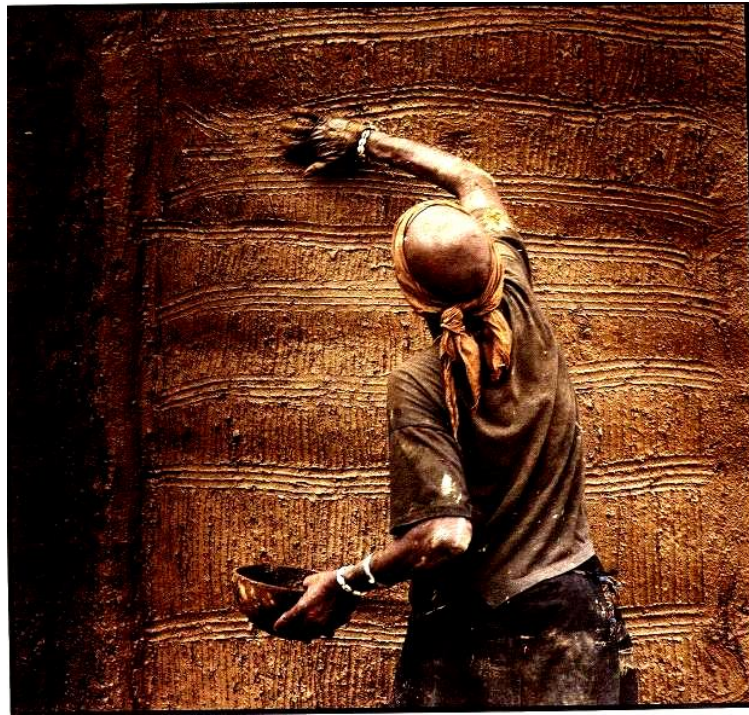


Figure 6.39: Mrs Kounde Lapoili plastering a tata wall in Koulangou, Togo. Reyboz, 2004.



Figure 6.40: A group of women plastering a tata roof terrace. Togo. Reyboz, 2004.

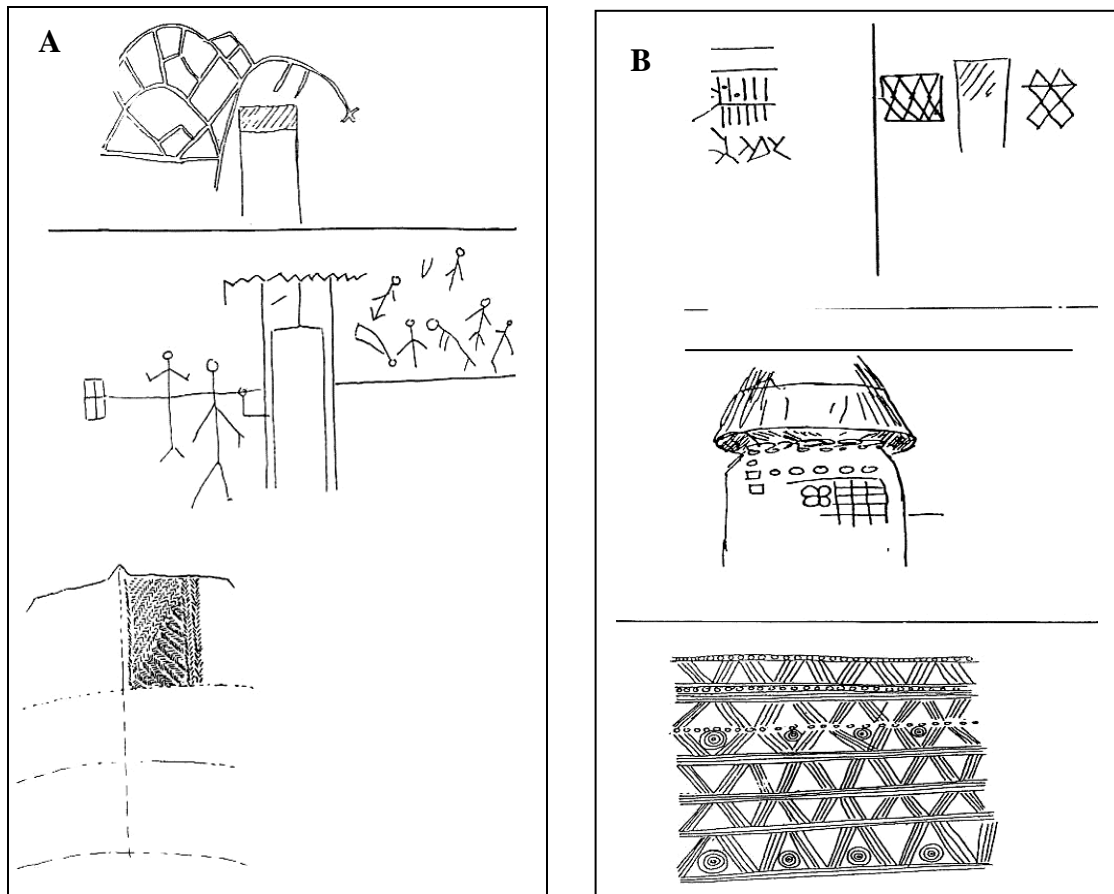


Figure 6.41: Sketches of decorative motifs, Yavo, 2006.

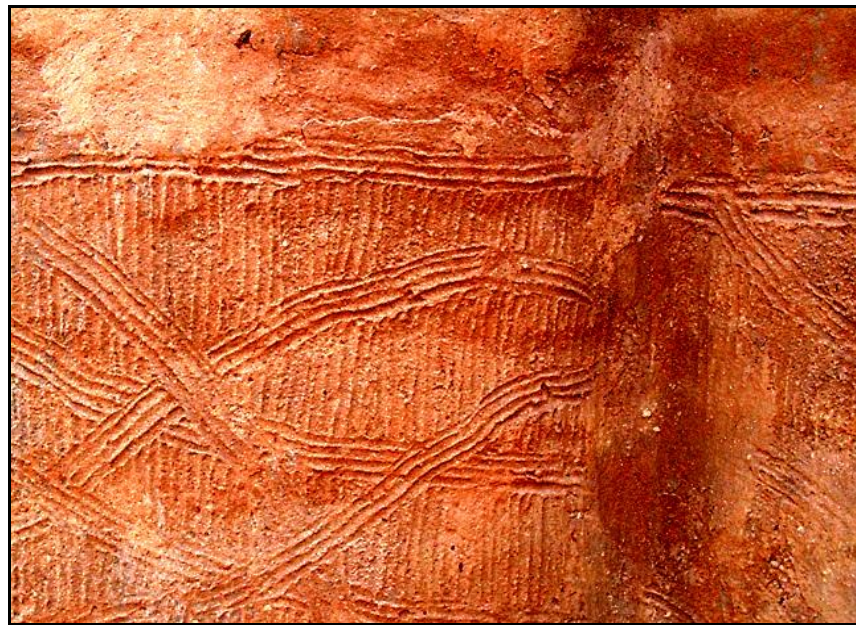


Figure 6.42: Picture showing a wall decoration. Yavo, 2006.

6.1.3 Disturbances in the tata and its abandonment

Among the Batammariba, if there are many deaths in a family, the family head says a prayer and then consults a soothsayer, who could suggest that the home be deserted: in such a case, a new home has to be built, taking precautions to avoid such misfortune. It is a very bad sign for a house to be invaded by sikyon black ants; the invasion is called bokyon somu and the soothsayer reveals the name of the demonic spirit who is expressing his wrath. The Takwonta god lives in the bukwammu tree: particles of the bark of this tree could be placed in the attics with fonio to increase its power.

This is the appropriate time for the family head, acting alone, to sacrifice a chicken to the gods at a place indicated by the soothsayer while reciting an invocation. Takwonta can also cause the ipwaga disease, which manifests itself in small boils or abscesses all over the body. The large red ants of the busiému bush are capable of kill herds of antelope and the black ants, called "magnans" can devour chickens.

While the first assertion could be considered a myth, the destructive power of the magnans ants is well-known. If these insects hover around the house, they are considered to have been sent by the sampafa snake; this predicts the imminent death of a household member. It is said that the snake requires "féwafé obéka." This could happen if a high priest has been hastily appointed without the approval of the gods. The pictures (6.43 A-B-C and D) show a ruin of a tata in nandoba (Togo).



Figure 6.43: Ruins of a tata in Nandoba, Togo. Yavo, 2006.

6.2 THERMAL CONTROL OR HEAT EXCHANGE IN BATAMMARIBA ARCHITECTURE

Shelter from the climate is usually regarded as an important function of a building. Batammariba buildings are designed to control the climate so that the interiors are dry and occupants remain comfortable during periods of intense heat or cold, when humidity is high and during the rainy season. This conceptualises a building as a filter between the external and internal environments, mitigating the harsher features of the climate to ensure the comfort of its users.

This view of the tata as a climatic filter may be extended to include large areas of the built environment, so that building groups may be analysed in terms of the shelter provided for outdoor activities. At a simplistic level, traditional Batammariba architecture conforms to this generalised model: buildings for man's use are designed so that the interiors are dry and comfortable. Externally, buildings, walls and trees are arranged to provide areas of shade in hot dry periods, while maintaining ample space for breezes to circulate during the hot humid times of the year.

The idea that a building is designed to control climate has to be modified to take account of the psychological interpretations of climate, the level of understanding of the problem and the cultural preferences of the group using and constructing the building. Although there is evidence that man has adapted physiologically and psychologically to some environmental conditions, he generally attempts to change the environment to meet cultural and physiological needs.

For example, in Batammaribaland during the cool evenings of the Harmattan when a European, not yet acclimatised, is comfortable, local people require a fire for warmth: a common feature of homes in this part of the world is a mud bed built like

an oven over a hearth. Design for comfort in the context of traditional architectural forms should not be confused with the overt application of scientific methods to the problems of building design in order to achieve prescribed internal environmental conditions.

The phrase “designed for comfort”, in the sense that it is used here, refers to the builder's skill in using tried and trusted traditional forms of structure, developed over many generations for a particular group of people. This is true of Batammariba culture; therefore, climatic control should be viewed as an essential part of the architectural programme imposed upon the Batammariba builder by his society.

How far society is willing to pursue the goal of environmental comfort depends on its priorities, which in turn depend upon cultural norms. For example, the two-storey entrance hut with its mud roof is probably the form of architecture most suited to the hot dry conditions on the margins of the desert, yet it became a common feature throughout Batamaribaland. It penetrated the more humid outlying regions to the south and was a status symbol for families. The Batammariba have developed a built form which has by and large mitigated the effects of local climatic conditions.

With the possible exceptions of nomadic herdsmen and agriculturalists who practise shifting cultivation, all societies attempt to build as permanent structures as levels of technology permit. In this sense, the Batammariba are no different from any other settled society. Traditional Batammariba buildings however, are constructed from the all-pervasive and readily available laterite, a material quickly eroded in this area where heavy rain falls during the wet season. Permanent shelter built using this material requires the invention and use of a range of waterproof

finishes. Prolonging the life of a building made from laterite depends on constant maintenance.

The annual chore of wholesale re-plastering means that building profiles are in a constant state of flux. The ever-changing outline of the Batammariba building takes the 'line of least resistance'; battered walls curve sinuously in two planes, roof lines sweep upwards into pinnacles and roof water is channelled down deep vertical grooves.

The resulting form has some of the quality and appearance of the natural shapes used by those other great mud builders, the termites, whose mounds compete with man's structures in this landscape. Mud-earth is a good thermal mass material, holding heat and cooling well. However, it has very low insulation value. Therefore, walls made of mud-earth need some means of insulation to maintain comfort in the building.

6.3 WATER-PROOFING

This research study revealed that there are alternatives to cement plasters for waterproofing roofs and walls made from natural materials. If left exposed and unprotected, walls can deteriorate rapidly.

6.3.1 Finishing

Finishing, as opposed to architectural decoration, is an essential technical aspect of mud architecture. The principal objective is the protection of the completed building from the ravages of the weather. In addition to the thick paste of mortar

in which the *tabodi* bricks are embedded during construction the *otammali* overlays his wall with a coat of plaster.

The material for the external finish of walls and roofs is subject to meticulous choice and painstaking treatment to ensure its resistance to the elements. The most common and cheapest variety of plaster is made by adding animal dung or animal hair from tanneries to soil. The mixture is saturated with water, covered with grass and allowed to rot to form foul-smelling compost. The mixture is then trodden with feet into a dark sticky paste, ready for application by hand on the wall surface. In addition to providing a protective layer, the finishing process allows the *otammali* to level off any unsightly protrusions and depressions on the wall surface.

Clay for external wall coating can also be treated with indigo liquid from old dye pits, the roots of a wild vine, sediments from dye pits, the pods of locust beans or a local cement of very complex chemistry. However, such prescriptions are often reserved for the treatment of the vulnerable external surface of the roof. It is pertinent to examine the techniques and processes involved in the manufacture of some of the constituents of the external plaster.

For waterproof or maintenance the *otammali difuani*, who is more often than not a woman or the wife of the *otammali*, takes the pods of the fruit of the locust nere tree and grinds them into a coarse powder. The powder or flakes thus produced are soaked in a huge pot of water and allowed some days to settle. The resultant dark reddish liquid can then be applied as a waterproofing coat on an already plastered surface; or it can be mixed with clay for plastering or mending leaking roofs. The sediment that accumulates at the bottom of the dye-pit is scraped out when the pit is cleaned. These dregs are moulded into lumps that look very much like *tabodi*, and allowed to dry. The lumps are burnt in a kiln and pounded into a fine greyish powder that is akin to Portland cement in appearance and to some extent, behaviour. This product can be mixed with clay for plastering, but more

often than not it is an intermediate product in the process of manufacturing the local cement proper.

The local cement thus produced is mixed with nere liquid from the dye-pit and blended with another mixture made of one part hair from the tannery and three parts animal dung. It is beaten to a soft mass and soaked in water to produce a solution which then is poured into this already complex substance. This is stirred thoroughly twice a day for about two weeks. At the end of the period of fermentation, we have a viscous brew. This is the best of all traditional waterproofing available to the builder. It is therefore reserved for the protection of walls and roofs. Unlike modern cement, it bonds well with mud construction.

More recently sand-cement plaster has gained favour with patrons as a symbol of modernity. However, master builders are aware of the incompatibility of the marriage between cement and mud in traditional architecture. Because of poor bondage, the cement plaster on the wall surface flakes off after a few years, exposing the wall to the ravages of rainfall. When cement plaster is used to waterproof the roof, the result is more disastrous than mere flaking off. According to Tapita Mouna, the cement expands under the scorching heat of the sun and develops cracks that allow water to reach the mud below. As the cement layer does not permit the mud to breathe, the reinforcement in the roof gradually decays. After three or four years, the whole roof comes down.

6.3.2 Internal finishing

Material for internal finishing need not be treated with the elaborate care required for external finishing. Ordinary clay is often made into a fine paste and applied as internal plaster on walls and roofs. A builder who intends to decorate his walls and roofs invariably plasters his exposed tata panels with clay; a process known to the builders as bunangetibu. Two types of plasters are used in their natural

state; the blackish sticky clay from old anthills and fine textured red clay. These materials are most often used internally, to give a glossy finish to a wall or column. The traditional floor is usually made of gravel. After removing the top soil, a layer of 15 to 20 centimetres is saturated with water and beaten with specially shaped wooden sticks by children and women. "The occasion of floor beating" is steeped in social significance. It affords women of the neighbourhood an opportunity to get together.

The event is accompanied by music, song and dance, in addition to the chewing of kola nuts and exchange of gossip. The finished floor is usually coated with a final layer of clay to give it a smooth, glossy surface. However, cement-screed has been used more recently in traditional floor finishes. Protected by the roof and walls, the screed does not crack or flake when used internally. The only complaint one hears is that the floor gets too cold "to allow someone to sleep on a simple mat or a goatskin". Another method is simply to treat the traditional floor with clean sand. This type of floor is especially appropriate for nursing mothers. When the baby fouls the floor, she simply scoops up the mess together with some sand.

6.4 BATAMMARIBA ECOLOGICAL RESOURCE MANAGEMENT

6.4.1 Batammariba cultural attitudes toward land resources

Among the Batammariba, land which is called Impurima is more than a physical entity or a source of economic subsistence. It has an essence. It contains the earth force embodied in the earth goddess called Butan who is widely regarded as the principle of fruitfulness and continuity. Thus land, whether it refers to family/compound or communal land or simply waste land is encrusted with rituals.

For example, compound land is associated with rituals of the cult of the family known as mueotie. These rituals are performed, for example, when a man plans to build a house. They ensure the prosperity of the family domain well as the well-being of its members. Village land has a cult which is known as Babwotwota otanti among the Somba Batammariba; the corporateness of the lineage is shown in the common ownership of the clay mound of fertility known as Koubalakonkou. Land is thus the mainspring of life.

If land ritually denotes life, the only appropriate condition for good health and the prosperity of the individual, his family and the village is the preservation of the holiness of the earth force. Batammariba social behaviour is accordingly structured around the principle that if one offends the land through abomination, there is a decline in the quality of the earth force available to man, which is observable as a decline in human economic, social and psychological well-being. Consequently, a system of taboos guides not only inter-personal and group behaviour but also agricultural activities. Rites of purification provide remedies for any failures to meet these social obligations.

The ritual and social collectivity of land among the Batammariba also means that land is an important link between the dead who are said to inhabit the spirit land, iwage, the living, bessodibe and the yet unborn, Dibo. This is another way of saying that although a man needs a piece of land where he can cultivate his farm and build a house, the land "ultimately belongs to the community and cannot be alienated from it." It therefore places on society the moral as well as social obligation to provide each member with land. The land which unites members of a society also provides a continuing link between dead members of a household, lineage or village and their living agnates. It also means that no member of the society should be without land, for to own a piece of land is to validate membership of one's society.

- **Categories of ecological resources**

The Batammariba's classification of land is based on social and economic needs which range from those of individual members to those of the community. The nature of the needs is reflected in the grouping of land into three categories, subject to local variations, namely, common land, family land and farmland. Meek (1934) uses the term 'common land' to refer to "bad bush" and uncleared forest preserved for magico-religious reasons.

Henderson (1974) suggests that this bad bush may in some cases be an abandoned compound belonging to one of the earliest settlers in a village nucleus which has been over-grown by bush. Its abandonment may have resulted from death by small pox, the swelling disease or suicide (these are regarded as abominations). Hence the bush that overgrows this area is viewed as an evil forest where in the past, twins were abandoned and sacrifices dumped. Or it may simply be a thick forest dedicated to a deity. This common land referred to as "bad bush" constitutes a potent force because it is the medicinal fount for villages as well as diviners and medicine men.

- **Compound Land and Farmland**

The Batammariba make important ecological distinctions between two categories of land. These are compound land and communal farmland.

- **Compound Land**

This refers to land that belongs to an individual by which is meant the family head. Land-owning rights are thus vested in the nuclear family. In keeping with this form of patrilocal residence, the land that belongs to a man passes on to his

eldest son with each succession to family land and property ritualised in the sacred family symbol.

Thus a man's rights to his land are identifiable with his sacred symbol which socially regulates succession to land and property but also the administrative as well as the ritual headship of the elementary family. The exogamous unit which controls this land is the lineage. When succession to family/compound land ends as a result of recurrent deaths so that no male successors are left, the land reverts to the community.

Family/compound land provides space for residence. It is also permanently cultivated. A man's wife cultivates her crops here as well as vegetable gardens. Home-grown yams are cultivated in land plots around the precincts of the family compound. Economically valuable trees are found in abundance here. They include oil palm, kola, kapok (*Ceiba paenifandra*), breadfruit (*Treculia africana*), iroko (*Chrolophora excelsa*), and calabash (*Lagenaria vulgaris*). Only in a few cases, such as among the Otchaou Batammariba, is compound land not used for any type of intensive agricultural activity.

- **Farmland**

This refers to land jointly owned by the members of a community. It is physically separated by patches of woodland from compound land which forms the residential nucleus. While compound land which belongs to a village is oriented toward the village common, communal farmland is located near the outer limits of the group's territory. The major economic decisions of a village on the use of farmland relate to the swidden cycle. Based on a block system of farming, an area of farmland is selected each year, divided amongst members and cultivated. After harvest, it is left for a period of say four years to lie fallow and regain its fertility, while other farmlands are subjected to the slash-and-burn cycle. This

form of agricultural activity derives from the fact that the farmland is the major source of food for the community.

However, the continuous extensive cultivation of farmland may reduce the fallow period to a minimum so that instead of allowing a period of four years, it is cultivated every two years. The consequence is the gradual deforestation of the original primary vegetation which is replaced by a secondary cover of grassland.

Karmon (1966) refers to this as "derived savannah", while Koffi (1997) notes the large villages or what he calls 'grassland towns' of the northern Batammariba may have resulted from this physiographical change. Varying patterns of land use in relation to changes in vegetation have considerable implications for Batammariba architectural planning. Batammariba social and religious attitudes to land are then carried over into architectural considerations.

The next chapter on summary of the study, analysis, discussion and findings presents an overview of the case studies and provides an analysis of the qualitative data obtained from the investigation.

CHAPTER SEVEN

SUMMARY OF THE STUDY, ANALYSIS, DISCUSSION AND FINDINGS

7.0 INTRODUCTION

This chapter presents an overview of case studies using the qualitative data obtained from the investigation. It also presents the analysis and discussion of the data. Content analyses (involving calculations) were used in the analysis of the qualitative data obtained at the exploratory stage. This helped to establish the profiles of the respondents and responses were put into tables in order to identify key results.

7.1 INVESTIGATIVE APPROACH

Frescura (1994) observed that the conventions used in the past by architectural and art historians to analyse and interpret folk architecture or, indeed, architecture as a whole, were clearly inadequate. He added that the complexity of the interaction between man and his social and physical environment is such that it may only be analysed in terms of a holistic approach and in the context of its own value structures.

Thus, the investigative process of the data and the derivation of findings on the technical know-how embedded within the indigenous knowledge system which

sustains the production and maintenance of Batammariba traditional architecture were based on a range of criteria which signified the presence or absence of the technical know-how which is shared among the actors in the production and maintenance processes. In particular, specific tools or systems of measurement and quantification as well as abstract concepts in geometry, ecology, etc., were sought.

The analysis seeks to establish the presence or absence of patterns or indications of awareness and responses in relation to the issues identified as well as the mechanisms of conceptualising and communicating that awareness in the absence of written records. In order for such analysis to take place, data collection focused on both the processes of production, use and maintenance as well as the actual forms of the architecture and settlements identified as case studies.

The following sections present the analysis of the data collected for this research study. A sample of the questionnaire is attached in appendix A3. It focused on the construction processes covering the western and eastern Batammariba territories of Benin and Togo, particularly in and around the rural communities.

As noted in the methodology, 12 villages were selected: Boukoumbé, Koudogou, Kougnandogou, Koutagou, Natta and Zongo in the Benin Republic; and Koulangou, Nandoba, Matéma, Pimini, Warengo and Wartéma in Togo. At least one master builder from each village was interviewed and 20 others, mainly builders, gatherers of materials and owner-patrons were also interviewed. A total of 32 people were interviewed for this study.

7.2 SUMMARY OF ANALYSIS, DISCUSSION, KEY RESPONSES AND FINDINGS

The interview questions and responses are analysed in the following subsections.

7.2.1 Analysis of interviews in Benin and Togo

To a certain extent, it is impossible to achieve a complete analysis of the production and maintenance of traditional architecture of Batammaribaland in a study such as this. Nevertheless, a quick glimpse into the diverse aspects of the traditional architectural process is necessary if we are to appreciate the density of the concepts, terms and syntax of the builder's architectural heritage. To methodically understand this analysis, each interview is presented.

- **Function of Batammariba house**

In an informal interview, Mr N'Tcha Lapoili, drew attention to the utility of Batammariba architecture. He stated that the two-storey building with its local variances plays both a defensive and economic role. In terms of defence, it provides protection from invaders or wild animals and in terms of economics, it does not cost a lot to build a tata; furthermore, once the tata is erected, its granaries are of great value for storing crops.

Therefore, the tata is seen as a citadel of first choice in a region with recurrent problems concerning the security of goods and people. The tata plays a multiple role and its various aspects are interlinked. Further discussion with Mr Lapoili, a prominent octogenarian Batammariba master builder (otammalimwa), revealed that the populations of Batammaribaland used simple processes to construct their dwellings and also revealed the origins of the tatas.

The two-storey buildings of the Batammariba are scattered on the mountain and in the plains. Mr Lapoili added that the people that use this kind of architecture are known under the common name of *Batammariba* (Appendix E: Glossary, page 280).

Mr Lapoili noted that the tata acts as both accommodation for the family, protector or supporter of the silos and as the abode of domestic and wild (bees) animals. He said that the Batammariba tata is the perfect shelter for men, animals, birds and insects. It is also a sanctuary for the clan. He also revealed that the tayaba model (Section 5.6.1, page 130) shelters a convent on the ground floor where the initiation ceremonies such as the passage of age and mystical rituals are carried out. This is defined by the west orientation of the house and a duplicate male and female polarisation that partially determines its functions.

He said that the east is always considered to be a bad side from whence come the threats to society such as rain and storms. In contrast, the west side marks the progression of their migration and promotes happiness. Mr Lapoili explained, for instance, that the circle is utilised as the core form. According to him, this form is borrowed from the spiritual belief that the circle is life's triumphant creator, as evidenced by the sun and full moon. The well laidout and geometric patterns used to lavishly decorate the outside of the buildings contrast with the seemingly drab landscape.

This former leading Batammariba builder recounts that:

If all goes well, all acts of the gods properly taken care of, the work will go on, the digging with the hoe and sprinkling of water, and then kneaded with the feet or even with the hand. And if the tools are taken to the construction site conveniently, and the plan summarily illustrated either with pecks or mapped out on the ground, the building will be effectively carried out.

In term of architectural knowledge, metaphors, similes and proverbs, he represents an entire library. Some of his aphorisms recorded during the fieldwork in Koulangou, are found in the (Appendix G, page 289) of this thesis.

Mr NDa Lapoili, who was an assistant to his father Mr NTcha Lapoili, explained how to make the tata. He revealed that the building is done during dry season during the Harmattan (the cold and dry wind from the Saharan desert) which enables the masonry, kunadakoua to dry quickly. He added that to build a tata, the family chief, passanta needs the assistance of all his brothers and friends of the clan, an indication of the cohesion, reciprocity and moral strength of Batammariba society. He detailed the different stages of tata construction. First, the choice of the construction site is made according to physical as well as religious criteria and is always on a slight slope to enable water to flow.

Concerning the earthwork, badowembe and the setting up, once the site is selected, swept and levelled, the builder sets up with rope, badabatomme. He added that there is no groundwork as such in Batammariba architecture. In cases when one has to do it, mould earth that has dried for two days is obtained. The feet are used to harden the soil. He explained that: “the earth walls are generally made by putting layers of 20 cm one after the other and their numbers are from 9 to 15 according to the height of the tata”. The builder cuts openings with a machete, butommu before the walls dry.

Mr Tapiba Mouna, a top builder (otammalimwa) was informally interviewed in Nandoba village in northern Togo. He provided important information on the core processes of traditional architecture and clarified some of the myths about building a tata. Special techniques are involved in building a tata. Even though he was unable to explain this, it appears that these techniques must be acquired at a very early age. Some remain secret; he said, “.....There are some things I am not allowed to divulge to outsider”. Skills acquired during childhood are perfected. Mr.

Mouna claimed that his eyes and hands are used for measurements, counting and calculations.

Informal interviews with Mrs Kounde were mainly conducted while she was plastering her tata walls. She revealed that once the structure is complete, family women cover the terrace and exterior walls with a smooth plaster of sediment and fruit essence, especially from the *néré* tree, *munuhan* (*Parkia biglobosa*), and sheep or cow dung which serves both to partially camouflage the horizontal building levels and to protect the earthen central part from possible destruction by rain (Fig. 6.38 and 6.39).

Mrs. Kounde added that earth that is very rich in cement *tetaoti*, preferably grey, is used for this operation. The sifted soil is mixed with water and cow dung. The cow dung maintains the consistency and elasticity of the soil. One then uses one's hands to cover the wall with this sleek dough. It is allowed to dry before being watered with a decoction made with *karate* peels, *mutammu* (*Parkia butyrospermum*) or peels of the *néré* fruit, *munuhan* (*Parkia biglobosa*). She added that she is one of the best in the village because she has been doing it since when she was 12 years old. Skills such as these are passed on from parents and learnt from childhood.

Mr Takpalata provided glimpses into how the roofing, *kumaliku* is made (Fig. 6.14, 6.15, 6.16). He said that two techniques are used for roofing by the *Batammariba*, namely the roofing made of straw and the terrace-roofing. He explained that the frameworks of the roofs made of straw are for the most part stems of millet or ironwood (oak) and the ceilings are stems of millet or "woven thatch". Twenty to 30 stems or more (according to the size of the stems) are attached and laid one after the other on top of the wall to build up the framework.

The structure or height of the framework is constructed with three bales of straw, mutieremmu. One is thicker than the others and supports the weight of the whole structure. Once the required height is obtained, the three bales of straw are firmly attached to the peak and others follow.

Usually, the ceiling is made from stems of millet. One attaches the stems by the “feet” or bottom as if one wanted to weave a mat. This is stretched on the framework to stop straw from passing between the spaces between the wood, cailcedrat, mukommu (*Azizelia Africana*) of the framework. A type of mat is attached to the bales of straw’s framework by a woven rope made of the leaves of palm tree or raphia, mubo (*Erythrophleum africanum*). Lianas are sometimes used for this purpose. Before attaching this ceiling solidly to the framework, one has to slip some sprigs of straw between the stringing and the twig mat. He stated that the straw lasts a maximum of three years; however, not all homeowners replace the straw timeously.

Mr Yafonian focussed on the terrace roofing. He explained that crossbeams of wood with a liana lattice are spread on the height of the tata house. They are subsequently covered by a layer of banco. The terrace of the roofing is treated similarly to the terrace of the floor. It is smoothed and watered with a decoction of karité peels or néré fruit (Fig. 6.35 and 6.36).

Mr Pamoussé observed that ventilation in the tata is his major concern. A small circular hole is formed next to the fire-box on the floor to permit the circulation of air between the two levels. Generally, the tatas do not have any openings apart from the kitchens. He added that this was for climatic and security reasons. He said that the system of closing the doors and windows was badly developed. The straw roofing was a source of ventilation (Fig. 6.10, 6.11, 6.12 and 6.13).

Mr Kougou shared his knowledge of fumigating the tata. He observed that fire, regularly lit in the hallway, not only dries the inner wall, but reinforces the beams against insect pests such as certain molluscs or larvae of certain insects, by depositing smoke on the partitions of the beams and crossbars.

Mr Disso appreciates the masonry in Batammariba architecture. He explained that the walls are in banco, achieved by kneading the earth, rich in natural cement and often in iron, with water. The adobe, that recalls the technique of the half-timbered house, is rarely used. The walls in banco contain neither branches nor remnants of straw. The thinner granary walls are in cob. The clay or termite earth (anthill) is used in this technique. Mr Disso explained that a wall is obtained by superimposing layers of 30 to 40 centimetres. Thus, the height of a turret of an ordinary hut is determined by the number of layers. Low huts have on average between six and eight layers. In two-storey dwellings there are up to ten.

In this informal interview, Mr Kpakou Kpanta, the apprentice of master builder Tapiba, revealed that at the age of eight or ten, a son begins to accompany his father to the building site. While the father and other apprentices work, the son is allowed to play with cob; he builds miniature models of houses. He added that by the time he reaches the age of 12, the future successor has already mastered the techniques of cob making, by combining wet clay with grass and mixing them into a viscous paste. He begins to help his father with light work, such as filling cracks in walls and minor plastering. He is given greater liberty and a freer hand on the building site than much older, but "alien" apprentices.

He explained that, "building is in my blood"; it is believed that he is better equipped to do the job than a recruit of say 18 years who is 'an outsider'. Mr Kpanta narrates his experience as a youth:

"I was about twelve years then. I used to dread great heights; when I climbed the roof of a tata my legs would tremble. My father would pull me

down and give me a thorough beating with his whip. He would say, You must be a bastard, one of our blood is never afraid of heights. The legitimate son of a builder does not tremble on buildings. People knew I was not a bastard because I resembled him so much. After a while I learned to walk straight on walls without fear”.

Mr Siwekou stated that a mud brick is made from earth, preferably red laterite which is thoroughly soaked in water, left for 24 hours, soaked again, trampled and kneaded. This process is repeated a number of times before the earth is rolled into oval mud bricks, usually circular cones varying from 5cm to 15cm in diameter, depending on the locality in which they are made.

In a group informal discussion, these fully-fledged builders focussed on the tata structural process. They observed that the construction process for a mud building is a long one. One of the builders said that insufficient time spent in preparing the materials or in the construction of the building results in repeated and costly maintenance. They noted that the preparation for building takes two to three weeks; the minimum period for building the walls of a small room from foundation to wall-plate is ten days. Since there is no way of speeding up the process, building starts at the beginning of the dry season and ends just before the rains; a period of three months is necessary to build a normal house.

This young assistant builder talked about his knowledge of erecting the tata. He explained that the tata work group consists primarily of members of the local clan who offer their services in the spirit of reciprocity; anyone related to the owner directly or through marriage will also help. There are no special responsibilities; every man can be an “architect”. Women collect and carry water and add the floor of the terraced roof by beating mud with a wooden beater; children help by tossing balls of earth up to the builders.

This gifted sexagenarian woman revealed that once the masonry is complete, women smear the whole building with rich clay earth, mixed with cow dung. Once it has dried, this coating is covered with an extract produced by combining nééré fruit peel or an aqueous solution produced during the production of karité butter. She confirmed that this not only strengthens the varnish, but provides waterproofing. This coating should be renewed every year, but this is not always the case.

Mr Yakata focused on the tata floor. He explained that the central turret and the support pitches constitute its main strength. This allows the tata to withstand heavy rainfall. The karité tree and the iron tree, well-known for their resistance, are used to build the floor. As long as cracks in the linking walls are fixed after every season, the building can last five to 15 years or more. However, without maintenance, its life span is reduced. Few maintenance problems are experienced during the first two years after construction.

Mr Taye noted that a house should always turn its back on the bad side. The north and the south determine the daily functions. In a tata, everything that is feminine is usually consigned to the north. The south is reserved for men. The less well-to-do tatas consist of only three, a third of the size of a tata, or two circular huts. He added that the assumption is that the size of the tata is in keeping with the family's status, since it shelters all members of a family and their goods.

Mr Koudeti highlighted that when a society calls itself "the real architects", it has quite a reputation to live up to. He confirmed that tata builders are among the most revered and well-remembered members of Batammariba society. Architecture is seen to be a specialised skill, although builders, like others in the society, also actively pursue agricultural and related economic activities. Because the seasons for architecture and cultivation are different, there is no conflict.

He added that each builder is seen to be the holder of a unique gift. To ensure that this gift is passed on, every funeral for a deceased elder includes a special ritual at the cemetery in which the deceased's son and daughter are asked to kneel on the newly plastered terrace in front of the tomb. This ceremony is performed so that when the deceased gives birth to another, he will also know how to build. If it is a woman, she will know how to plaster the walls and house floors. Because of the importance of this ancestral gift, considerable pressure is placed on current builders to conform to traditional standards of architectural form and technique. These standards are determined and enforced by the village's master builders. They must agree on every foundation design before the house walls can be raised. Each house, while representing an independent work, must meet standard design requirements.

In this informal interview, the field assistant gave his view on Batammariba builders. He explained that the traditional builder is in direct contact with all the factors, both real and imagined, that impact on traditional architecture. Furthermore, he revealed that the builder is the custodian of the repertoire of techniques and skills handed down by his ancestors to be used, improved, augmented and passed on to his descendants. The builder is the safe keeper of the linguistic terminology and witticisms of architecture.

An informal interview with Adrien Tchakou revealed some of the problems the community confront with tatas. According to Adrien tatas often get too dry and crack when it's too hot. However, they often wait for the next dry season to take action. Women, often wives, are contacted to do repairs. Where there is no woman to take such responsibility, neighbours are asked for assistance.

7.2.2 Key Questionnaire responses

The ages of the respondents ranged between 15 and 90 years (Table 1). However, the bulk of the respondents (22%) fell between the ages of 51 and 60 years. This was followed by those in the age brackets 41 to 50 and 61 to 70 (19% each). Turning to gender, 75% of the respondents were male, and 25% were female (Table 2). In all 12 villages visited for this research study, all the respondents stated that a tata is a traditional house built in a village. According to one respondent in Nandoba “a tata is our way of life”. Another respondent from Boukoubé also claimed that “a tata is our way of life and it is link to our ancestral father”.

Table 7.2.2.1: Age of respondents

Ages	Number	%
10-20	01	03
21-30	02	06
31-40	03	09
41-50	06	19
51-60	07	22
61-70	06	19
71-80	04	13
81-90	03	09
Total	32	100

Table 7.2.2.2: Gender of respondents

Gender	Number	%
Male	24	75
Female	08	25
Total		100

Among the Boukoumbé respondents, it was noted that tatas have great significance to the Batammariba people as their technology is linked to the ancestral spirit. All the respondents claimed that not anybody can build a tata; only the “master builder” is qualified to do the job. Forty percent of the respondents stated that master builders can only acquire their skills from their father, 15% said that this occurred through apprenticeship, 20% claimed it is through initiation ceremonies and 25 % said it relied on constant practice to master the skills. The responses are presented in Table 3 below.

Table 7.2.2.3: What qualifies one to become a tata builder?

Responses	%
Acquired skills from father	40
Apprenticeship	15
During initiation ceremonies	20
Constant practice	25
Total	100

The data collected for this research study showed that, even though tata builders don't receive formal training, developing the skills of a good tata builder requires a great deal of informal and formal training. According to one builder: "You don't have to go to school to become a good tata builder, but you need to learn a lot from your father and on the construction site". Another builder said the skills that he acquired to become a builder cannot be learnt anywhere: "It is not something you learn in school, even our fathers didn't learn it in school, they have to be taught by our forefathers and the spirits taught our forefathers".

- **Preference for the tata over modern structures**

Many reasons were advanced for why the Batammariba people prefer tatas. The table below present the different reasons advanced by the respondents.

Table 7.2.2.4: Reasons for preference for tatas

Reasons for building tatas	Number	%
Part of culture/cultural preservation	14	45
Spiritual attachment	07	20
Have lived in tatas for centuries	03	10
Its generally cheaper	03	10
It's very comfortable	05	15
Total	32	100

Forty five percent of the respondents said that they continue building tatas because it is part of their culture. For them, building a tata is a way of preserving their culture. According to one builder from Nandoba village, “if anyone visit this place and see a tata, they know immediately that they are in Nadoba village because this village means tata”. Twenty percent of the respondents claimed that the tatas signified some kind of spiritual attachment.

Ten percent of the respondents said they continue to build tatas because they are generally cheaper than modern structures and are very comfortable to live in. All the respondents claimed that tata builders are paid in local currency. Family members and neighbours often contribute in kind. This includes collecting building material, supplying water, moulding the mud, and preparing material for plastering. Almost all of the respondents claimed that other cultures do not influence them much. This study revealed that Batammariba culture is very attached to the lifestyle of the people. How they live, work, eat and build their tatas are related to their cultural values. This perhaps explains why most people in the study areas prefer the tatas to modern structures.

The following sections present, analyse and discuss the interviews undertaken in the 12 case study villages with master builders, builders, decorators, owner-patrons, trainees and gatherers of materials who are involved in the process of Batammariba architecture in order to fulfil the aims and objectives of the research study.

7.2.3 Discussions and findings

- **Who builds the tata and how do the Batammariba build it?**

It was noted that the unique professional is the Otammali, the ‘tracer’, and the chief builder who marks the plan of the house on the ground with his hoe,

following a traditional and fixed sequence. He is also the only one to be paid - with a red cock and a certain number of cowries (2,000 for the door, 40 for each interior passage and 60 for the entrance to the Kuiyé, the 'house of spirit').

The investigation revealed that the work group for the construction of a tata consists primarily of members of the local clan who offer their services in the spirit of reciprocity; and, more particularly, anyone related to the owner directly or through marriage. There are no special responsibilities. Women collect and carry water, and add the floor of the terraced roof by beating mud with a wooden beater; children help by tossing balls of earth up to the builders.

The study revealed that tata construction commences with a gathering at the centre of the house, with the two oldest people in the family leading a simple prayer. They stand in opposite directions, in the east and the west, joining hands and each holding a piece of mud ball. They say the following prayer: "Lord we are praying that our forefathers will protect those who will live in this house we are about to build, and keep them united as these two moulded bricks will be united."

Amongst the Bétiabés, the same ritual exists under the name of tatanbwokota. In Koutagou, Boukoumbé Zongo, both old Teyoata and Kemannitiammou derived the rite from the Mpokwaba and Ndakwaba districts. The rituals were similar, with the two eldest people in the family requested to pray one after the other. Corn beer and eguisi paste or fufu was prepared by the women while young people carefully knead cob called "banco" by Europeans.

A chicken is slaughtered on the two mud balls and blood-soiled feathers are placed around the foundation. The youth then place the first layer of the building blocks on the whole foundation. After nine hours, when this first part is finished, the babwantedieta (wall block) is said to have taken place. The two oldest people take the fufu with which the liver of chicken is mixed, say a prayer, bless the wall

and then eat the fufu which is served to them from a special pot. Everyone joins in the feasting, and the first layer of the foundation is allowed to dry for two days.

The first layer is a small circle about 30 centimetres in height, and approximately 20 to 30 centimetres from top to bottom as demonstrated in (Fig. 6.3 and 6.4). Above the initial layer, the height of the block decreases to an average 12 to 15 centimetres. The foundation layer must be allowed to dry sufficiently, otherwise it will disintegrate; this is one of the reasons why the Batammariba do not build in the rainy season.

In December and January, the climate is so dry that a builder can erect two layers per day. The speed of construction varies and as the height of the walls generally consists of 12 layers of mud bricks, it would be possible to complete what one could call the structural building in six days.

Mr Tapiba, a well-known builder from Nandoba, said that the mud bricks must be placed in the mortar in a uniform manner. While water will permeate from the wet walls into cracks in the previous layer, there is always a young man in place who scratches dried blocks into the previous layers as the water permeates and then kneads it. He then passes earth balls to the master builder who, on tracing the contour, will place large lumps of mixed soil while turning in a clockwise direction. If a builder contravenes this rule, the household is at risk of misfortune, diseases, bad harvests, sterility, etc.

The builder, otammali uses every part of his body for quantification. He uses his fingers, feet, hands to do measurements and surveys. Chapter 6 provides more details. Batammariba architecture may be viewed from several perspectives. It may be regarded as a building process in which traditional builder uses all the available materials at his command to work for him. From this point of view, Batammariba architecture is building technology.

Second, Batammariba architecture may be viewed more conceptually, as the enclosure of space. The emphasis is not on the technology of enclosing space, but on the nature and quality of space created by the technology. Finally, Batammariba architecture may be construed as a material manifestation of a culture's symbolic system. As such, it quantifies, graphically and formally, the system of values inherent in a culture. Batammariba culture and art are important.

Taking part in construction process in Batammaribaland was a great deal for the researcher. It allowed him to confirm that the builder of the new tata starts to prepare the mud by mixing it with water, straw, leaves and cow dung; the mixture is then worked and trampled until it is set. Horizontal building levels (usually five to six layers) whose thickness varies from around 50 cm at the base to 25 cm at the top make up the foundations and lie directly on the soil and against the walls.

Earthen stakes are placed between each layer to reinforce the wall even if it's only function is to delimit the internal spaces. The load of the terraced roof (250 kg/sq m) is supported by forked wooden posts (1.6 or 1.7 m from the ground), which limit the internal habitable space to 1.55 or 1.65 m. These construction systems, in which walls are independent of the bearing structure, allow the repair or modification of the interior of the house without interrupting the continuity of living. Wives sit, work and sleep on the roof of their own rooms, while the husband, who normally has no personal room, sleeps above the entrance that is pre-eminently male space.

- **Building Techniques and levels of understanding these techniques**

The analysis of the data revealed the following: The construction process for a mud building is a long one: too little time spent preparing the materials or on the construction of the building results in costly maintenance. The preparation for the building takes two to three weeks; the minimum period for building the walls of a small room from foundation to wall level is about ten days. Since there is no way of speeding up the process, building starts at the beginning of the dry season and

ends just before the rains; a period of three months is necessary to build a normal house.

A mud brick is often made from earth, preferably red laterite which is thoroughly soaked in water, left for 24 hours, soaked again, trampled and mixed together. This process is repeated a number of times before the earth is rolled into oval bricks, usually circular cones varying from 50mm to 150mm in diameter, depending on the locality in which they are made.

Interviews with the respondents revealed that it takes about two to three months to build a tata. However, 25% of the respondents observed that it can take up to five to six months to build some tatas. Further research revealed that, the length of time needed to build a tata will depend on the nature of the tata to be constructed. There are different types of tatas such as the Berba, Beyanbe, Osori, Otammari, Otchaou and Tayaba, and their complexities vary. Some tatas appear to be more complex to construct than others.

- **Batammariba architectural typology**

The investigation of homesteads in Batammaribaland found that there are six types of tatas amongst the Batammariba: Berba, Beyanbe, Osori, Otammari, Otchaou and Tayaba. The most predominant of these is the Otammari house type which readily meets the need for storage facilities for as yams, goat pens, kraals, etc.

1. The Otammari tata

The study revealed that the Otammari tata is the most common house type in Batammaribaland and that the plan of the classical Otammari house can be reduced to a precise diagram, although there are sometimes differences as a result of material constraints or the family situation.

The analysis of the Otammari tata confirms that nine towers surround the main or central tower. These are joined by a wall built in pisé; in the plan, a kind of circle is drawn. Inside, very simple roof structures support the floors and terraces. The intermediary terrace is one metre to 1.5 metres above the soil in the northeast segment of the hut, and the superior terrace is more than two metres high; it occupies the southeast and west parts.

Further investigation established that the sole entrance to the castle is located on the western side between the two main tower granaries. The tata is geographically-oriented: it thus turns its back on the dry and cold wind of the winter and the Harmattan which blows from the northeast.

In this way, it also avoids exposing its openings to the furious breezes and violent storms of the winter-season; the doors of the rooms facing the terrace overlook the northern side and, in addition, as the dwelling axis bears slightly northwest, a measure of protection is also provided against abundant rain during the winter period (June- September) which generally comes from the southwest.

In the region of Boukoumbe, the entrance of the Otammari tatas is normally located in the west. The northern part of the house is feminine and the southern part masculine; this is also reserved for religious activities. This orientation is tied to a sense of rotation during diverse ceremonies; the Batammariba normally turn around in an anticlockwise direction.

The analysis of the tata reveals that the ground floor part under the superior terrace forms a dark hall, and light comes only from the door and a little from the intermediary openings of the tower. These narrow apertures, sometimes in the surrounding wall, serve exclusively to look outside.

Sometimes, a special platform is created for sleeping. In other tatas, the smith is placed on the left-hand side at the entrance, but this is uncommon. If the family has livestock, this hall also serves as a cowshed, which is reminiscent of the practice of men and domestic animals living together; young people also use it as a bedroom when the family has grown and old people who cannot climb the notched trunks which serve as stairs, do the same: all of these people sleep on a common piece of wood, or on mats made of millet stalks.

Access to the intermediary terrace is by means of the passage through the northern tower which is the stair tower. This is generally used as a kitchen or for different utensils: very often, women grind millet there on big stones which are used as fixed millstones. The height of the internal platform of this tower is very variable: a forked trunk on which coarse stairs have been carved and sometimes two or three step of pisé serve as stairs. The intermediary terrace which follows the stair tower is also used as a vestibule and is reserved for small work or for drying grain, for example. It is surrounded by the central tower and by one or two granaries.

Access to the terrace proper is by means of stairs of the model already described. The southeast sector is usually used as a urinal or washbasin, consisting of one or several flat stones with a calabash full of water placed along the wall in some households. The discharge pipe for waste water is made of fine, burned sand. The water flows along a number of stones placed at the bottom of the wall. This is almost always the same height as the western side of the terrace, but it may be higher, which is infrequent, or lower, which is more frequent. At Koutagou the terrace was located 50 centimetres above the level of the great terrace and extended the ceiling for the children's bedroom located immediately below it.

The usual bedrooms open onto the west and the upper terrace and that of visitors in the south tower. From the parents' bedroom, a very narrow opening leads to the room or to the children's rooms. In principle, this room has no opening other

than this door; it is thus extremely dark and only lit by a meagre fire. When children are old enough, they dig a hole to help them to discretely escape to the ground floor. The room designed for the guests is not often used as such, and is used as a cellar for certain crops' fruit: karité, tobacco, beans, néré, etc. In general, the granary towers have no internal platforms, but in large families there are kitchens, or rooms for single persons; this was also evident in the vast castle of Koulangou.

2. The Berba tata

Whenever possible, new Berba tatas are located on sites that have already been consecrated by previous human dwellings. Consecration is evident in the existence of conical ancestral shrines. A new shrine is added before construction of the new compound. Building construction is a cooperative effort on the part of the future inhabitants of the compound and their relatives. The division of labour is simple: the men build the walls and lay the roofs and the women apply the finishings to the surfaces. The circular mud walls are built up tier upon tier with moulded balls of wet mud, under the direction of the new compound head. The conical thatch roofs are then lashed onto a radial framework of rafters. All the room units are thatched except the millet-grinding room, which has a domelike mud roof supported by horizontal wooden beams. The mud roof is a rounded extension of a bullet-shaped enclosure.

The study revealed that women are responsible for surfacing all walls, as well as for the patterns incised into the surface. The plaster is a mixture of cow dung, locust bean-pod juices and mud. As the surface dries it hardens and becomes impervious to water, becoming smooth and durable. The incised patterns are not made with the finger but are cut with a sharp tool in deliberate patterns that bear no relationship to applied techniques. Floor surfaces are also plastered so that they can be used to dry the various grains and greens that complement the staple diet.

The study illustrated that Berba buildings reveal a level of technical proficiency that far exceeds that of either the Beyanbe or the Osori. This can be seen in the regularity of wall surfaces, the formation of curved surfaces, and in the careful transition effected between surfaces when the plaster is applied. This high level of proficiency suggests that the internalisation of a building process particularly appropriate to the physical environment has had a long history.

3. The Béyanbé tata

The investigation in the Béyanbé area revealed that, judging from appearance, the Beyanbe dwelling is a combination of the Osori and the Otammari tata. Its ordinary features are: a control tower surrounded by two garret corridors which lead to the arch and the staircase. These five towers are connected by the enclosing wall frame to the top floor. Access to this floor is facilitated by an intermediary staircase which runs through the left right side of the house.

These types of residences extend to Koutakou, Kougnandogou and Koudogou and their neighbourhoods. In Boukoumbe, the design of Beyanbe houses is modified as follows: a central semicircle is added to the others and thus becomes even more like the Otammari type. The intermediate corridor is short, but access to the top floor is facilitated by climbing. There are hardly any essential differences but an arch is located at each entrance. The external frontage is presented in the form of the Osori castle.

4. The Osori tata

The study showed that the Osori castle is more or less similar to that of the Otammari, at least with respect to the method of construction. The essential differences are as follows: the entrance is an encryption of two doors from the courtyard instead of two corridors. There is no intermediate balcony, nor corridor with staircase. One reaches the higher balcony by means of a large tree trunk

that is 3.5 metres high with rough steps and ending in a bifurcation: the latter rests on a relatively circular opening at the top of the balcony.

This horizontal bull's eye is protected by a pad in the mortar to prevent rain or dust from falling on the staircase to the balcony. This also prevents the staircase from drifting backwards. The Osori house is less widespread than that of the Otammari, which is common and found across widely distant villages. In contrast, the Béyanbé seem to use various combinations in balconies, rooms and the garret corridors, and the plans of their residences are much more diverse and prevalent in the whole Osori landscape.

The functions of the various parts of the house are similar to those of the Otammari house. The ground floor is used as a cattle shed and to house hens, the altar to the ancestors lies within the interior and the wall of the principal entrance leans on the first floor. The parents sleep in the front rooms while the children use others. The grandparents live with other family members and, in theory, brothers live together; this explains the partitioning that separates certain Osori houses into two parts.

An entrance passage links the balcony to the back part of the house and another primitive staircase is installed here. On the terrace a small dry stone wall separates the two households. However, the entrance always consists of a single central tower of the façade. The circular wall and its role are similar to what exists at Otammari, but because of its structure, the Osori tata appears much larger.

5. The Otchiaou tata

It was noted that an altar is located in front of the dwelling to bridge the gap between the living and the gods. Two or three yakwankwanyé horns are mounted on the arch at the entrance; these dried mud-made horns about 20 centimetres high, are intended to support the funeral drums. Their number would be

insignificant if each conformed to different family traditions. But the existence of these horns seems to be related to the masculinity principle; no single house should be without a male child. This entrance curve looks horizontal with an oval shape.

The Otchiaou use plywood ceilings in their houses and the oval form is necessary because the logs support all parts or even the whole of wall which could be laid out adjacent to the small oval base whose short range strengthens the house. In certain houses, the left-hand part is used as a dining room and grinding stones are laid out there.

The entry semicircle is always divided by two walls, one side of which is for men and the other for women. Each side has an additional arch of the same design as those of the Otammari. The top floor's staircase normally leads to the kitchen, but also links with the ground floor; this is seldom seen in Otammari. This controls movement in the house. The chimney is established at the base of the curve and slightly detached from it.

In many tata castles there is a kind of chimney called téboté, which spreads over the entire balcony, serving the ground floor. This semicircle opening could be used by an attacker to strike with a javelin and penetrate the house. The Batammariba normally sealed this with a punt stone; no religious or magical connotations are attached to it.

6. The Tayaba tata

Mud is a universal building material among the sedentary dwellers of the savannah, but it was noted that the methods employed in exploiting its limited structural properties vary from place to place. Tayaba compounds employ some of the variations already discussed; in addition, they illustrate other variations in

circular building techniques which are far more structurally sophisticated than those encountered at either Otammari or Otchaou, their closest counterparts.

The construction, repair and extension of Tayaba compounds take place, as elsewhere in northern Benin and Togo, during the dry season. However, unlike the Otammari, the Tayaba commence building early in the season, immediately after the guinea corn is harvested and when water is still available in the pools and ditches of the low-lying areas adjacent to compounds.

The wet season and the continually changing composition of the resident group call for annual attention to the compound structures. The study noted that the structure of the circular room units that constitute the Tayaba compound is based on a simple post-and-beam system, a system unique in northern Benin and Togo. The flat mud roofs laid over the rafters are similar to those at both Otchaou and Otammari, but the unique feature is the supporting system of posts.

The mud walls, laid in traditional tiered fashion, are not load-bearing, for the roof load is carried by the posts. These screen walls last longer than load-bearing walls because they are subject to fewer stresses. Their surfaces show less deterioration than the Osori and Otammari's load-bearing walls. The unique post-and-beam system is thus utilised in conjunction with more characteristic building techniques. The detailed sketches in Chapter 5 coherently explain how the Batammariba builders achieve the consistency in circular forms demonstrated in their traditional buildings and settlements.

- **Batammariba builders and their own metric systems**

The interviews with the respondents revealed that builders use many faculties to do surveys. Amongst the most popular were the eyes, observations, foot measurements, their hands, the height of an average man, special ropes from trees and the use of a bow and arrow. In many cases, Batammariba builders are

able to determine the measurements of a building merely by looking at the building site with the naked eye. Foot pacing measurement is also a common technique. It was also observed that they use their hands and ropes to determine distances. The major instruments for traditional Batammariba architecture include ropes and bows and arrows.

Some of the old builders observed that the use of bow and arrow is also effective in coming up with accurate measurements. According to one builder, “if we want to dish out a big piece of land we mostly use a bow and arrow to determine the distance of the land”. Further questions were asked regarding the arrow, especially the exact distance the arrow should be thrown. It was observed that, the villagers know the arrow throwing skills of everybody in the village. If they need a great distance, they will get someone who is a good thrower.

The investigation unveiled Batammariba systems of “recording”, archiving and communicating quantitative and geometric information relating to the production, utilisation and maintenance of their architecture and settlements. One example is the geometric analysis of spatial forms and the system used in spatial demarcations and its geometric outcomes (the interaction between discernible abstract geometries and their equivalent existence as an abstract understanding). Another is the concepts and words for abstract geometric forms in the built form such as square, circle, rectangle, etc.

It was also noted and confirmed by the analysis that abstract quantitative and geometric information is applied in “planning” prior to construction. This includes a design process with the goal of improving certain outcomes.

- **Protecting the Tata**

It was observed that all 12 villages adopt similar techniques to protect their tatas. Techniques such as plastering the walls with cow and sheep dung were commonly used. This helps to hold the wall materials together. The research study observed that the dung helps to increase the viscosity of the materials; at the same time, when it dries it acts like varnish that makes the wall brighter and look beautiful. The builders also use special liquids from tree bark such as “néré” and “karité” to produce a paste which is splashed on the walls of the tata. The liquids are mixed with the mud and dung and increase the viscosity of the material. It was also observed that, smoke from the cooking section of the building helps to strengthen the tata as it acts like a fumigating agent.

- **Maintenance of the tata**

The roof of the tata is replaced every two years. This roof is often made of straw. The terrace roof also needs to be maintained, often with a clay-cow/sheep dung mixture to fill holes and cracks. This is mostly done during the dry season when it is hot and dry. As noted earlier, liquid from the nere tree bark is used to produce a paste to plaster the tata and for waterproofing. Builders’ knowledge of this product was transmitted to them by their forefathers.

The discussion with Mr Tapiba showed that tatas are part and parcel of the Batammariba people. Building a tata is not just a physical activity as it would seem to most people. It involves the master builders as well as the ancestral spirit who guides the master builder. Even though master builders need some training to be a good tata builder, such training would be incomplete if it did not start from childhood. The skills of a tata builder must come from the forefathers and be supported by the ancestral spirits.

The discussion also revealed that the construction of tatas in Nandoba, northern Togo is preferred over modern structures because as Mr Tapita put it “tatas are our souls, spirits and the meaning of the Tamberma/Somba life. We cannot separate ourselves from the tatas.” Special techniques are involved in building a tata. Even though Mr Tapiba was unable to explain, it appears that these techniques must be acquired at a very early age. Some of these techniques remain a secret: “.....There are some things I am not allowed to divulge to outsider”. Skills acquired during childhood are perfected. A builder claimed that his eyes and hands are for measurements, counting and calculations. According to this builder, they use every part of their body for quantification.

As far as communication is concerned, the builders revealed that they use lots of signs, symbols and objects. This includes songs, stories and other methods which the master builders could not explain.

- **Structural properties and behaviour of materials used**

Informal interviews revealed that, depending on the weather, it takes two to three months to build a tata, and that they have a lifespan of 20 to 100 years with ongoing maintenance. The tata pillars need to be repaired every five years or so. According to a builder, experience tells them when a tata needs repair, but sometimes they can tell when there is a leak.

- **Knowledge of heat exchange and waterproofing**

Tatas are usually constructed after the rainy season mainly because in the dry season the moulded materials dry more quickly. The construction of a tata is therefore not affected by the rains. Women use a decoction of karité peels or peels of the fruits of néré and cow or sheep dung to plaster the walls.

Women are favoured for plastering because of their sense of beauty. “They know how to do the job and when they do it, it looks beautiful,” said one builder and head of household in Koulangou village. The builder revealed that a woman must learn plastering during initiation as well as when she is young through observing her mother.

Temperature regulation in the tata will depend on the type of clay used to build it. According to a builder: “here we have white clay and brown or dark clay. My father used to explain that the white clay is light and less heavy and has some proprieties which can regulate the temperature”. The clay is mixed with other substances which control temperature as well as waterproof the tata. Mixing soil with cow or sheep dung, for example, improves elasticity. This alters the composition of the soil to enable it to control the temperature of the tata.

The type of soil used is also very important. Clay soils were observed to be the best and most preferred type of soil for tata building. Different types of clay soils were observed, namely, white, grey and brown, in the study areas.

However, the tata builders mostly use white clay for constructing their tata. Despite being difficult to obtain, all the builders interviewed for this research study claimed that, white clay is preferable because it keeps the tata warm when it is cold and cool when it is warm. More often than not, white clay is used to decorate the interior of a tata.

Further data analysis showed that white clay has other cultural functions such as its medicinal value and its role in the spiritual world. To delve into the functions of white clay and its role and function in Batammariba culture and people would be a diversion from the focus of this research study.

- **Resource and ecological balance**

The interviews revealed that the selection of a site for a tata depends on many factors. First, they consult their gods through the ancestors. The spirits of the ancestors guide them in selecting a site. It was also observed that the materials used to construct a tata are mostly obtained from their immediate surroundings. However, it was noted that the community faces challenges in terms of the sustainability of construction materials. They therefore try to rejuvenate the surrounding area and sometimes go to other areas to look for building materials.

- **Batammariba architecture and communication system**

Overall, it was confirmed in this research that the magnificent structures and technologies can rely on the incorporation of indigenous knowledge. Some of the most wonderful indigenous construction forms have originated on the African continent. African design sense is often more than pretty; it has a social meaning that can be read by those who understand its symbolism and hidden cosmological and other cultural characteristics. The creation of tatas involves all the able-bodied members of a household, female and male. The light duties such as floor ramming and decoration, water collection and floor decoration are performed by women and children. This teaches the younger generation skills to become master builders in the future. It is because of this that the spirit and sense of belonging to their traditional roots are still strong among the Batammariba.

It was noted that the Batammariba only share the techniques involved in the building of the tata among themselves, not with people outside their territory. This affirms the importance that the Batammariba people place in their knowledge. Other cultural influences do not affect the traditional style of the Batammariba architecture. The compounds are far from one another because it is believed that one has the right to be independent as well as to avoid quarrels and fights with

people in the next compound. The Batammariba have historically been fighters. A lack of awareness of the Batammariba people and their architecture is prevalent amongst contemporary builders/architects..

- **Strengths and weak points of Batammariba architecture**

The results of this study show that the Batammariba castles are strong. The earth used for their walls is very rich in natural cement. The layers that form these walls are 30 cm high and are laid one on top of the other. These houses are generally constructed in the dry season. Once the masonry is complete, women smear the building with rich clay earth, mixed with cow dung. After it has dried, this coating is covered with an extract produced by decocting the fruit peels from the *néré* or an aqueous solution produced during the production of *karité* butter. These solutions not only strengthen the surface of the varnish, but provide waterproofing. This coating should be renewed each year, but this is not always the case.

The main problem is found at floor level

The central turret and the support structures are the main strength of the *tata*. As long as these elements are strong, the *tata* will withstand even heavy rain. The *karité* and iron trees, well-known for their resistance, are used to construct the floor.

The last Chapter on Conclusion and Recommendations provides key findings based on the case studies, matches these to the stated hypothesis and discusses the overall findings in relation to the research questions. The principal conclusions are drawn from the findings and offers recommendations for further studies.

CHAPTER EIGHT

CONCLUSION AND RECOMMENDATIONS

8.1 SIGNIFICANCE OF THE FINDINGS

The indigenous knowledge systems underlying the production and maintenance of traditional architecture play an increasingly important role in Batammariba society, as they continue to advance and integrate it into their daily lives. The study attests that traditional architecture is characterised by a shared knowledge of measurements, structural properties, thermal control and water-proofing, as well as ecological resource management.

The research has validated and produced the following lessons regarding technical know-how in the indigenous knowledge system underlying the production and maintenance of traditional architecture:

- It can be researched and learnt as a continuous process.
- It can be integrated into today's architectural practice.
- It can be applied in decision-making models.

While not conclusive, the study has provided evidence of the presence or absence of the methods used by the builders to code and communicate construction knowledge without a written knowledge system.

The study reiterates the importance of allowing a community to make its own decisions. This can be achieved by empowering local communities to manage their own indigenous knowledge. While the study did not provide a complete picture of the manifestation of indigenous know-how, it provided evidence of the presence of resource management systems in the Batammariba settlements.

The methodology adopted for this study avoided theorisation prior to data collection; in this way it avoided twisting the facts to fit a preconceived theoretical formulation. An effort was made to adhere to the research paradigm noted by Maanem (2003: 53), "less theory, better data, more facts better theory". A drawback to this approach is that it could not produce the kind of grand theories that proclaim the solution to certain questions, once and for all. Questions were only raised on certain issues and generalised within given cases, rather than across a spectrum of cases.

8.2 CONCLUDING STATEMENTS

The builders of Batamaribaland have an idiomatic expression called Koutamakou. This emphasises the idea of the changeability of the times. The grim expression on the face of an older builder when he discusses the future of his craft and the injuries inflicted on it is evidence that his fears are real, rather than simply representing the afflictions of old age. This phenomenon is commonly known in Third World politico-economic literature as "the development of underdevelopment," a tendency that is encouraged by the modern educational process, where youth are brought up to believe that indigenous technology is not appropriate for modern needs.

The solution that is often offered is not to develop indigenous traditional technology to enable it to cope with modern needs, but to throw it away and

adopt alien methods, even if they are inappropriate to the local physical and social environment. The result is not only the loss of indigenous technology, but the lack of appropriate modern technology. At the same time that per capita income is increasing and educational levels are rising, the society is progressively losing its ability to sustain itself.

During the fieldwork, a builder reprimanded his son for refusing to take up building as a career. He made the following statement that modern architects should take note of: "A man who does not take after his father is like a tree that has no roots. Such a tree cannot stand the storms of the early rains. It will fall. If we lose our tradition, we will fall like the tree. We will have no identity as the descendants of a great building lineage."

The primary lesson emanating from this research is that there is a need for more documentation. There is surprisingly little documentation and it is extremely difficult to access. There is a need to establish a database on the technical know-how in the indigenous knowledge systems underlying the production and maintenance of traditional architecture. In this era of globalisation, many cultures are losing their identity; architecture is an integral part of culture. The only way one can learn, build on and improve technical know-how is to understand it clearly. The first step in this process is documentation, clear explanation and wide dissemination of this knowledge; this represents the contribution of this research study.

With respect to indigenous knowledge, the term indigenous refers to context-bound (Batammariba) knowledge and technologies, using local materials and knowledge for local consumption and implementation, whereas the term traditional refers to non-modern; non-mainstream (as opposed to conventional) systems and/or practices which could be applied on a global scale – for example

the use of adobe and wattle-and-daub in other African countries and international locations, such as India.

Within the rural context of this study, traditional building methods (including natural materials) in the construction sector (on a global scale) and the use of technical know-how (non-mainstream applications that range from high-end applications to low-tech interventions) are rooted in the African, specifically the Batammariba, context through the integration of related indigenous knowledge.

The indigenous rural context thus has specific indigenous knowledge implications of its own, for example tenure and traditional leadership, designs that accommodate different family structures, layout for cultural rites and practices and the prolific use of natural building materials. The envisioned technique should thus support current traditional building practice to integrate and promote not only the use of technical know-how, but the inherent knowledge related to that specific technology. The following are examples of such practices:

- The decoration of Batammariba houses, where women hold the indigenous knowledge of the symbolic meaning (decoration) that represents a specific rite of passage, as well as intricate knowledge of plant materials for colouring and finishing houses (plant oils, etc. Fig. 6.31).
- Indigenous technical knowledge pertaining to future applications and the use (including bio-mimicry and nano-technology) of natural and traditional building materials should be explored for relevant technical know-how.
- Climate and social organisation are key issues in traditional building and technical know-how and related indigenous knowledge in Batammaribaland (climate-sensitive and passive thermal design); this technical knowledge should be researched.

- The inherent indigenous knowledge related to gender should be acknowledged in rural dwelling building processes; women are also house builders and are often the keepers of the indigenous knowledge associated with traditional building.

8.3 RECOMMENDATIONS

The recommendations are structured into a number of parts, each outlining recommendations specific to that part – for example recommendations pertaining to technical assistance, training and awareness-raising and the regionality of the use and application of technical know-how.

It is recommended that:

1. Communities should be encouraged and given financial support to explore and research their inherent knowledge related to African architecture.
2. The promotion of technology and related indigenous knowledge in traditional architecture should be conducted in an integrated manner through rural development strategies that require government departments (among others) to collaborate to formulate a clear strategy that aims to promote sustainable rural housing.
3. Indigenous knowledge in traditional architecture should be recognised as an essential aspect of sustainable housing delivery, social organisation (supporting the uptake of technical know-how), institutional arrangements (local management in terms of land rights etc.) and the housing maintenance processes. Indigenous knowledge should be recognised and incorporated at the local level through bottom-up, participatory processes.

4. For the survival of indigenous knowledge it must be integrated it into international knowledge. This ensures that traditional knowledge does not lose its essence and significance but remains relevant within a context of change. This would enable the Batammariba people to make choices about resource management systems.

This study suggests a wide range of possible strategies to mainstream technical know-how and indigenous knowledge systems, as well as improve the way in which traditional architecture is delivered. Inevitably, the recommendations offered in this study will involve a wide range of actors within (and beyond) governments and coordinated intervention by different directorates.

It can be argued that technological intervention in rural areas is the correct strategy in the context of the 21st century, as it has the capacity to pass on skills and ensure adequate shelter without large capital investment in infrastructure. This research study stresses that research on traditional architecture and its potential to develop appropriate architecture specifically for the African continent is a very promising and open field. It can prove useful in furthering both the theory of harmonics in African architectural processes and the development of culture in African modern design.

Current fields of development such as sustainability in architecture should not be regarded as overlapping with this study, but should be understood as informing the direction this study wishes to take. Relevant architecture for Africa should not turn its back on Western architectural discourse. It simply needs to find its own means to answer the important questions the world is grappling with. This can only be done by understanding the past and present priorities of the world's indigenous development, then adjusting these priorities to an African context along with the observed set of key form-dictating criteria.

In terms of synthesis of traditional architecture principles in modernity, the study has revealed the bond between the varied ideologies, conventions and concepts which can produce a building that augments the African architectural agenda. Broadly speaking, whether it is in Togo or Benin, it is yet to see more architects to be inspired by the inherit of values and principles of indigenous knowledge of Batammariba architecture and particularly its splendid two-storeys house.

Some have carried out well than others in the name of cultural identity and local architectural magnificence. All this shows the intrinsic significance, the uniqueness and the genuineness of this architecture. One of the remarkable illustration in this regard is the Headquarter of the West African Development Bank in Lome – Togo as the synthesis of traditional indigenous systems of architecture in modernity (Fig. 8.1, 8.2 and 8.3).

Great master builders of yesterday could be the answer to present day architectural problems. The present day generation of master builders all over Batammaribaland consists of a group of intelligent and active craftsmen, who are capable of adopting indigenous technology to modern needs if given the opportunity. Their grandfathers and great grandfathers did so in the past. Moreover, the future generation of architects has a lot to learn from both past and present day traditional builders.

This does not imply that modern technology should be banished from African architecture, but that architectural ideas need not come only from outside. One is not advocating that modern African architects staple pastiches on facades, introduce meaningless arches, or place horns and pinnacles on buildings; rather, the vision is an authentic analysis of the principles of traditional architecture and the utilisation of those elements and concepts that enhance the modern building.

While the work of the modern architect constitutes an insignificant percentage of the built environment in any given African society, this proportion is increasing daily. As the balance shifts in favour of the new architect, the aesthetic quality of the environment becomes inextricably linked to the calibre of architects dispatched onto the architectural landscape from the various schools of architecture. The future of cities, towns and villages are therefore entrusted to these educational institutions. Any meaningful change will, therefore, have to start with the educational process.

This study has demonstrated that there is an unlimited reservoir of aesthetic, technical and conceptual wisdom locked up in the minds of traditional builders all over Africa, waiting to be tapped and utilised as an educational resource. Only by so doing will one be able to safeguard this rich architectural heritage for future generations and steer the youth towards a meaningful cultural revolution.



Figure 8.1: The West African Development Bank in Lome (Togo) is a stimulating influence of Batammariba architecture. Yavo 2006

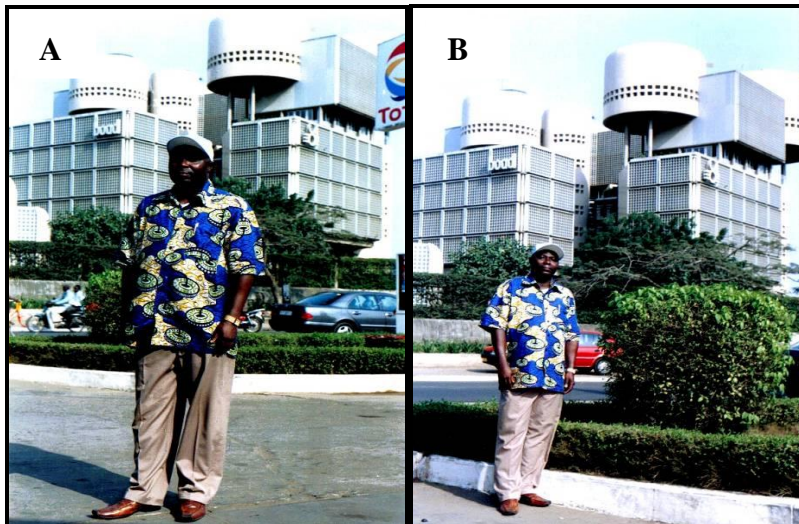


Figure 8.2: Another view of the West African Development Bank with the researcher below. Yavo 2005.

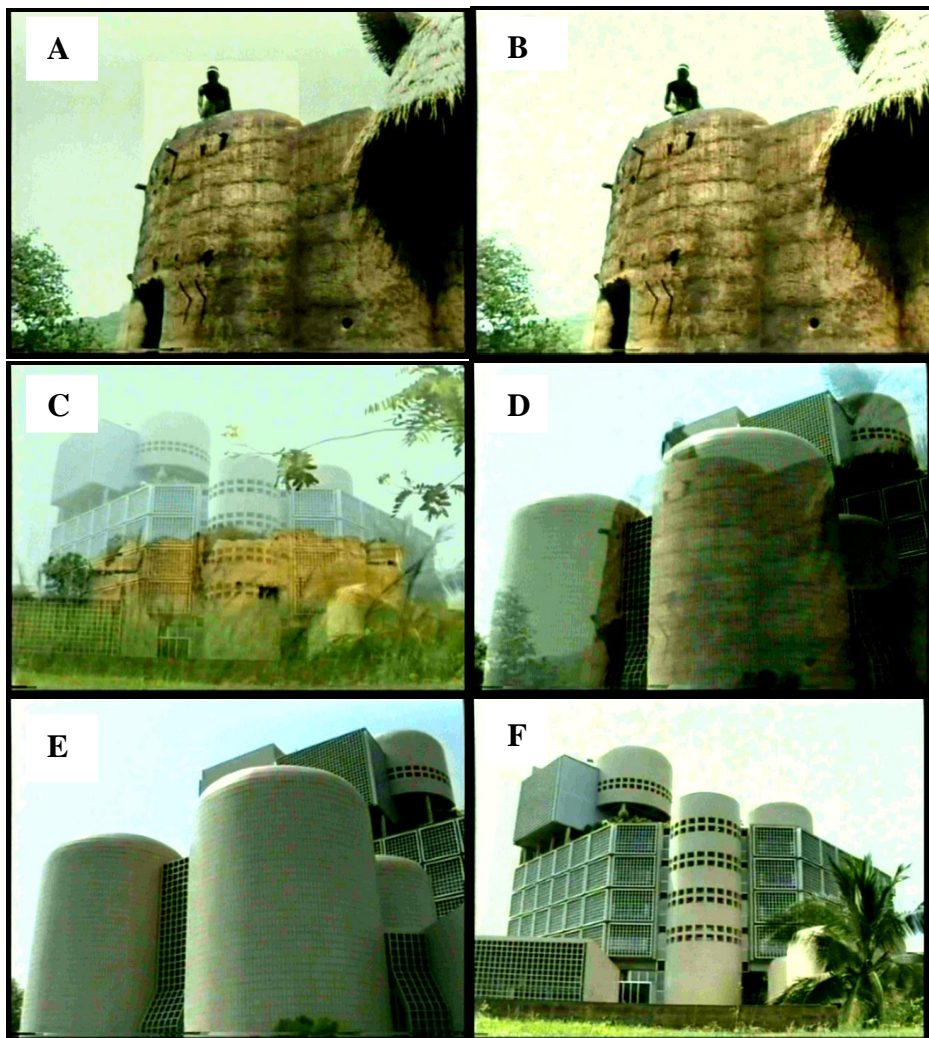


Figure 8.3 : Traditional architecture and modern outlook. An inspiration from an elegant Batammariba architecture. Yavo 2006.

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