



by Fernando Varanda

Djenné

Djenné, Mali



Architect

Cultural Mission of Djenné

Client

Ministry of Culture and Tourism

Design

1996 - ongoing

Completed

1997 - ongoing

I. Introduction

Djenné is located on the internal delta of the Niger in Mali. The city, built almost completely of raw earth and covering some 50 hectares with a current population of about 12,000, was once an important trading centre, deserving mention by travellers and historians from the Middle Ages onwards. Its architecture became a reference point in West Africa. The French occupation at the end of the nineteenth century was instrumental in the city's decline but also made its particular form of building the object of drawn and photographed records and monographic descriptions, as well as the source of inspiration for new constructions in different contexts (the so-called 'Sudanese Style'). Modern research on the area began in the 1950s and has continued to the present day, confirming the early occupation of the site, the historical importance of the urban structure and demonstrating the architectural quality of both the great mosque and common houses. In 1988, the city was included in UNESCO's World Patrimony list. In 1996, a seven-year restoration and conservation project began, financed by the Dutch government and based on a programme formulated by the scholars who had carried out studies on the archaeology, urbanism and architectural character of Djenné. A local team led by an archaeologist, an architect and a master mason is implementing the project.

II. Contextual Information

a. Historical background

Traces of continuous occupation since the third century AD were recently found at a site a few kilometres inland from Djenné. This was the birthplace of a city, Djenné-Djeno, whose importance reached its peak between the eighth and the eleventh centuries when it had a population of about 20,000. The move to present-day Djenné, located on the Bani, a tributary of the Niger, was largely completed by the thirteenth century when Koy Konboro, the twenty-sixth prince of Djenné, converted to Islam and tore down his palace to found on its ruins the city's first mosque.

The reasons for the abandonment of Djenné-Djeno in favour of Djenné may probably be found as much in the adoption of Islam and the preference for a site free from the influence of former cults as in the more favourable location offered by greater proximity to the river. Throughout the ensuing centuries of political change and successive domination of the region by groups of different ethnic and cultural backgrounds, Djenné, positioned at the crossroads of the major trade routes of West Africa, prospered as a trading centre. The nineteenth century, however, saw the beginning of its decline: drought, civil war and cholera marked the fifty years that preceded the arrival of the French who, in 1893, occupied the city and demolished the city wall with its fourteen gates. The city's commercial importance suffered a final blow when the French decided that this role would be better served by a new trading post which they established 100 kilometres downstream in Mopti, at the junction of the Bani and the Niger. In recent years, periodic droughts have caused the emigration of significant

numbers of farmers and fishermen. By the mid-1980s it was feared that Djenné, in the form it had assumed for most of the last millennium, was in danger of disappearing.

b. *Local architectural character*

The major construction material of the whole region is *banco*, the local name for the mud used in blocks, mortar and plaster. Rural buildings are usually one-storey structures with flat roofs; in the city of Djenné, however, two-storey houses are the most common. Roof terraces are actively used and may occasionally have a thatch-covered area to provide shade. Ancillary buildings may also be thatched. Dwellings made entirely of thatch appear mostly by the river banks as temporary shelters for groups of fishermen during the fishing season.

Wood is necessary for the construction of floors, ceilings and roofs, doors and windows, and also for *toron*, bundles of palm-tree trunks that jut some 60 centimetres from the elevations of taller buildings and which serve simultaneously as decoration and as scaffolding for the periodic rendering of the walls. Otherwise, the singularity of the city and of its buildings results from the plastic quality offered by mud, combining structural elements such as pillars and pilasters with the decorative opportunities they offer, so that pinnacles, parapets and *toron* create natural details.

The city was organized around ethnic/professional quarters along a major axial system, at the centre of which the mosque and the market square form an imposing urban space. The great mosque, built in 1907 on the ruins of the first, is considered to be the largest raw-earth building in the world and provides an architectural model for other mosques in the wider region. Domestic architecture in the city exhibits characteristic conventions which, although of the same family as those of the mosque, identify different styles.

Three major styles are recognized in the city houses: the 'Moroccan', the 'Tokolar' and the 'Plain'. The designations identify to a certain extent different historical periods and socio-economic levels but they refer specifically to the way the main elevation of a building was treated and how this corresponded to the spatial organization of the house.

The first two styles have a special place in the old urban fabric, identifying the 'monumental houses' with two storeys and an interior courtyard that belonged to the important families of the city. Their spatial organization reflects a strict separation of the sexes and the relative social positions of the inhabitants; for example, the second floor was reserved for the male head of the family. The most striking formal elements of these houses appear in the main elevation and are called *potige*, the ensemble made by the pilasters and ornamental elements above the main door. The Tokolar elevation differs from the Moroccan mostly for having a canopy (*gum hu*) above the main door and very small openings. There is usually only one window, above the entrance, the other openings to the street being reduced to ventilation holes. Windows and doors may be of the Moroccan style, meaning, for the windows, with latticed sections carved so as to form voids of eight-sided stars, and horseshoe shaped wickets. Doors may be decorated with incisions but mostly with large round metal nail-heads, shaped occasionally as crescents and stars.

In the second half of the twentieth century, new types of houses appeared. One type sits alongside the older forms from which it seems to directly derive, with two storeys around an interior court. The other, which has developed on the fringes of the oldest heart of the city, consists of a one-storey compound built around a large central yard that looks like an adaptation of a common model found in the villages. These types, and especially the latter, may fall under the designation Plain, in so far as their façades have no decorations. Nevertheless, the taste for traditional ornamentation has prevailed and is seen in many new and remodelled houses – although with concessions to new tastes and needs such as more and wider windows – in decorations above yard gates, on single-storey buildings and so on.

The introduction of new materials has been discreet and so far mostly limited to concrete blocks for yard and ancillary-construction walls, as well as pre-cast grilles used commonly for parapets. The major exceptions are the institutional buildings built in concrete in the late 1990s, such as the school in the centre of the city and the hospital on its periphery. Recently, private initiatives seem to have favoured rendering in concrete or facing the mud walls with baked tiles made locally, jointed with cement. These are used as a means of protecting the wall and to reduce the need for periodic rendering. However, the Cultural Mission does not recommend these techniques on the grounds not only of the debasement of the formal characteristics that distinguish the city but also because of the risks associated with the faulty adhesion to the mud walls of the concrete rendering or the mortar used for the tile facing.

The actual rendering of mosques with mud, in the city or in the villages, is a communal affair where the inhabitants help according to their capabilities. In some villages it seems that the results rather fall short of the professional standards seen in the best examples of Djenné or Sirimou.

The different ethnic groups coexisting in the region have different occupations. Thus the Bozo are fishermen, the Peul raise cattle, the Bamanan are farmers, and the Marka are merchants. It is mostly the Bozo, the fishermen, who also provide the masons.

Masons (*barey*) are organized by a professional body, the *barey-ton*, which warrants the professional training of the masons and establishes conduct and interdisciplinary support codes. An apprenticeship begins at the age of seven and the apprentice goes through a formalized structure of training during the course of which he becomes familiar with tools and materials, building techniques, building conception and the supervision of construction, until finally, in his mid-twenties, he is officially accepted as a *barey*. Magic plays an important role both as a means of protection against professional risks and as part of the relationship code between all the participants in the creation of a house.

The whole process of building is affected by the special link that exists between masons and the families that own the houses: a family has ‘their mason’ as much as the mason has ‘his family’. The relationship goes from father to son on both sides (the son of the house-owner’s mason is the mason of the house-owner’s son), and lasts for the whole of their life: the mason of the house also builds the house-owner’s tomb. For a mason to work for a different client requires the agreement of both the family and his fellow masons.

c. *Climatic conditions*

The climate in this region is semi-arid. Annual precipitation in Djenné averages 580 millimetres a year, most of which is concentrated in July, August and September. For the three following months, the flooding of the interior delta moderates the temperature to between 30 and 20°C. From January onwards, as the flood beds dry out, the temperature rises steadily to peak above 40°C by April or May. The dry season is also that of the *harmattan*, the harsh desert wind with its sandstorms.

d. *Site context*

Djenné stands near the river Bani in the southern expanse of the Pondo, a vast flood plain where the Niger and the Bani divide into numerous watercourses, causing the region to be seen as the interior delta of the Niger. Settlements near the water, as is the case with Djenné, are located on the most elevated parts of the flood banks; thus, in the rainy season, Djenné becomes an island. This is the season for fishing; as the water recedes, rice is planted in the swampy areas; as these dry out, they turn into fields for grazing, to finally become pocked with pits for the preparation of *banco*, the mud that forms construction blocks and rendering plaster.

The villages around Djenné repeat this pattern, while further away from the flood areas villages are scattered in the savannah. These may have their own architectural vernacular, but they have one constant feature, a mosque that looks like a scaled-down version of the mosque at Djenné.

III. Programme

a. *What conditions gave rise to the formulation of the programme?*

In 1995 and 1996, joint missions between Mali and the Netherlands were constituted. The members were, on the Dutch side, Dr Rogier Bedaux, Chief Curator of the Ethnology Museum of Leiden, and Dr Pierre Maas, an architect from Eindhoven, and on the Mali side, Dr Boubacar Hama Diaby, an archaeologist and Chief of the Cultural Mission of Djenné, Dr Samuel Sidibé, Director of the National Museum of Mali, and Dr Mamadou Konoba Keita, Chief of the Division of Cultural Patrimony, National Direction of Arts and Culture. The Cultural Mission, which acknowledged the special quality of the built environment of Djenné, recognized also that if the city had not suffered from serious inroads by 'modernity', it was in part due to its isolation and in part to the stagnation of its economic activity – which were also the causes of the collapse of an alarming number of older structures. It was thus decided to undertake a short-term project with the goal of 'conserving this unique monument for the present and future generations', focusing on the rehabilitation of 168 major houses, considered to be the most representative of the 'national cultural identity'.

b. *Objectives*

The general programme objectives were 'to contribute to:

- the safeguarding of Mali's cultural patrimony, by the conservation of the architecture of the city of Djenné, part of UNESCO's world patrimony
- the reinforcement of the cultural identity of the local population by increasing familiarity with their patrimony
- the professional formation in the subject of historical restoration, respecting local construction techniques and thus revivifying technologies at risk of extinction
- the constitution of professional cadres working in the restoration, conservation and development of the city of Djenné and reinforcing the existing administrative structures
- the cultural and tourist promotion of Djenné
- the city's economic development
- the promotion of the prestige of earth architecture'.

c. *Functional requirements*

Briefly, the director of the Restoration and Conservation Project expressed two main goals: to combat poverty and to preserve a built patrimony and a building knowledge. At the same time he hoped that the population would learn to be aware of the quality of local building forms and techniques and be able to cope with 'modernity'. In practice, this meant a project with four phases.

The first phase (1996–98) consisted of establishing a financial fund and setting up an administrative structure through a contract between the Dutch Ministry of Foreign Affairs and the Rijksmuseum voor Volkenkunde, constituting a Scientific Committee, an Executive Office and a Steering Committee (*Comité de Pilotage*); making an inventory of the houses to be restored; training masons and supporting the *barey-ton*, their professional guild; undertaking a pilot project consisting of two groups of houses; raising the awareness of the population.

The second phase (1998–2001) was to act on the twelve groups of houses and the sixteen free-standing houses that appeared to be the most important in the city; monitor the buildings previously restored; maintain (with mud rendering) the buildings already restored; train the members of the Executive Committee and the *barey ton*; encourage the population's interest; evaluate the work done.

The third phase (2001–2003) would cover the conservation and/or the restoration of seventy-three major houses; the maintenance and rendering of the restored houses; training of the members of the Executive Committee and the *barey ton*; encouraging the population's interest; consolidating and preparing a publication of the results; preparing the project for transference to the government of Mali; final evaluation.

The fourth phase (2003 onwards) will involve the maintenance and rendering of the houses restored in the whole period. The government of Mali is to take over from this point and the maintenance of the architectural patrimony is to be the charge of the Cultural Mission of Djenné.

As part of the whole scheme, the Cultural Mission of Djenné was to engage a consulting architectural firm to give detail to the technical restoration files, submit these to the Scientific Committee and supervise the execution of the approved projects. The mission also had to make sure that the by-laws concerning the classified monuments were observed and had to keep the population informed about and interested in the project.

The income generated by the project was emphasized by the Cultural Mission, first through the employment opportunities provided by the restoration process itself, then through building maintenance (consisting primarily of regularly rendering the walls with *banco*) and ultimately through the stimulation of cultural tourism.

IV. Description

a. Project data

The buildings that are the object of this project are two-storey houses, with one or two interior courtyards. The total number of buildings has been reduced from the initial 168 to 100, a more feasible figure for the proposed timescale and budget. The interventions go from minor repairs and wall rendering to total reconstruction, based on existing documents (photographs, drawings) or people's descriptions.

During the pilot phase of the project, 1997–98, eight houses were restored over 4,950 square metres, of which 3,735 square metres were built areas. The year 2000 showed the increased momentum after the pilot phase, with twenty sites opened, of which five were complete reconstructions, seven partial reconstructions and eight schemes of simple mud rendering.

As part of the project, a systematic survey of houses is planned so that a database on the city's architecture will be as complete as possible. This is being undertaken by an architect and a draughtsman from a local firm who are contracted to cover three fields: a survey of the existing condition of the target sites, the elaboration of the respective 'restoration files', and the supervision of the construction work.

b. Evolution of design concepts

Houses that are already part of the existing urban fabric are the targets of the intervention, with the intention of making reconstitutions that are as close as possible to their original forms. Therefore, considerations such as optimizing climatic conditions or plot ratios are dependent on this goal. The home-owners have to be willing to restore not only the material features but also the spatial organization of their houses. Minor adaptations may be allowed, such as the possibility of widening some openings and creating new windows.

The objectives of the project imply the restoration and the conservation of the special architectural features of the city. This includes not only the restitution of traditional motifs – pilasters, pinnacles, canopies, mouldings, *toron*, balustrades and openings – but also the biannual rendering of the houses with mud. This is believed to be the secret of the homogeneous quality of Djenné's architecture, and it has other arguments in its favour such as the ready availability of the material, the continuance of a sound technology, and the avoidance of the importation of materials of dubious performance from distant sources.

There is no landscaping project in the strictest sense, however, where a group of houses also defines a public space, this is also treated.

c. *Structure, materials, technology*

All the bearing elements in the buildings are made of mud (*banco*) blocks: foundations, walls, pillars and pilasters. Roofs, ceilings and floors are constructed of wooden joists that are crossed with branches and then covered with fine mud. The foundations are about 100 centimetres deep and 80 centimetres wide; walls are reinforced with pilasters and wooden beams (*domba*) intermittently laid over the courses.

There are two types of mud blocks. The older kind, now no longer used except for specific restoration work, are called *Djenné ferey* and consist of roughly cylindrical pieces, moulded by hand, which explains the tapered appearance of the oldest houses and the softer modelling of their pilasters and decorative elements. From the 1930s, however, it became common to shape the mud in rectangular wooden forms, producing blocks of about 20 x 10 x 40 centimetres (*toubabo ferey*, the white men's bricks). This gives the houses a more angular and less tapered form, although it is likely that mud rendering and weathering will see them develop the soft contours of the original buildings.

The earth used for blocks, mortar and rendering may come from the site or from nearby (earth from collapsed buildings is also used) but it is selected according to its ultimate use. Earth from pits excavated in the flood beds is also used, and complete production sites are often found here, with mud pits for the blocks, blocks already shaped, and pits for the 'fermented earth' used for rendering. Rice or barley straw is mixed with the mud for the blocks in a proportion described as 'for one cart of earth, thirty bags of straw', a bag being the size of a 100-kilogram rice bag. The mortar should be about 3 centimetres thick for the horizontal joints and 2 centimetres thick for the vertical.

The plaster for rendering is made by mixing mud with rice husks ('ten carts of earth for five 100-kilogram bags of rice husks') and the mixture is then covered with water and stirred occasionally, the same quantity again of rice husks being added gradually. The mixture then sits for two to three weeks. As has been said, rendering of the walls is part of the standard maintenance of a house, and at least three layers of plaster are necessary before the rendering of a new wall is considered to be complete.

For rendering and, to a certain extent, waterproofing roofs, a different composition of *banco* is needed which incorporates earth with a high content of organic material and ashes from

firing pottery. This is applied in a layer 10 to 20 centimetres thick which is left dry to consolidate with the first rains and only later is subject to formal rendering. Plaster for the interiors has fine sand in the mixture and the interiors are usually finished with whitewash or water-based paint.

The floor and stairs are often of compacted earth, although baked earth tiles are increasingly used. These tiles are baked in the open air: piles are made with the tiles and cow dung for a fuel (often the top layer of the pile is pottery), the whole being covered with rice straw which is set on fire. Once the fire has gone out, the pile is left to cool for up to fifteen days. The quality of the resultant tiles is very uneven.

Ceilings and floors are of three basic kinds, according to the span to be covered. The first, *fata taki* (literally, 'four wings'), consists of laying four beams that connect the midpoints of adjacent walls; on top of these, two beams connect the midpoints of the sides of the quadrangles thus formed (each quadrangle uses two beams) and branches cover the spaces in between. The *fata hinka* (two wings) is similar but needs only two main joists and is used for narrower and more elongated spaces; the *dar fo*, (single placement), which is used for smaller spans, consists of parallel joists laid between the narrower sides. A variation of this, *chetiguegum* (transverse ceiling), uses two main beams in the middle and across the smallest dimension of the compartment, with thinner joists being laid between these and the top of the walls.

Drainage from roofs is ensured by regularly disposed holes equipped with ceramic drainage pipes that jut out from the walls. However, their length, which is only 60 to 80 centimetres, is not always sufficient to keep the heavy rains away from the walls and so the pipes often have additions made from corrugated metal or plastic.

The criteria of the restoration team are founded on the strictest respect for the local structural and textural traditions. Whenever necessary, excavations are made to identify the primitive plan. Existing walls are maintained and completed as needed by exposing the first sound layer of blocks and binding the old and the new parts with wooden joists (*domba*). Carved woodwork is restored wherever possible, but wood for new or replacement doors and windows is unadorned. Traditional baked clay tiles for floors and stairs are acceptable. The project specifications are detailed, with an insistence on critical points such as the jointing of the blocks.

The work is done by local masons, supervised by the family mason who agrees to work within the framework and budget established by the Executive Committee, a decision in which he participates. The family masons are in turn supervised by the project mason. Architectural conformity to the models surveyed is controlled by the resident draughtsman under the supervision of an architect who also supervises all the work.

Site utilities have had a negative environmental impact. Electricity arrived in 1996 and the generators are in constant need of repair. As a result, the production of electricity is insufficient for the population and supply is rationed among the different neighbourhoods depending on the day of the week. On the other hand, the ubiquitous poles and aerial cables

jar visually with the spaces electricity was supposed to improve. The telephone service is very limited.

The worst problem, however, concerns the disposal of the liquid waste generated by the supply of water to the houses that do not have a corresponding sewage network. As a result, the dried-mud streets become soaked, open liquid-waste channels form and there is seepage into building foundations.

Dr Diaby, the project director, reported that in the nineteenth century there were still the remains of a sewage system made with ceramic elements. Aside from this, the traditional sanitary system of the town was based on a low consumption of water and the separation of solid from liquid waste (using a system that was seen in a more developed form in Yemen). Toilets were located on the roof and liquid waste went directly to an outside receptacle at ground level, while solid waste dropped through a shaft to a chamber that was periodically emptied by an opening being broken at the foot of the shaft and the sludge removed. Washing was done on the roof terrace by the toilet. More recently, an enclosure for the washing area was added to the toilet which caused a new structural element – a pillar of variable thickness – to be created beside the toilet shaft.

The introduction of running water totally disrupted the system and in consequence open sewers are now a constant feature of the city's streets; the situation was only slightly improved by directing the liquid through open concrete lined troughs. By the late 1990s, the situation was visibly deteriorating so that, early in 2000, a study was produced, commissioned by the Dutch Embassy in Bamako from the Technical University of Delft. The main conclusions of this study were that:

- the problem of solid waste was being resolved locally
- the existing type of toilet was adequate and required no adaptations
- rainwater could be treated in the existing way
- domestic liquid effluent – 'dark waters' – needed to be collected and treated.

And so the major problem consisted of disposing of domestic effluent. The authors of the study opted for the controlled local infiltration of liquid effluent. A pilot project was recommended for fifty houses which were to be equipped with local infiltration devices. This project, included in the scope of the Project for the Restoration and Conservation of the Architecture of Djenné, is expected to begin implementation during the last quarter of 2001.

A comprehensive programme for the installation of storm and domestic sewers with treatment plants was also proposed by the central government, financed by international aid through the World Bank. This plan also considers the disposal of rubbish, which is a major new problem.

The impact of motorized traffic is still negligible; however, the roadways in the city would not be able to accommodate the level of traffic the population might generate.

The mission had expected that by 2002 these problems would be solved as heralded in the Master Plan for Djenné, which is the responsibility of the Regional Directorate of Urbanism and Construction. This plan included provision for sewage disposal, waste collection and disposal, underground electricity cables and street paving. These expectations may have been too optimistic, and so, in the meantime, remedial measures have been implemented by the mission, such as rubbish collection points and/or the door-to-door collection of domestic waste by donkey-drawn vehicles.

d. Origins of technology, materials, labour force, professionals

The technology, materials and labour force are local. The architect was hired under a contract between the government and a private firm. Originally, the resident architect was on secondment from a firm in Bamako (BEAU, Bureau d'Études d'Architecture et Urbanisme), but, since 1999, assistance has been provided by a firm from Mopti (Atelier Inter-Architectes), with a draughtsman living on site to survey the buildings and a weekly visit from an architect from Mopti. The consultants are the Dutch scholars mentioned above, Dr Rogier Bedaux and Dr Peter Maas.

Other partners of the project are:

- in Bamako, the Ministry of Culture; the Ministry of Education and Scientific Research; the Ministry of Public Works, Urbanism and Construction; the Ministries of Tourism and of Foreign Affairs and the Dutch Embassy
- in Mopti, the Regional Directorate of Urbanism and Construction
- in Djenné, the mayor, the 'Commandant de Cercle', the town chief; the Imam; the *barey ton*; the local development committee and local associations such as the Youth and the Women's Associations, and the Djenné-Patrimoine Association
- in Paris, UNESCO
- in the Netherlands, the Ministry of Foreign Affairs, the Rijksmuseum voor Volkenkunde and the architectural and urban planning firm Rothuizen, Van Doorn 't Hooft.

V. Construction Schedule and Costs

a. History of project

The phasing of the project is described above. Construction began in March 1997 and the first occupation was in December 1997.

The project was considered to be composed of two parts: the first covering the period 1996–2000 was positively evaluated in early 2001 by the Dutch Embassy; the second began in 2001 and extends until 2004.

The evaluation report notes a late start and consequent delay in the number of buildings and construction sites surveyed and proposes a reduction in the total number of houses to be selected from 168 to 100. Because of this, although the costs of materials and labour have

increased, the budgetary adjustment is within reasonable limits. The initial delay has been somewhat compensated for since 1999, with the result that, while only eight houses were completed in 1998, forty-three in total had been completed by the beginning of 2001. Another forty houses are marked for the period 2001–2002.

b. Total costs and main sources of financing

The total cost is estimated at 394 million CFA (approximately 562,000 USD), paid for by the Dutch government.

c. Comparative costs

The cost estimated at the beginning of the project was 417 million CFA.

The cost of the first units was 16,572 USD, which brings the cost per square metre to a little over 4 USD.

d. Maintenance costs

A sum of 32 million CFA (approximately 45,300 USD) was estimated for rendering and maintenance of the houses, covering the period 1999 to 2003.

VI. Technical Assessment

The implementation of the project responded to the methods and objectives of the programme. The completed houses set an example to their neighbours. The observation of on-going work showed that the choice of materials and the level of technology followed principles that guaranteed a quality not inferior to that of the existing, unrestored buildings. Ageing and maintenance problems are so far the same as those demonstrated by the existing buildings and will be checked by the regular inspection and rendering of the buildings as stipulated by the programme. The evaluation made by the Dutch parties involved is very positive, concluding that great progress has been made in the prosecution of the programme's objectives and registering a reasonable budgetary adjustment with only slight delays in relation to the initial dates.

The project was first seen by this reviewer in 1998. Since then, the number of head masons has grown from twenty-four to forty in 2001 and nearly three hundred people, from assistants to carpenters and blacksmiths, are involved. After a slow start, the project picked up a regular rhythm of about twenty houses being surveyed and renovated in a year – a more realistic goal than the original estimate. It was also noted that a certain number of houses had been added to the yearly restoration programme, not because of their architectural merit but for social reasons: these are houses for the destitute.

In spite of very poor administrative conditions, especially for reproducing and copying drawings, there is a graphic record of all the houses that have been the object of restoration, namely the plan of the existing, pre-intervention situation and the restoration plan of the

house. A systematic photographic survey of the operation has been undertaken which will be used in the creation of a CD-ROM.

A major early problem was the refusal of some owners to have their houses restored. In the beginning, the intentions of the project may not have been very well understood (it was even feared that the mission wanted to take the houses from their legitimate owners); then some owners did not want the reorganization of the interior spaces of their house to be imposed, particularly thinking of the tightness of the original compartments when compared to the space needed to house modern furniture; but the main reason for difficulties with owners seemed to be multiple inheritors of certain properties, usually the oldest houses, and the difficulty of getting them all to meet and agree. Nevertheless, the example of the houses already restored has acted favourably and the number of reluctant owners has diminished.

The evaluation report of February 2000, compiled by Professor Dr Gerard van Zeijl for the Dutch Embassy, underlines the need to establish a transparent decision-making process, where both the interests of the collective cultural patrimony and of the individual inhabitants would be safeguarded. It also suggests policies that could be followed to consider various approaches to the restoration so as to adapt to the needs of the population without sacrificing the features that give character to the houses. Thus, three strategies have been proposed: pure homogeneous restoration (in the cases of evident purity of style); heterogeneous rehabilitation (in the case of a cultural and functional dialogue, referring mostly to the adaptation of the building form to the existing conditions of use); and replacement with a new construction when the original building is in ruins. The report emphasizes the need to reconcile the good intentions of the restoration team with strict enforcement of standards by the local administration, and it strongly recommends that after 2003 a land-use plan should be available with a subsidiary plan of classified views to be protected.

It is with reference to the development of the masons' skills that one of the project's goals has clearly been achieved, not only through the masons' increased contact with the prime material itself but also by developing their capacity to read drawings. But the success of the project has brought its own problems, one of them became the number of masons who are required to work simultaneously on too many sites because of the ties created by their hereditary attachment to households. An agreement was reached in 2001 by which family masons could delegate work to other masons not previously associated with houses in the project.

A few foreign students have been involved in the research and documentation relating to the houses but so far no Mali students have come forward.

VII. Users

a. Beneficiaries of the programme

The beneficiaries of the project are 'the community in general', but the houses requiring primary attention, the 'monumental' houses, belong or used to belong to the main families of Djenné.

Another benefit stems from the employment generated by the project. Currently, three hundred people are regularly employed on the project and about twice as many are indirectly involved with it.

b. Users' and professionals' response

The users appear satisfied with the results. A survey on cultural patrimony and identity conducted by Professor Dr M Rowlands of University College, London, revealed that the project is well known and that the inhabitants increasingly accept its restoration principles. It is understood that giving permission to restore a house does not simply serve personal interest but also the common good, and people seem to be proud to inhabit a monumental building.

The influence of traditional formal idioms is felt even in the newest quarters of the city at its western end (Kanafa West), designed in the seventies, and, most recently, the new areas established by the Regional Directorate of Urbanism and Construction (in Mopti) on the southern fringes of the town, across the flood bed. Here the plots are large and the houses adopt models with a large courtyard and mostly a single storey, although a few two-storey houses were seen during my latest visit. They are mostly unadorned but elements of the traditional architectural vocabulary are seen here and there, such as the shape of openings, pilasters and pinnacles on the entrance gates to yards, and so on.

Private initiatives to restore houses have maintained the traditional elements although these are sometimes hardened with cement rendering or covered with baked tiles. The adaptation of spaces to receive tourists – small hotels and inns – use traditional elements more or less imaginatively. The most uncompromising interventions have been those made by the central government – the school in the middle of the city and the hospital on the periphery – with concrete frames and blocks rather perfunctorily disguised with stylized details from traditional elevations.

VIII. Persons Involved

Clients:

The owners of the houses selected for the project.

Project for the Restoration and Conservation of the City of Djenné: Cultural Mission of Djenné

Executive Director: Dr Boubacar Hama Diaby, Ministry of Culture and Tourism, Bamako

Architect: Idrissa N'Diaye, Atelier Inter-Architectes, Mopti

Draughtsman: Gouro Bocoum, Atelier Inter-Architectes, Mopti

Site Controller and Master Mason: Boubacar Kouroumansé, Djenné

‘Comité de Pilotage’ (City authorities and associations):

Mayor

‘Commandant de Cercle’

Chief of the city

Grand Imam

Barey ton

Local Development Committee

Djenné-Patrimoine Association

Women’s Association

Youth Association

Consultants:

Dr Rogier Bedaux, Chief Curator, Rijksmuseum voor Volkenkunde, Leiden National
Museum of Ethnology

Dr Pierre Maas, architect, Rothuizen, Van Doorn ‘t Hooft, Eindhoven

Fernando Varanda

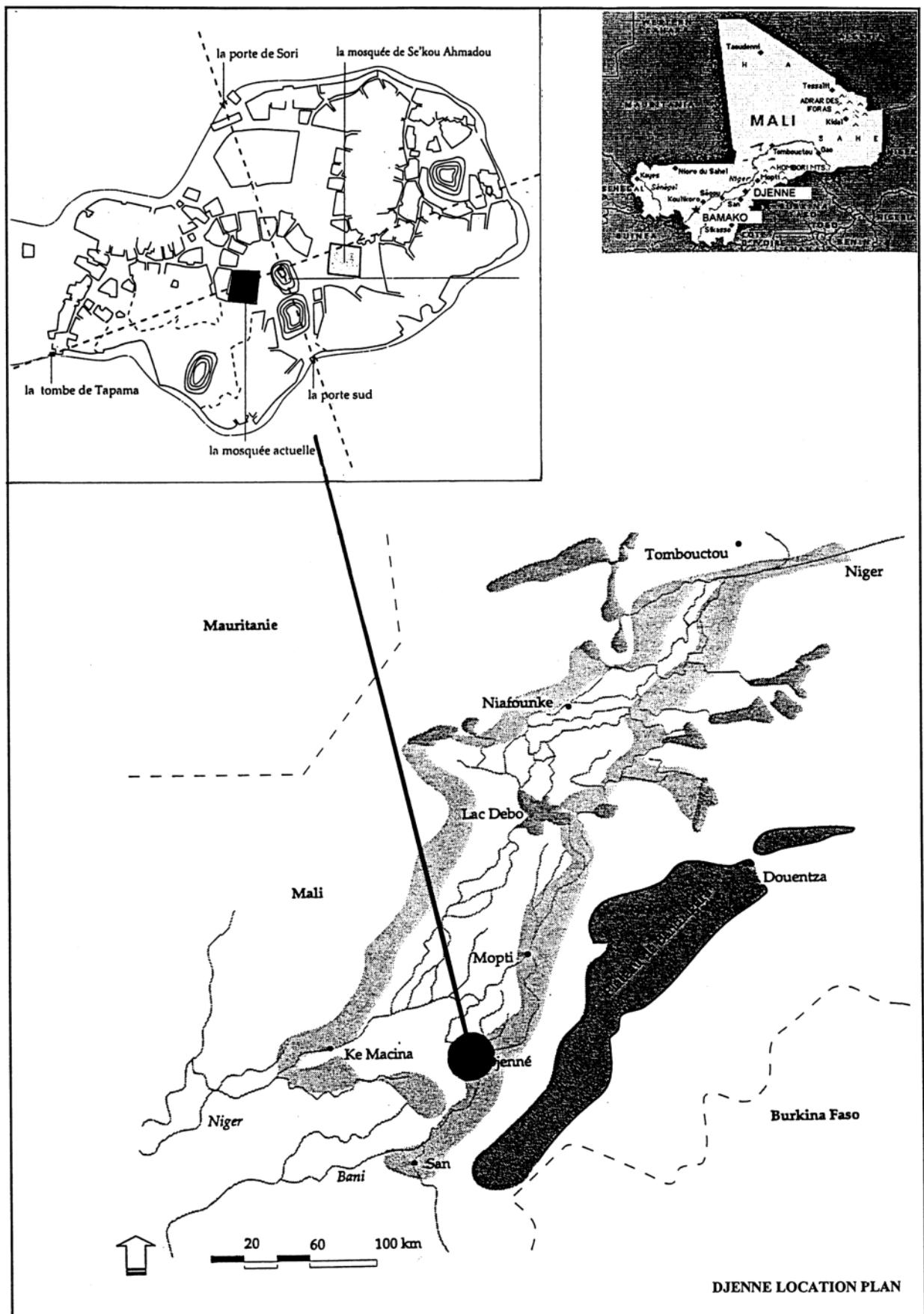
April 2001

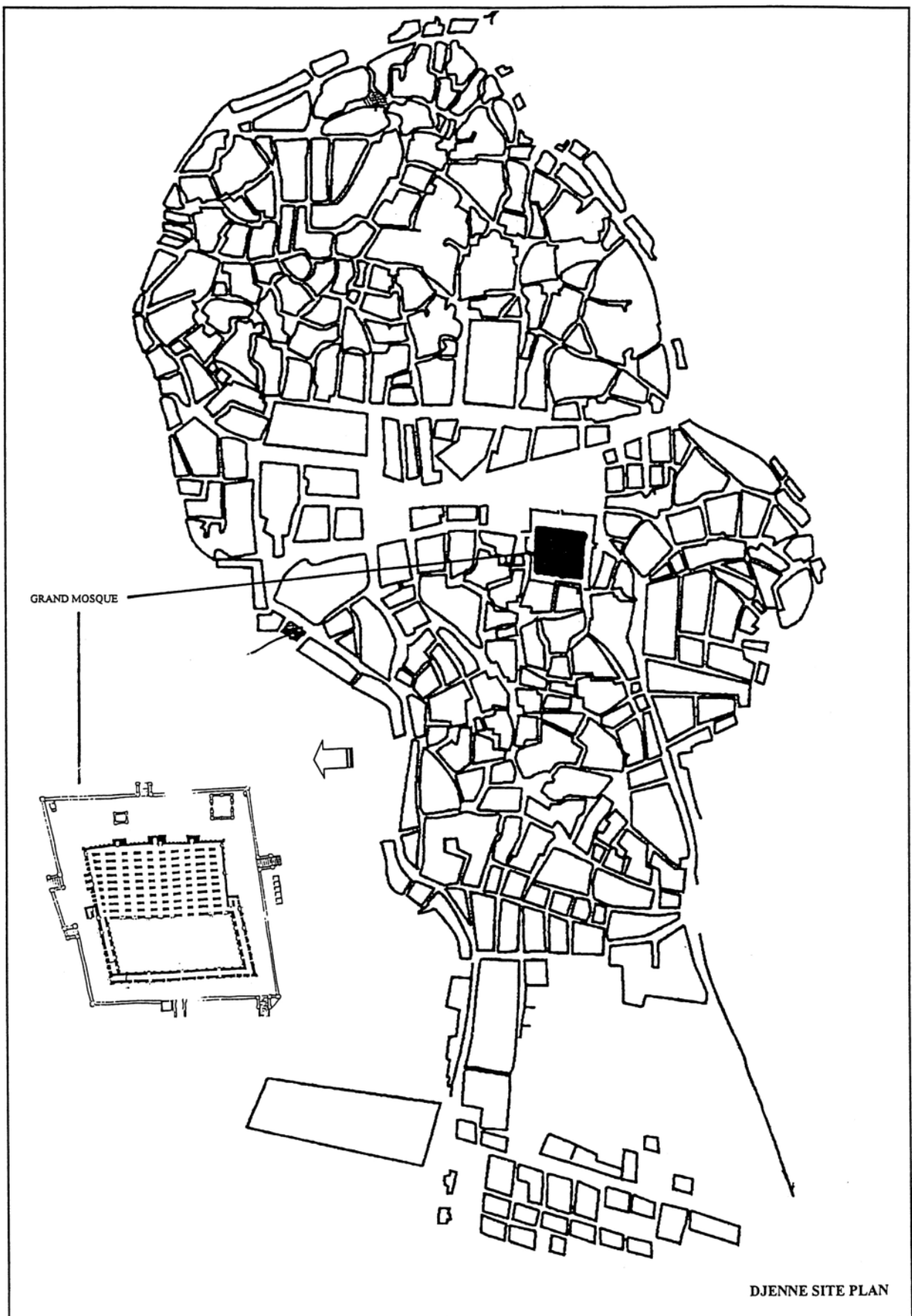
References

- ‘Plan de projet de réhabilitation et conservation de l’architecture de Djenné, Mali’, trans. M Daru, Eindhoven, Bamako-Leiden, 1995
- Bedaux, R M A and J D van der Waals, *Djenné, Une Ville Millénaire au Mali*, Rijksmuseum voor Volkenkunde Leiden, Martial, Leiden, Gand, 1994
- Maas, Pierre and Gert Mommersteeg, *Djenné, Chef d’Oeuvre Architectural*, Université de Technologie, Eindhoven, 1992
- ‘Projet de Restauration et de Conservation de l’Architecture de Djenné’, Djenné, République de Mali

Reports:

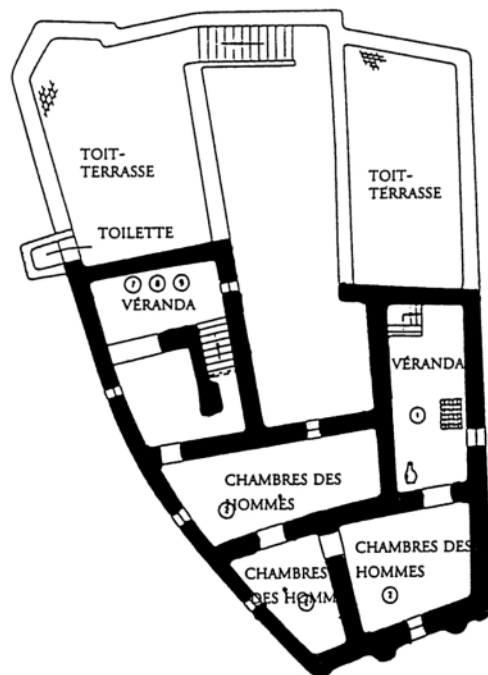
- Atelier Inter-Architectes, ‘Études et Suivi des Travaux, Rapport au Comité Scientifique’, February 2001
- ‘Projet de Restauration et de Conservation de l’Architecture de Djenné’, Mission Culturelle de Djenné, Ministère de la Culture, Bamako, February 2001
- Hama Diaby, Boubacar, ‘Rapport Synthétique de l’Année 2000, Projet de Restauration et de Conservation de l’Architecture de Djenné’, Mission Culturelle de Djenné, Ministère de la Culture, Bamako, February 2001
- van Zeijl, Gerard, ‘Evaluation de Projet de Restauration de l’Architecture de Djenné (Mali)’, CUL-J-203/ML 008501, Bamako, February 2000
- Langeveld, J G, ‘Étude d’amont du système d’assainissement À Djenné, Mali, Rapport de l’Ambassade des Pays-Bas à Bamako’ (Ref. ml 012307), Technical University of Delft, April 2000
- Rijksmuseum voor Volkenkunde, ‘Plan de Project de Rehabilitation et Restauration de l’Architecture de Djenné, Mali: Phase finale 2001–2003’, Bamako-Leiden, 2000



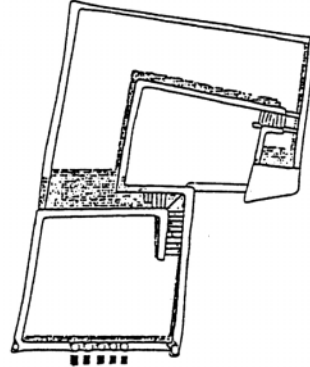
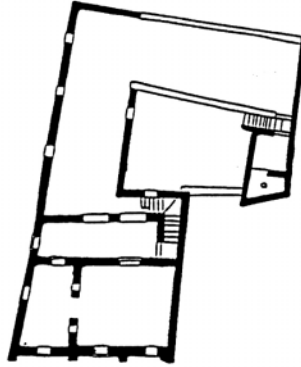
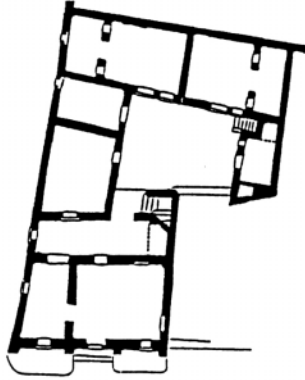
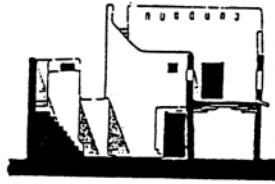




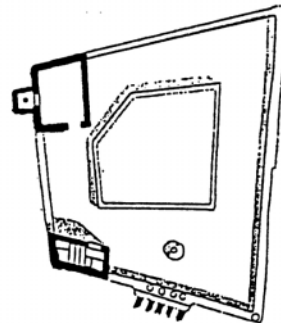
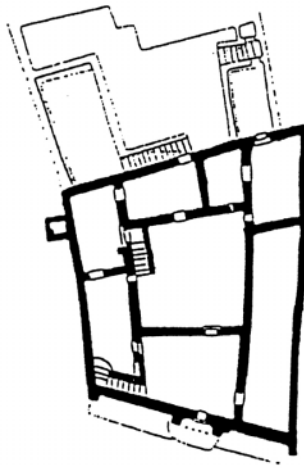
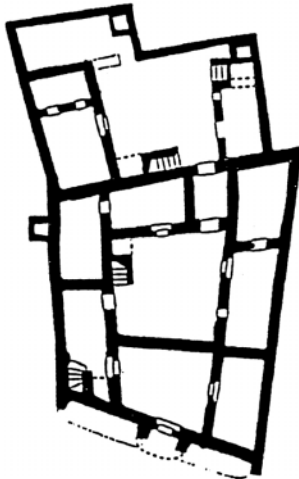
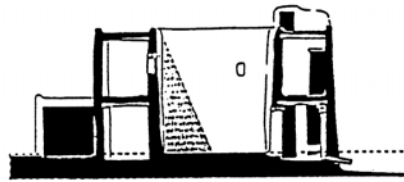
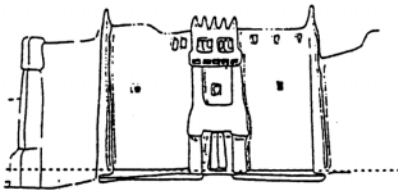
TRADITIONAL DWELLING GROUND FLOOR PLAN



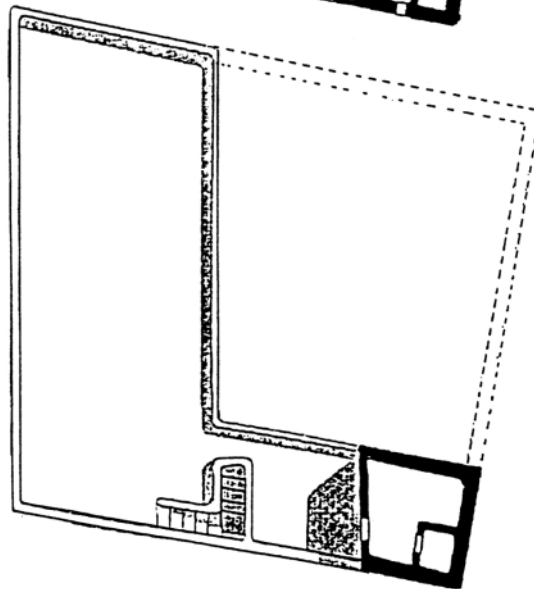
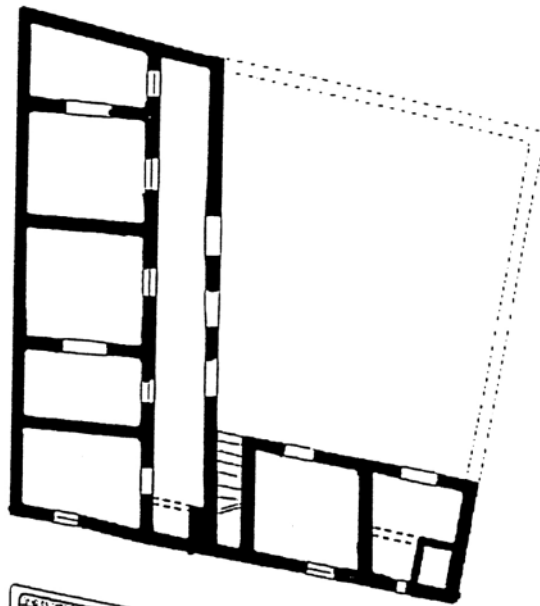
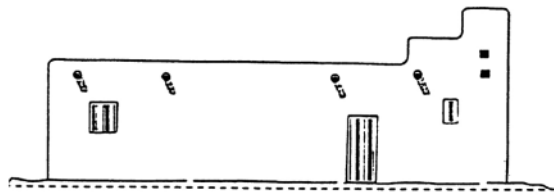
TRADITIONAL DWELLING FIRST FLOOR PLAN



MOROCCAN HOUSE TYPE



TOUCOULEUR HOUSE TYPE



ELEVATION, SECTION, AND PLANS OF A NEWLY CONSTRUCTED DWELLING

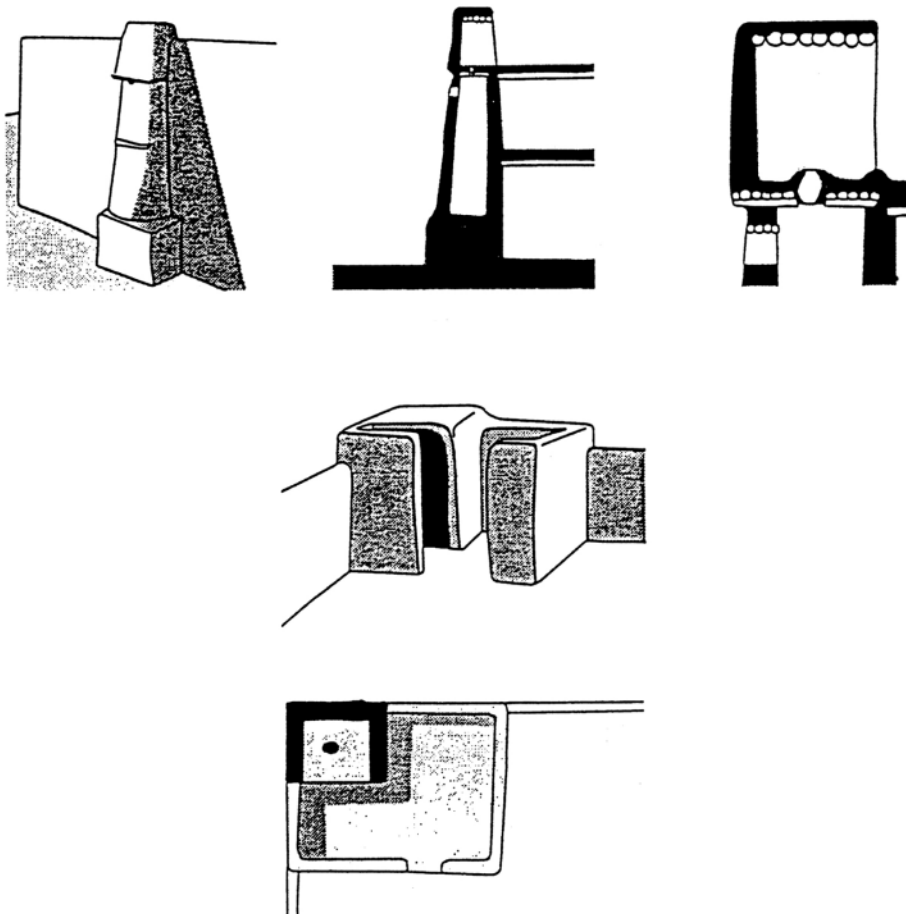
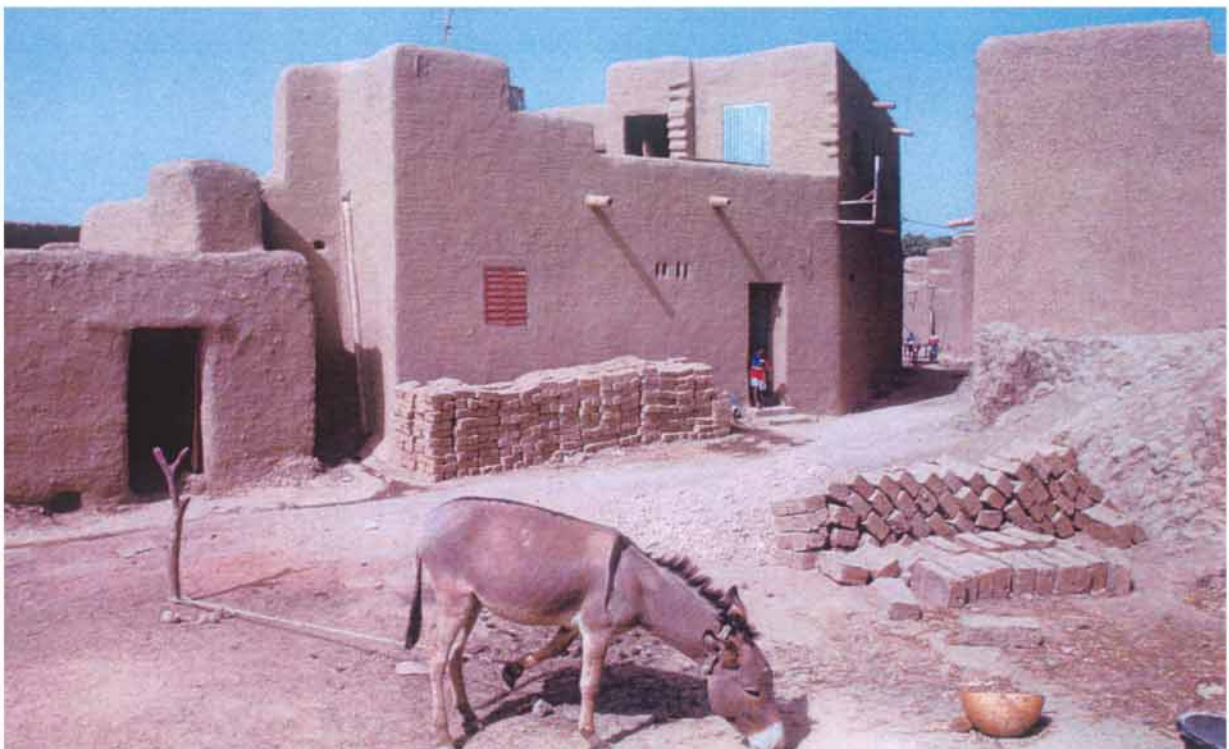


DIAGRAM OF TOILETS AND WASHING AREAS



Above: General view over the flat mud roofs and courtyards of private residences.

Below: There are three distinct house types in Djenné: Moroccan, Toucouleur, and Modern. A Modern style house is seen here; water drainage pipes project from the main elevation.





Above: A badly deteriorating house in need of reconstruction.

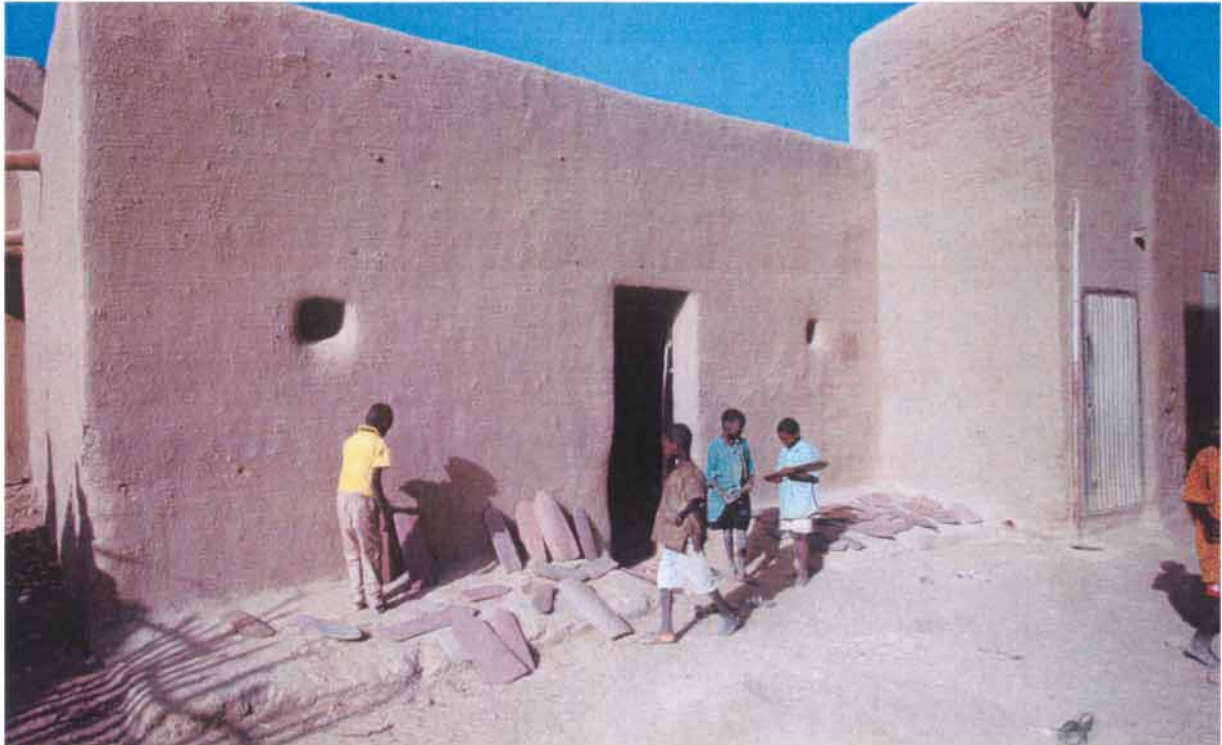
Below: Mud brick surfaces are rendered in smooth mud plaster. Wood is necessary for the structure of floors and roofs, doors and windows, and toron - palm tree trunks protruding from the elevation of taller buildings which serve as scaffolding.

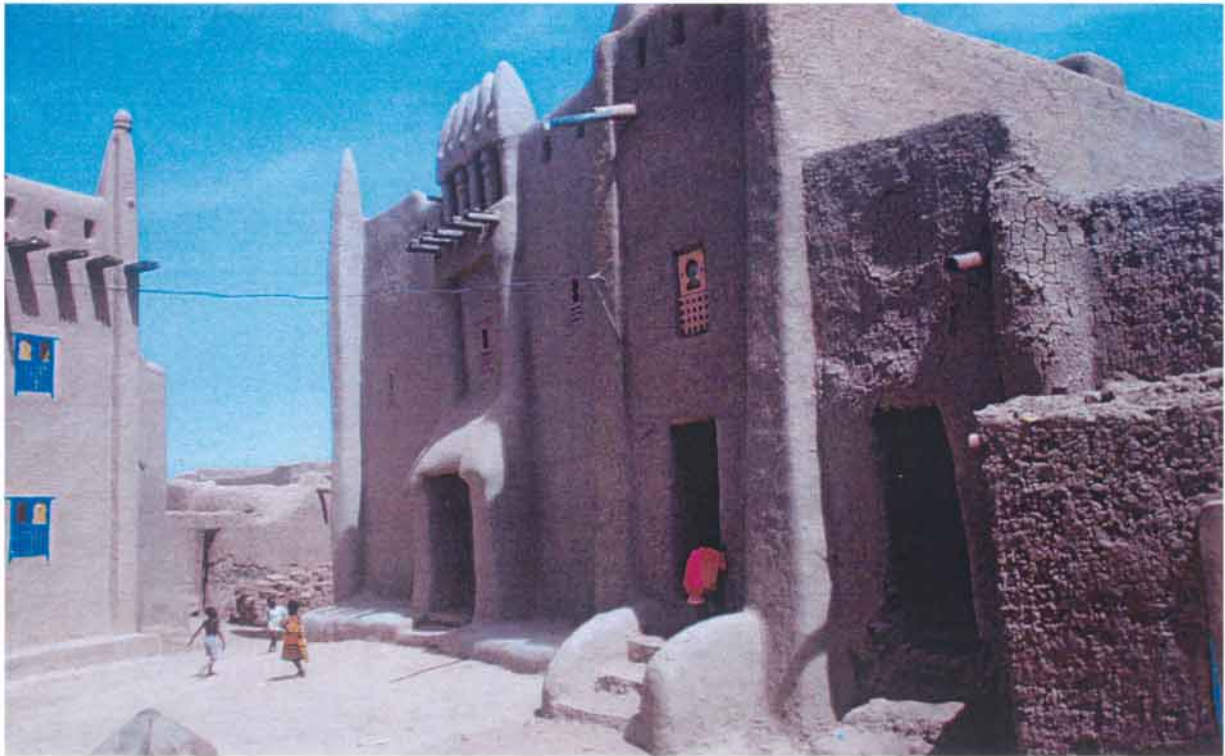




Above: Students gather in front of a recently rendered two-storey school. Minimal openings on the façade help keep the building interiors cool.

Below: Students leave their writing tablets against the wall of a one room schoolhouse.





Above: The Moroccan style identifies this house as one of two-storeys containing an interior courtyard and belonging to an important family.

Below: View into a private courtyard of a residence.





Above: Workmen mixing mud or banco dug from the floor bed of a site to be constructed. The mud will eventually be mixed with rice or barley straw before being shaped into bricks.

Below: A mud brick production site.





Above: The Moroccan style identifies this house as one of two-storeys containing an interior courtyard and belonging to an important family.

Below: View into a private courtyard of a residence.

