When I began to work in the Mzab and Jenne recently, I was struck by the architectural beauty and by the characteristics held in common by these two urban settlements on the frontiers of the desert. They share an urbanity uncommon in modern times, characterized by pure, sober geometric forms combined with a certain monumentality in particular buildings. But most impressive of all is the integration of these cities with their surroundings, which seem to have gradually matured together. The rhythmic arrangement of volumes of the ksars, scaling the hills of the pentapole of the Mzab; the silhouettes of the mud houses of Jenne along the banks of the Bani River: they form a natural part of a seemingly eternal landscape.

After the initial infatuation, I tried to get to know the regions better, studying their origins, history, societies and cultures. In the sources I read, I was surprised to observe a difference in the treatment of these two architectures which seemed to me to have developed so similarly. Today the pentapole of the Mzab is world-famous. Le Corbusier was inspired by its forms. At the instigation of Ravereau, the Algerian government created the Atelier of the Mzab which tries to preserve the architecture and adapt the tradition to present-day needs. By contrast, the architecture of the cities of the Bend in the Niger region is only known to a few initiates. Malians themselves sometimes deny this heritage, and little effort is made to better understand and appreciate its admirable qualities. Little by little the beautiful houses of Jenne, Timbuktu or Gao are returning to the soil from which they sprung, to be replaced by concrete buildings conceived by standards foreign to the region and the country.

In this paper I will try first to identify the origins of this lack of appreciation which the Black African architecture of the Bend in the Niger has suffered up until recent times. Secondly I will suggest a method of analysis which may help to restore this heritage to the creative resources of the Black African peoples.
The Ecology and Ideology of Cities on the Edge of the Desert

A People Deprived of its Architecture

Doubtless the reasons for the veritable usurpation of the paternity of the Western Sudanese city lies in the ideology of its historians. Indeed, with the exception of the Tarikhs, the scholarly elite of the University of Sankoré at Timbuktu, most of the historical texts until recent times are due to foreigners, Arab ambassadors or chroniclers during the 10th to the 16th centuries, and then, after a long hiatus, European travellers and conquerors during the nineteenth century. Thus it is hardly startling to learn that, just as the magnificent bronzes of Benin have been related to Greek influence, or the monumental walls of Zimbabwe have been linked to Phoenecian origins, the creation of Ghana, the first urban civilization of the Sudan, has been attributed to a Judeo-Syrian people and the architecture of the Bend in the Niger to Moroccan origins. These ethnocentric reflexes are now obvious.

Careful examination of Arab and European writings on the Western Sudan will give us a better understanding of the vision these northern peoples entertained of the Blacks, and thus of their architecture.

Arab Ambassadors and Chroniclers

The Arabs became interested in the Sudan very early on, for the sake of its riches. At this time the Western Sudan was the source of the gold so vital to the Mediterranean economy. Indeed, according to Mauny, Sudanese gold served as the basis for the prosperity of the great medieval cities of Europe up until the discovery of America. The gold route was controlled by Arab middlemen who had swept across the land from the Arabian desert to the foothills of the Pyrenees. Arab sultans commissioned historical and economic chronicles, such as those by Ibn Bekri and Ibn Khaldun, to help determine what kind of political relations should be established with the fabulous Black empires to the south. Ambassadors were exchanged between the two frontiers of the Sahara. The exploration was mutual, including, for example, the pilgrimage of Mensa Mūsā to Mecca, which is famous in the history of Cairo for having lowered the market price of gold for fifteen years.

The Arab accounts give us our first glimpse of West African urbanism. But apart from a few references to architecture which confirm that cities south of the Sahara had already attained a certain urbanity, what most impressed the Arab writers was the omnipresence of gold. Those were the terms in which El Bekri described the court of the king of Ghana: "When he gives an audience to his people, in order to hear their problems and resolve them, he sits in a pavilion, encircled by ten horses decked out in golden cloth. Behind him stand ten pages carrying shields and swords with golden mounts, and to his right are the sons of the princes of his empire, dressed in magnificent costumes, their hair braided and intermingled with gold' "

Despite the fascination with the magnificence of the Western Sudanese empires, most of the Arab accounts display an ordinary ethno-centrism which sets the standard for that classification of the characters of races which is later used to justify so many massacres and so much ignorance. Ibn Bhāṭṭūṭa, for example, hardly appreciating the modesty of the presents given him by the king of Mali, laughed over his avarice. "Then I regretted coming to the land of the Negroes, due to their poor education and their low regard for white men'." Commencing the denigration, he referred to their customs with condescension. "It is said that of all the peoples, the Negroes are the most submissive to their king, and humble themselves the most before him'. Ibn Khaldun systematized this characterization of races, which one finds later in Montesquieu. In his discourse on Universal History, he wrote: "The Blacks of the Western Sudan, as we have seen, are generally charac-
characterized by lightness of character, fickleness and emotionalism. They want to dance as soon as they hear music. People say they are stupid."

The ideology of Leon the African follows that of his predecessors. In speaking of the lands of the Blacks, he tells us: "They are all inhabited by men who live like animals, without king, lord, republic, government or customs. They hardly know how to sow grain. They dress in sheepskins, and not a one has a wife to himself alone. During the day they graze their livestock or work. In the evening they gather, ten to twelve men and women in a hut, and each sleeps with the one who pleases him most, reclining on sheepskins." Although he concedes the importance of commerce and craftsmanship for the area and describes the royal court in Timbuktu as "very well organized and magnificent," he links those few features that find favor in his eyes with northern influence, especially the beneficial effects of Islam. If "the inhabitants of Timbuktu are the most civilized, intelligent and highly regarded of all the Blacks," it is because indeed they "were the first to join the religion of Muhammad." If at Agadès "the houses are very well built," it is because "it is the city of the Blacks which most resembles the cities of the Whites," that these houses are built "in the manner of the houses of the Berbers," and that "these inhabitants are almost all foreign merchants."

Leon's text is crucial, since for three centuries it was the only source of information on the Western Sudan for Europeans. The European condescension towards all that is Black was accentuated by other factors, such as the slave trade between the West African coast and the American colonies, which had to be ideologically justified and which profoundly influenced the Western perception of the Black world. Furthermore, it is significant that when the first European travellers such as Mungo Park or René Caillé arrived, three centuries later, they saw the empires in decline.

European Vagabonds and Centurions

The Arabs and Berbers gained their vision of Black Africa from writings and diplomatic encounters intended to help define the appropriate political stand for them to adopt towards the great West African empires. The European discovery was altogether different. Beginning with the accounts of marginal, impoverished travellers, the discovery of Africa led to a bloody colonial conquest, which took different courses and rhythms in the North and South, and which found its justification in a devaluation of African civilizations and cultures. Europe underwent great changes during this period. The structure of commerce changed. Trade was no longer essential; it was necessary to find raw materials and markets for industry.

On June 21, 1795, Mungo Park departed for Africa, sponsored by the African Association. His goal was the city of Timbuktu. He reached Ségou and turned back, exhausted by the difficulty of the voyage. Several years later René Caillé took up the challenge and succeeded in crossing Africa from the south to the north. Starting from Saint-Louis, he reached Timbuktu and from there took the route through Sijilmassa to Morocco, from which he returned to France. The motives that inspired these travellers, over and above the immediate goals of their long and complicated journeys were clearly spelled out in the directives that the African Association gave Mungo Park: "to open new sources of wealth for their ambitions, commerce and industry."

Certainly their modest origins and manner of travelling influenced the picture of Africa that these two vagabonds presented to Europe. They were hardly conquerors, merely travellers astounded by their discoveries. Mungo Park's description of his arrival in Ségou is characteristic: "It was market day at Ségou, and all the roads were filled with people bringing different articles to sell. Looking ahead, I saw with delight the great objective of my trip, the majestic Niger, which I had sought for so long. As broad as the Thames at Westminster, it sparkled like fire in the sunlight and flowed gently eastward. The appearance of this great city, the many boats covering the river, its active population, the cultivated land which stretched far out into the environs, formed a picture of opulence and civilization that I had hardly expected to find in the center of Africa." But whether they were simply stipulations destined for his financial backers at the African Association or his profound convictions, Mungo Park's conclusions were such as to justify colonization: "I could not view the prodigious fertility of the soil, the immense herds of livestock, suitable to nourish man or to serve him, nor could I reflect on the resources available for internal navigation without regretting that a country so generously endowed by nature should remain in the rough and barbarous state that I had witnessed. In order to make improvements, all that was needed were examples capable of enlightening the natives on their interests and some instruction on how to direct their efforts."

The way towards colonization had been opened. At first, two methods were considered, that of the peaceful "civilizers" and that of the soldiers. After resistance to peaceful colonization, which after all was only disguised conquest, force prevailed. Solleillet exemplifies the former point of view. For him, "The best and most enduring conquests are the peaceful ones, made through industry, commerce and exchange, rather than by weapons." However, paternalism underlay his declarations of principle: "These people occupy the lower rungs of a ladder whose summit we enjoy; our task is to make them climb higher." All this ended in the terrible butchery of the military forces. This approach was not without opposition from the left wing in the Chamber of Deputies. On July 28, 1885, the deputy Camille Pelletan cried out in alarm, "What is this civilization we are imposing with canon-fire, but another form of barbarism!" But a peremptory answer came from Jules Ferry: "That is your thesis, sir, but I won't hesitate to declare that it
belongs neither to politics nor to history, but to political metaphysics. We must speak out with the truth. Indeed, we insist that superior races have rights over inferior ones.” Paternalistic technocrats or cynical conquerors, they shared the same belief in the superiority of their own civilization.

Some may find this a strange way to discuss architecture. But just as one needs to know the ideological, economic and social context in order to understand the architectural practice and forms of today, it follows that in order to understand the methodological constructs of architectural historians, it is necessary to understand their ideological frame of reference and its origins. How can one comprehend the persistent repudiation of the originality of the Black African architecture of the Bend in the Niger, without knowing the consistency with which the foreign writers have denied the capacity of the Blacks to create their own history, and in their own accounts have sometimes even refused them any ounce of humanity?

It is that ideological substratum which, only 50 years ago, constituted the credo of the textbooks of the Third Republic. That is what was taught, in the West and in Africa, to all who have been interested at some point in West African architecture. Hence Hachette’s very serious publication of 1925, the Nouvelle géographie universelle, whose description of the Black African character typifies the perceptions of the period. The account emphasizes that the Black “character has been profoundly marked by the influence of a perpetually hot and humid climate, which dulls the intellect and stimulates the instincts and appetites at the expense of intelligence and sensibility.” One is not surprised to find, in the same work, a photograph of Sudanese architecture with the following caption: “The cities at the frontier between the Sudan and the Sahara contain many examples of this type, which, despite a certain childishness, demonstrates some architectural initiative and produces a rather interesting decorative effect”

**Elements for a Reappropriation of West African Architecture**

The peoples of the Bend in the Niger region have been further dispossessed of their architecture in the sense that when it has indeed been appreciated, its admirers have sought its origins in the influence of foreign cultures: El Bekri invoked the Libyans; Delafosse the Moroccans; Dubois the Egyptians. Here we will advance the hypothesis that the architecture of the Bend in the Niger is indigenous, by comparing its development with that of the architecture of the northern Sahara, in the Mzab, which seems so similar in some ways, and which has been considered a possible model for the cities on the Niger river.

Without denying the importance of the historical factor in the development of the cities of the Mzab and of the Bend in the Niger, we will consider it as only one aspect of a multidisciplinary approach. What method would enable us to integrate the factors which combined to give rise to environments at once so original and so similar? We can most appropriately adopt an eco-systematic approach, viewing the city and the house as the crystallizations in time and space of economic and social mechanisms powered by a given social system, in confrontation with a specific ecological context. Having reviewed the historical record, which we have tried to present in a new light, we will analyze the ecological and economic influences, including the external economic context. These factors constituted a system of constraints: the local social system, characterized by its structure, its mode or combination of modes of production, its tools of production. This constellation of limiting influences, situated in a larger, external system of production and management of the environment, shaped the urban and architectural landscape to the north and south of the Sahara. To avoid complicating the system, we will not analyze here the internal feedback mechanisms which, in combination with changing external influences, have facilitated new adaptations, but also brought the deterioration visible in the two areas of settlement today.

**Economy and Ecology of Cities**

**An Overvalued Economic Factor. Trans-Saharan Commerce**

Through trans-saharan commerce, the southern fringe of the Islamic world of the Maghreb was in contact with the fabulously rich Western Sudan. To the south of the Sahara, from the 7th to the 16th centuries, the great empires of Ghana, Mali, and Songhai flourished in succession on the strip of land between the desert and the forest, until the Moroccan armies and the mercenary forces of El Mansour precipitated a decline. Slaves and Sudanese ivory were exchanged for salt mined in the desert and, most importantly, for weapons, gunpowder and other products manufactured to the North. Sijilmasa to the West, Ouargla and Mzab in the center, and Gadamès further to the East constituted the northern ports of entry for West African gold and slaves. Berber families branched out towards the South. The Ibadhites played the critical role in trade during the first phase of Islamisation. To the South of the desert, Kumbi-Saleh, Jenné, Timbuktu, and Gao were the collection points for products arriving from the South, as well as the economic and administrative capitals of the great West African empires. Koumbi-Saleh numbered 30,000 inhabitants in the 11th century, and Gao had as many as 50,000, which is comparable to the population of European cities of the same period.

As administrative centers serving the royal palace and the court, the primary function of the cities was to guarantee political stability, which fostered commerce. As commercial centers, emporiums at breaking-points in the trade routes, like Jenné or Timbuktu, these cities housed
important communities of traders and artisans. The traders' quarter was separate from the administrative city. Arabs and Berbers were prominent, not only in the commercial sector, but in administration and in the arts, and their prosperity was one of the factors permitting the development of an original architecture.

But perhaps this Arab (and especially Berber) influence has been overestimated in relation to that of the local inhabitants of the Western Sudanese cities. Several facts, cited here at random, suggest that this is the case. Important human settlements existed to the South of the Sahara well before Islamization, while to the North of the desert, the first settlement in the Mzab, Ar'ram Tal Azadir, dates from 904; Gardaia, the major city of the pentapole, was founded in 1053; Beni Izguen, the main religious center, in 1347; and the last, Berriane, was founded in 1679. In addition, trans-saharan commerce included some Black peoples, such as the Dyula, who also participated in the development and diffusion of the architecture of the Bend in the Niger. We must also bear in mind that the peaceful, prosperous period induced by Northern influence was equally interrupted by two Almoravid invasions, the last of which marked the decline of the Western Sudan. Early on, El Bekri noted the pernicious effect of the first invasion on Audagost, which he described as a flourishing city, "containing handsome houses and well-built structures" before its destruction in the 9th century. In this context it is appropriate to recall the poor opinion that Ibn Khaldun entertained of Berber and Arab builders. The former, he claimed, "are not interested in architecture," while the latter "are not builders."

Finally, one must take into account certain structural similarities, which transcend the differences of wealth, between the bourgeois houses of Jenne or Timbuktu and the village architecture of the area. Who would deny the similarity between the niched facades of the Dogon houses and those of Timbuktu, or between the buttress-lined walls of the mosques of the Sahel? The similarity leads us to suppose that, external influences aside, there is a common method of organizing space among the peoples of the Bend in the Niger, whose sources must be sought locally. One element of this formal relationship seems to lie in the historical continuum that archeologists now agree exists between the pre-Islamic and Islamic settlements of the area. A second and essential element underlying the similarities between the architectures of the Mzab and the Bend in the Niger is probably the similarity of the ecosystems to the North and South of the Sahara.

Remains of Pre-Islamic Cities
Recent archeological discoveries confirm the hypothesis that the cultures of the Bend in the Niger are indigenous.
The Ecology and Ideology of Cities on the Edge of the Desert

a) House in Timbuktu, Mali
b) Dogon house in Mali

Sources: Drawings by Alberto Alecchi after photographs as follows
Professor Devisse explains that “until recently, one had the idea — quite silly, when one thinks about it — that all sub-Saharan urban life resulted from trade across the desert. Since the trade did not flourish until the 9th and 10th centuries, it was simply assumed that the ‘trading cities’ of the Niger, for example, could not predate 800.” Recent historical and archeological work has invalidated that notion. Numerous traces of ancient settlements survive in the valley of the Niger. They are found “by the hundreds in the flood zone, where the tumuli are made of earth, rather than of stone.” Where did they come from?

1) Peoples from the East? Many West African tribes make reference to mythic ancestors from the East, quasi-supernatural beings, possessed of extraordinary physical strength and wisdom. Some scholars, like Davidson, have suggested Meroë influence, while others, such as Dubois and Cheikh Anta Diop, have made a case for Egyptian influence. But is not the tendency to try to enhance the value of the architecture of Jenné, by giving it prestigious origins, simply another means of robbing the peoples of the Niger region of their role in creating their architecture?

2) The Empire of Ghana. The ruins of Koumbi-Saleh, 300 kilometers north of Bamako, reveal a city which predates the advent of Islam in the area, and which epitomizes the development of the first West African empire. Ghana Mauny’s minute description unquestionably indicates a veritable control of urban space: “The houses were multi-storied. When the upper stories collapsed, the debris filled in the ground floors, preserving them magnificently at an average excavation depth of 4 meters. The city center is organized around a great plaza which leads into several streets. The paved streets, the plaques painted with Koranic inscriptions on the walls, the handsome niches carved into the walls and piers, the stone staircases, suggest the civilization that flowered in this setting.” The area excavated so far is mostly Islamic, but it is likely that subsequent excavation will reveal pre-Islamic remains. For example, there is no convincing proof that we have yet uncovered the imperial palace of Ghana.

3) Jenné-Jeno Several kilometers from modern Jenné, on the site of Jenné-Jeno, the remains of another important agglomeration have been discovered. Dating to 250 B.C. in origin, but flourishing between 400 and 900 A.D., it covered 40 acres by the end of the first millennium. It thrived on the necessary exchange between two ecosystems, the food products of the valley, and the products of the arid plain, which had already developed iron metallurgy before the Christian era.

The similarity of forms and products found at various sites at Niani, near Mopti, and among the Tellem-Dogon, cause one to reexamine the type and meaning of the exchanges which structured the area, and to doubt the previously-accepted hypothesis that trans-Saharan trade was the dominant influence on the rise of urban civilization at the Bend in the Niger. It remains to weigh the respective significance of the pre-Islamic and Islamic heritages. Above all, we have yet to measure the environmental constraints which constituted perhaps the most important influence on urban development.

A Similar Ecological Context North and South of the Sahara
Though naturally an obstacle to communication, the Sahara must also be seen as a vast area crossed by diverse currents of influence which shaped the peoples living to the North and South. On the edges of this ocean of sand and in its oases, ecological conditions are fairly similar.

1) The southern Sahel, a transitional area between the desert and the forest, was the setting for the Sudanese empires. It is characterized by minimal rainfall, from 250 to 500 millimeters per year, spread over the five-month winters. Temperatures vary only mildly with the seasons. At Timbuktu, for example, on the 16th latitude, the mean annual temperature is 29°, an average of 35° in June, the hottest month, and 20° in January, the coldest month. Violent storms may accompany the rainy season, and hot, dry winds of sand blow off the Sahara at times during the hot season. The Niger river, the Nile of the Blacks, which traverses more humid regions in its upper and lower stretches, deposits a fertile mud in the Sahel zone between Jenné and Gao. This alluvium provides a building material known as banco, which varies locally in relative proportion of sand to clay. A rich soil, it yields a characteristic vegetal cover: a carpet of gramminaceous plants that serve as fodder for the nomadic herds, locust trees and thorny bushes, doum palms and palmyra, which grow in damp depressions, and spotting the landscape, the baobab trees which so astonished the Arab travellers.

Wood and banco are the main building materials of the Sahel. The scarcity of wood and the twisted tree trunks serve as limitations on construction: economical use of wood, which is confined mainly to ceilings, short spans of at most 2 meters, intermediate supports of wood or banco, in large buildings like mosques. As for banco, its architectural forms, thick walls, buttresses, and rounded forms are necessarily those shaped by the hand of the artisan. The same characteristics are found from the historic site of Koumbi-Saleh to the modern houses of Jenné or Timbuktu.

2) The oasis of the Mzab valley, on a latitude of 32° 30’, provides a similar setting. Temperatures are generally mild (an average of 33.1° in July, in summer, and 10° in winter) but they fluctuate more widely than at Jenné, both daily and seasonally (a range of 17° during the summer, and 12° in winter). The sparse rainfall, perhaps 50 to 60 millimeters per year, occurs in winter, rather than in summer as in the Sahel. This is the region of the terrace house. With a relative humidity of less than 40 per cent, the atmosphere resembles that of the Sahel during its dry season. The sun is hot and intensely luminous.
However, the hydrological and geological context differs. While the Niger River and its tributary, the Bani, put Jenné in the midst of a vast swamp, severed from solid ground during the rainy season, the inhabitants of the Mzab must draw their water from wells that are 40 to 70 feet deep. The Mzab rests on a substratum of hard turonian limestone, which provides the coarse white blocks used for the houses of the *ksour,* the garden walls being of mud-brick as in Jenné. Hydrated gypsum and carbonates of Chebka are used to produce *timchet,* the local mortar, as well as the lime traditionally used for daub.

The vegetation is typical of an oasis. The gardens of the Mzab cover more than 1000 hectares and boast some 110,000 date palms, which provide shade for fruit trees and truck gardens. Until recently, palm trees were an important cash crop, which meant that their use in construction was parsimonious, though critical. Only non-producing trees were cut, and that wood was systematically recycled from demolished buildings. Highly resistant, the palm trunks last for 2 or 3 centuries. In the Mzab, as in the South, economical building methods and sober forms result from a difficult environment and an austere culture.

**The City and the House Considered as Social and Spatial Imprints**

In effect, the city and the house are shells 'secreted' by the community that inhabits them. Each level of social organization corresponds to a specific urban or private space.

*The Space of the City*

The plans of the cities are determined by their military, commercial, and religious functions. The Ibadhites originally selected the Mzab for its defensive advantages and built the *ksour* of the pentapole on elevated points, surrounded with ramparts. But the Mzab was equally influenced by its role as one of the cradles of Ibadhite Islam. The
mihrahs appear like prayers in silhouette against the sky. Numerous medersa, religious schools, perpetuate Ibadhite principles: free will and equality among believers regardless of their social origins, which are the basis of Mozabite democracy. But one cannot separate the religious vocation of the cities from their commercial function. They are the terminus of trade routes from Audagost and Gao, and indeed, are centered on the souk, the market place where the cities receive the outside world.

The dense urban texture of the Mzab (495 people per hectare at Ghardaia, for example) can be understood as a series of spaces of different degrees of sociability: city, neighborhoods, culs-de-sac, corresponding to levels of increasing privacy. The narrow, winding streets serve as transitions between the fully public spaces, such as the mosques and medersas, semi-public spaces for the use of the neighborhood and its sub-divisions, such as fountains and communal ovens; and the familial space of the private house. This urban structure also reflects ecological constraints, for the houses shade one another from the bright sun, and twisting streets and covered passages provide protection from the wind and sun respectively.

Jené has a complex plan, characterized by dense residential neighborhoods, furrowed with winding alleys only 3 meters wide, but which tend to converge on a large, open, central plaza containing the market and the great mosque. Here too, a combination of military, religious, and commercial factors are at play. Jené's situation, frequently cut off from dry ground by the Bani River, provides a natural defense, for attack required a great fleet of canoes, which could only be assembled by a major power. A now-demolished wall, 2.5 kilometers long and pierced by 12 gates, further protected the city. Jené, although to a lesser degree than Timbuktu, which was the foremost religious center south of the Sahara, famed throughout the Muslim world, is equally shaped by Islam. One need only gaze at
the imposing mass of its great mosque, reconstructed on the ancient plans during the colonial period.

But Jenné is above all a commercial city. Situated at a break in the North-South trade route, Jenné oversaw the transport of products by canoe to Timbuktu, forming a critical link in the trans-Saharan trade. The Dioula merchants of the city also organized the transport of goods to the South, by man or by cow, and enjoyed commercial contacts extending as far as modern-day Ghana.

The Space of the House
Both to the north and the south of the Sahara, the identification of the built structure with the social cell is so powerful that the same terms are used to designate certain sections of the house and parts of the body. One can argue that relationships within families and between men and women determine spatial organization.

1) The Houses of the Mzab present plain, white walls to the street, in the egalitarian Ibadhite tradition. Except for loopholes, few openings puncture the facades. Occasionally, projections presumably defensive in origin overhang the entrances, and here and there stone benches are built out from the facades, for the benefit of weary visitors. One massive entrance breaks the facade. Traditionally its palm door is decorated with a wooden Berber lock and a wrought iron ring, which serves as a handle. Sometimes a verse from the Koran hangs in the entrance to protect the house from vipers and scorpions.

One enters the house across a symbolic threshold about 20 centimeters in height. The household animals, a goat or donkeys, are housed to either side. By a bent corridor that prevents outsiders from seeing into the house, one approaches the central volume, an interior courtyard lined by rooms: the reception hall, where the master of the house can receive guests without disturbing the household, the women’s room, or tisfri, with large openings onto the courtyard, and which contains the loom, a fundamental element of domestic economy until recently; a

Dwelling in an oasis of the M’zab region
Photo J J Guibbert
The Ecology and Ideology of Cities on the Edge of the Desert

The Space of the House a house in the ksar of Beni Isguen, M'zab
Source Domadieu and Didillon

The courtyard, lit by a grilled opening in the roof, serves as the children's playground and shelters many other domestic functions, such as the traditional kitchen with its chimney, set aside in a corner of the courtyard. Here one also finds the traditional wash basin and the dellou, skins which store drinking water and also help to humidify the air during the summer. Indeed, the central space serves as an air-conditioner, for the fresh air accumulated overnight remains cool into the afternoon.

A stone staircase leads to the first story, its placement taking account of the staircase of the adjacent building in order to minimize any disturbance to either household. It arrives at a terrace courtyard, one of whose sides is roofed, but opens towards the south in an arcade. A climatic adaptation, this opens the space to the warmth of the low winter sun but shields it from the high sun of the summer. Rooms are located around the courtyard as on the ground floor. Since the Mozabite family is generally monogamous, they are allocated as follows: one room is reserved for the patriarch or the grandfather, a private room is given to each couple, and one or more rooms are shared by the children. The latrines, usually upstairs, are placed as far from the courtyard as possible, to minimize the smell. They operate on the dry system, and are emptied from the exterior.

Finally, a very steep stair climbs to the upper terraces, the exclusive domain of the women during the day. Men who need access, to make repairs, for example, announce themselves by making noise, which allows the women of the neighboring house to withdraw. These terraces are subdivided by low partitions, to create sleeping porches for the summer, although...
it was once equally common to move to cooler summer houses in the palm groves.

The furniture, consisting of benches, beds, niches, and shelves, as well as the chimney, are of stone and timchent. The staircases are built of rubble and timchent, or framed on palm beams supported on an arch or two, low walls. Household objects are few, namely the magnificent rugs made by the Mozabite women, pottery, including glazed ware from Tunisia, and wooden platters from the Tell or from Black Africa.

The Mzab house is mainly the residence of the family, especially the women, and everything is done to guarantee its privacy. It is characterized by the multiple uses given to its spaces, and by daily and seasonal migrations among them, for these houses served primarily as winter dwellings, complemented by summer houses in the palm groves.

2) The Houses of Jenné are renowned for their monumental street facades. About 7 meters high, these facades center on a door at least 2 meters tall, set between two pilasters which support the potige. The latter consists of a horizontal band surmounted by columns spaced about 1 meter apart, which form a rounded crenellation above the cornice. Over the doorway there is often a single window with a wooden shutter, which lights the first floor, and is clearly derived from Moroccan craftsmanship. The door is sometimes protected by a large hood, somewhat reminiscent of the corbelling found in Mozabite houses. Some houses welcome visitors with benches (tintin) on either side of the door. The massive wooden door, decorated with locks and nails, has a 30-centimeter threshold. It leads to a vestibule containing a bench which doubles as a bed for the guard in merchants' houses, or as a reception area. Often one finds the reception hall directly adjacent to the vestibule, so that the master of the house can receive guests without disturbing the privacy of the household.

A narrow corridor leads to the interior courtyard and to the staircase. As in the

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Plan of Jenné
Source: Monteil

Mosque in Jenné
Photo: J J Guibbert
Typical facade in Jenné
Source: Monteil

Facade of a traditional house in Jenné, Mali
Photo J J Guibbert

ground floor
1. vestibule (sifa)
2. guard's quarters (darfo)
3. benches (tintin)
4. corridor to courtyard (sorodyide)
5. staircase (kalikali)
6. central courtyard (batuma)
7. women's suites (bedroom connected to storage room)

The Space of the House Jenné.
Source Monteil, figs 3 & 4

Traditional house in Jenné with covered entry
Photo J J Guibbert
Mzab, the interior courtyard is the center of domestic activity. Here the women cook on a portable stove made of terra cotta and go about their various tasks while the children play under their eye. A covered passage may lead to a second courtyard reserved for servants, horses and small livestock. Surrounding the main courtyard are the rooms, which are usually paired: the servants' room with storerooms, the women's room with pantries. Since the households are generally polygamous, each wife shares a room with her children. These rooms are arranged to afford some privacy, and are lit solely by the doorway. A contiguous room houses the wife's food reserves, her personal belongings, and the goods she has made as a craftswoman.

A staircase of banco leads to the first floor, which repeats the plan of the ground floor. Generally one room is reserved for the master, while the others are variously used for living or storage. They may have small windows, and some, called barmane, a reference to the openings of cooking pots, are only partly roofed. Here too are the latrines (salaga) which employ the technique of separation of solid and liquid also used in the Mzab. The terraces are sometimes partitioned by low walls to define individual spaces for the couples who often sleep there in summer. Most of the furniture is made of banco, as in the rural houses of the area, such as those of the Bozos or the Toucouleurs. Locally-made mats, chests, pottery, calabashes, and waterskins constitute the household objects.

Houses in Jenné often combine two functions, commercial (warehouse and trading office), indicated by a few architectural embellishments like the facade with its potige; and residential, whose organization parallels, but in denser form, the plans of the rural houses of the region. As in the Mzab, one finds little specialization of function, and a certain daily and seasonal migration among the spaces.
A Comparison of Building Principles in the Mzab and in Jenné

<table>
<thead>
<tr>
<th></th>
<th>Mzab</th>
<th>Jenné</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foundations</strong></td>
<td>Nonexistent as such Houses of the ksou built directly on rock Houses in the palm groves built directly on the ground</td>
<td>Nonexistent Very high water level. Construction directly on the ground</td>
</tr>
<tr>
<td><strong>Walls</strong></td>
<td>Rough blocks of white limestone for the houses (1 meter at the base; 15 centimeters for the raised edges of the terrace) Bearing walls of 15 to 20 centimeters Binder of sand and timchet or sand and lime Garden walls of mud brick mixed with straw, bound with sand and clay</td>
<td>Dried bricks of banco, made in a mold; may be mixed with rice chaff (walls 80 centimeters at the base) Bearing walls of banco Binder of banco</td>
</tr>
<tr>
<td><strong>Plaster</strong></td>
<td>Mortar of timchet and sand, covered with whitewash, which is renewed every 3 or 4 years (the light color reflects heat)</td>
<td>A special kind of earth from pond beds, sometimes mixed with rice chaff or cow dung. Karite butter may be added to help waterproof the facades</td>
</tr>
<tr>
<td><strong>Ceilings</strong></td>
<td>(See illustration 1) Palm tree trunks covered with palm ribs, flat stones, palm sheaths or vaults of stone, covered by 30 centimeters of rammed earth</td>
<td>Trunks of doum palm covered by a lattice of wood, on which is laid a bed of bricks, then 20 to 30 centimeters of earth rich in organic matter (often compost)</td>
</tr>
<tr>
<td><strong>Terraces</strong></td>
<td>Built on the same principle as the ceilings. Sometimes a layer of composted earth mixed with ashes is added Drainage by water spouts hewn from palm trunks</td>
<td>Built on the same principle as the ceilings. Waterproofed by a coating of &quot;rotten&quot; earth found in pond beds and mixed with rice chaff Drainage by waterspouts hewn from palmyra trunks or made of pottery</td>
</tr>
<tr>
<td><strong>Beams and Lintels</strong></td>
<td>Made from palm trunks, they span about 2 meters</td>
<td>Made from palmyra trunks, they span about 2 meters</td>
</tr>
<tr>
<td><strong>Arches, Vaults and Domes</strong></td>
<td>Characteristic of the Mzab, they follow one of 2 techniques: • rubble laid up in courses with timchet, • concealed framing with palm ribs</td>
<td>With certain exceptions, not found in the Bend in the Niger</td>
</tr>
<tr>
<td><strong>Piers</strong></td>
<td>The piers that support the arches measure 20 centimeters to one meter on a side. They are of rubble and timchet</td>
<td>Because arches are rarely used in the houses of Jenné there is no need for piers. However, monumental piers of banco carry the pointed arches of the Jenné mosque. They are the sole means of creating large collective spaces</td>
</tr>
<tr>
<td><strong>Drainage</strong></td>
<td>A recent system of underground sewers Dry latrines, usually upstairs, emptied by an opening onto the street, and temporarily closed with timchet Soak-away dug 2 meters deep in the open-air courtyard, in rock in the case of the ksou, and in sand, using a stone lining, in the palm groves</td>
<td>Open air drainage of rainwater Dry latrines upstairs. Collected liquids carried outside through a pottery pipe to a receptacle emptied daily Solids collected in a banco receptacle, one of whose walls faces the street, and which is emptied every 2 years No soak-away</td>
</tr>
</tbody>
</table>
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"The ceiling is composed of either a bound latticework of palm ribs" (p. 95)

"or of flat stones" (ibid)

"or of low vaults constructed in stone and trenched between the beams..." (ibid)

"or of juxtaposed palm sheaths"

Mozabite Ceilings: Ingenious use of local materials

Source: Donnadieu and Didillon

Conclusion

Preparatory to my conclusions, I would like to reiterate two essential points regarding the context of building production and the management of the environment.

Urban Production: Guilds of Masons

The Mzab has a highly-organized guild of masons, which follows strict rules for urban construction. For instance, doors and windows are positioned so as to prevent views into the houses, and parapet walls are built around the terrace courtyards to block the view into neighboring courtyards. The traditional egalitarianism of the Mzab prevents any individualist architectural display in facades. This apparently ancient architectural code, perpetuated by the guild, is what gives the Mzab its stylistic unity and urbanistic beauty.

At Jenné, the masons belong to a guild called the Bari, in contrast to the other tribes where they are organized by ethnic group. The guild has a director, a professional code, particular building traditions, an apprenticeship system and esoteric rites, probably for initiation. Jenné's guild dominates architecture in the Niger valley. Called upon to build any major structure, it has diffused the Jenné style not only in cities like Segou, Sikasso, and San but even in villages, where rural notables have also commissioned buildings.

Urban Management and Democracy

In the Mzab, each neighborhood corresponds to a kinship group of people descended from a common ancestor. The kinship group constitutes the basic social unit of the democracy, and assumes such charitable and social responsibilities as the care of widows and orphans, and the mediation of minor disputes. Each elects a representative, the Mokhadem, who sits in the djemaa, the city's executive assembly. The djemaa is divided into two coffs, which alternate control of the body. It administers civic services, such as the police, maintenance and repair of buildings, garbage collection, maintenance of the seguis, or communal irrigation ditches, and the fences of the palm plantations, and draws on a treasury based on local contributions.

Neither Jenné nor Timbuktu were capitals of the Sahelian empires, and consequently lack the grand urbanistic gestures typical of autocratic governments. On the contrary, Jenné is characterized by a basically democratic urbanism. The system represents a synthesis of external influences and local factors. Jenné is led by a chief, the dienwere, who is chosen from the traditional ruling family by a small group of electors. He is assisted and monitored by a council of notables, a system of government characteristic of West Africa.

In a seminar such as this one intended to study the contemporary city of the Sahel and to consider its future, it may seem inappropriate to dwell on the past. Far from clinging to history, I hoped to show that the architecture of the Mzab and Jenné shares the dynamic orientation that the Aga Khan Foundation wished this meeting to develop.

Until recently, historians have emphasized external influences, when analyzing the economy and society of the Third World, and their translation into architecture and urbanism. At a time when self-development and indigenous tradition are especially valued, it seemed useful to review the development of local architecture in terms of internal factors—which is not to deny the existence of external influences. On the other hand, in terms of future development, the Mzab and Jenné are topical from two points of view.

First, they demonstrate that it is possible to create an architectural and urbanistic response to the given ecological and economic context, using local resources and techno-
logy adapted to them. Recent construction relying on international financing and imported technology cannot claim the same success.

Finally, on the basis of the evidence presented above, it seems that urban planning and management are only possible given local democracy, with the community participating at every stage. The Mzab and the cities of the Bend in the Niger show that the dilemma of architectural tradition versus modernism is a false one, and that the "traditional" houses of the Mzab and Jenné are in many respects more "modern" than their recent rivals. For this reason, Jenné and the Mzab merit more than a privileged place in the pantheon of historic architectures; they deserve to be studied as present day models.

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1 El Bekri, p 329
2 Ibn Batu, vol III, p 402
3 Ibid, p 417
4 Ibn Khalidun, p 172
5 Léon l’Africain, p 462
6 Ibid, p 466
7 Ibid, p 473
8 Adams, p 17
9 Park, p 205
10 Ibid, p 305
11 Soleillet, p 108
12 Ibid, p 112
13 See Cherbuliez, Rhodes, and Suret Canale
14 Cited by Suret Canale, p 213
15 Granger, p 129
16 Ibid, p 126
17 Prussin, “Sudanese Architecture and the Manding”
18 Devisse, p 164
19 Manny, p 92
20 Ibid
21 Devisse, p 167
22 Ibid, p 166
23 For Black Africa, see Prussin and Brasseur; for Morocco, see Boughali
24 Conclusion based on author’s research, and on Donnadieu and Didillon
25 See Monteil, Brasseur, and Caillé for detailed descriptions and comments
26 In Timbuktu the house façades are more sober and only about 5 meters high, perhaps because of the poor quality of local banco. The crenellation characteristic of the Jenné style is absent. However some façades are reinforced by a series of buttresses, a feature shared by some of the grander Dogon houses

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**Architecture of Mzab**


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