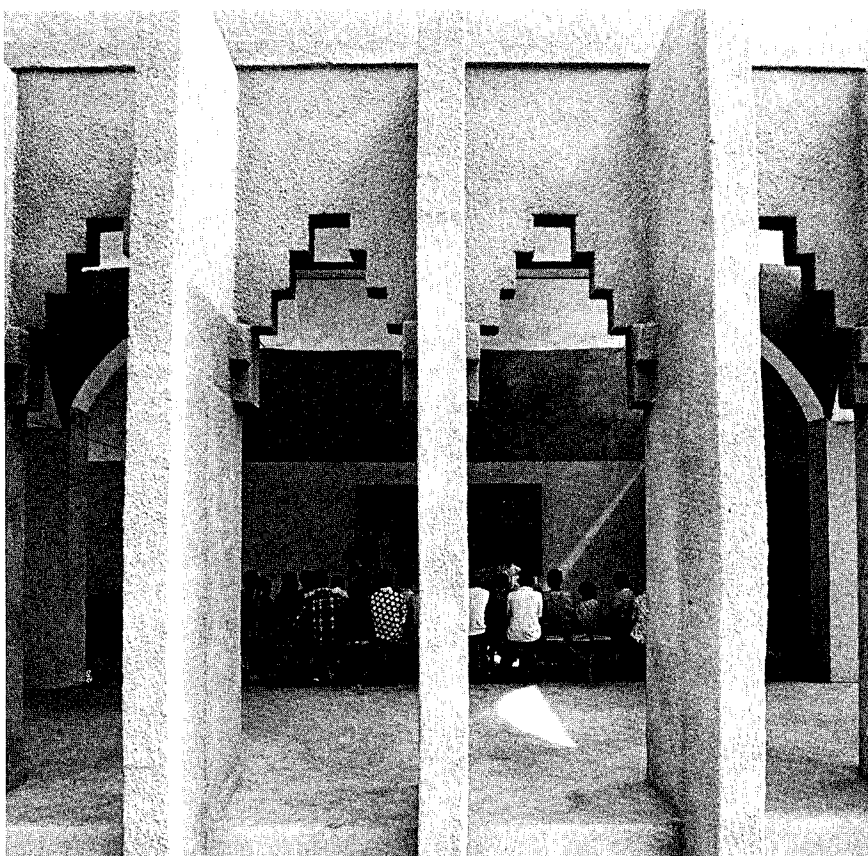


Daara School, Malika

The Daara School in Malika, near Dakar, Senegal, uses a construction system developed by UNESCO which depends upon the active participation of the local population. The centre's architect Raoul Snelder started the work for a private association in 1977. The building was inaugurated in April 1980 by M. Diouf, the

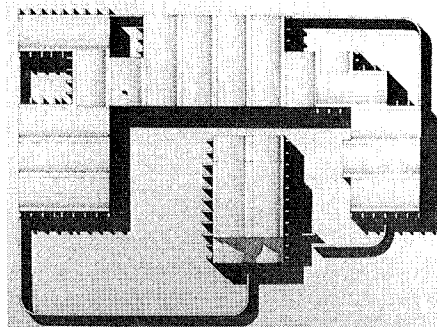
President of Senegal, (then Prime Minister). The boarding school was built at a cost of CFA 16.5 million (approximately US\$80,000), has a covered area of 552 square metres and houses sixty to seventy students of between six and thirteen years of age.



In the traditional Muslim society of northern Senegal, a form of social contract tied local communities to their *serigne* (Koranic teacher). These men, well-versed in the Koran, were responsible for elementary education of children in Koranic studies in exchange for which the community satisfied their basic daily needs. The young boys (*talibé*) were frequently given completely to the *serigne* by parents and he took over the responsibilities of the latter during the training period.

It was common practice for the boys to solicit charitable contributions, mostly in the form of foodstuffs on behalf of their teacher (and themselves); this system of distribution of sorts, which gave community members a chance to act charitably and at the same time taught the boys humility, was part of the social convention in small, rural, socially-homogeneous villages. There were few risks of abuse where people knew one another and where a monetary economy barely existed.

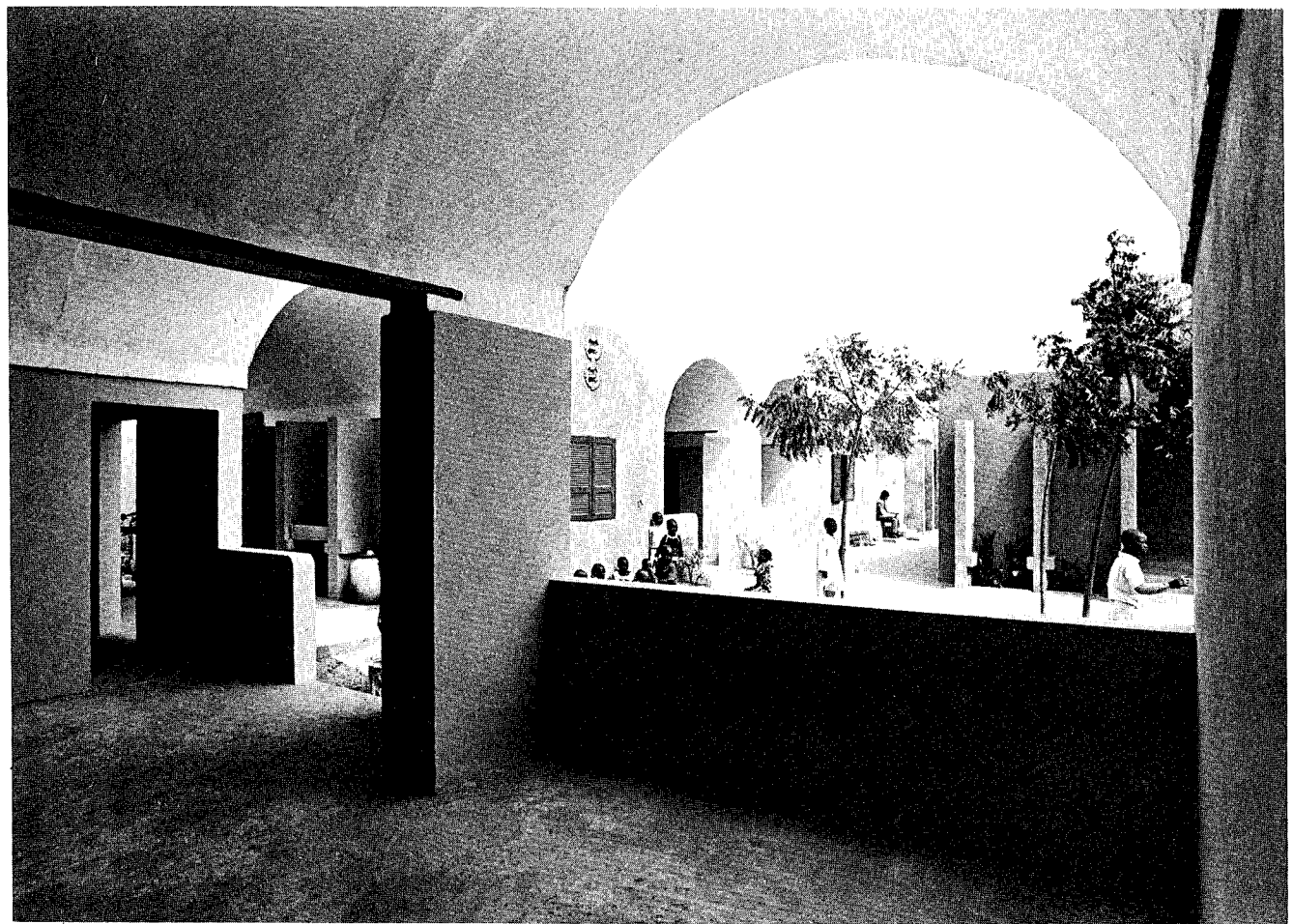
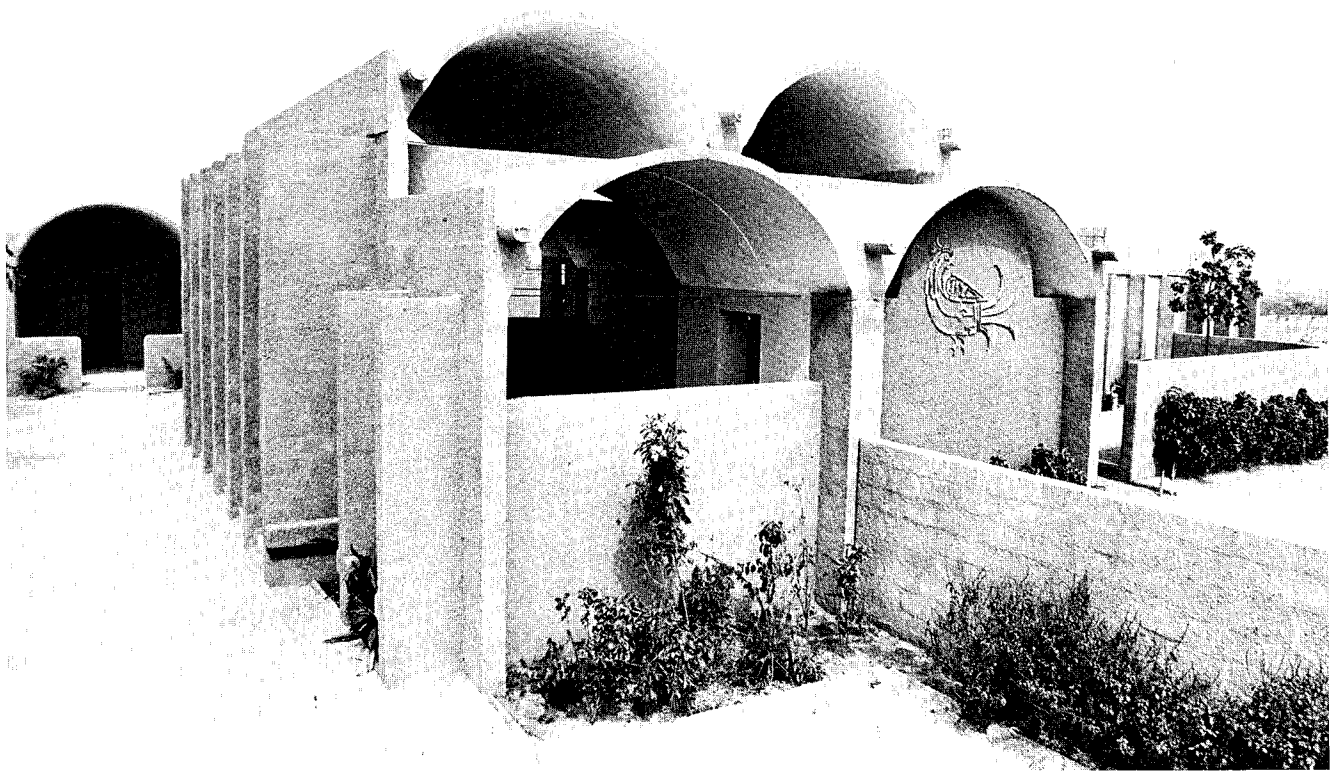
However, transposed to an urban context, with a heterogeneous population,

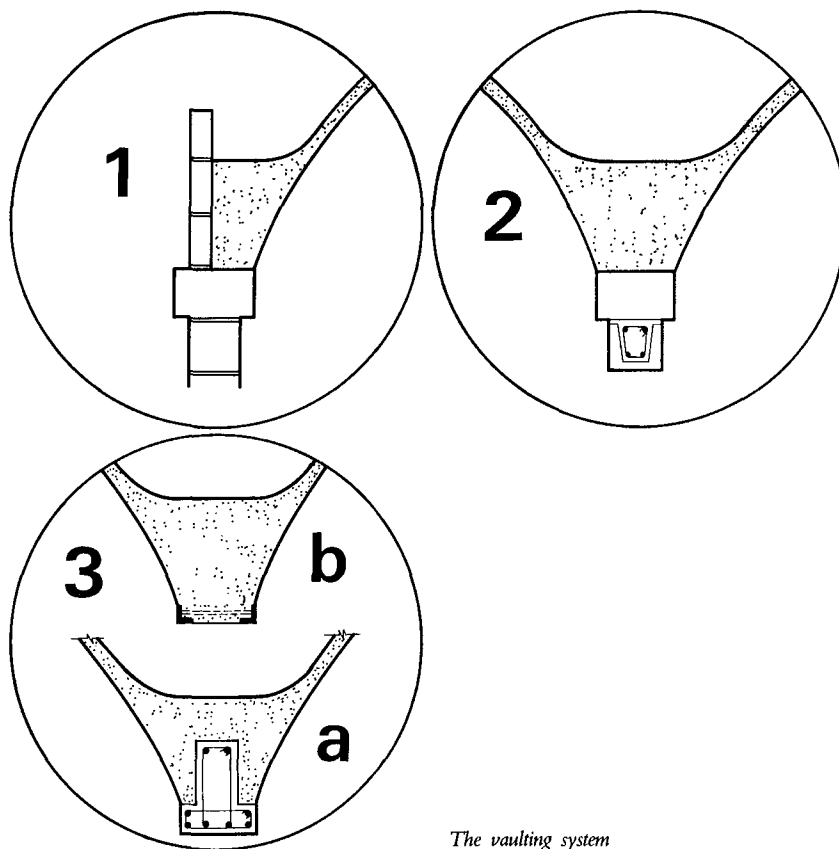
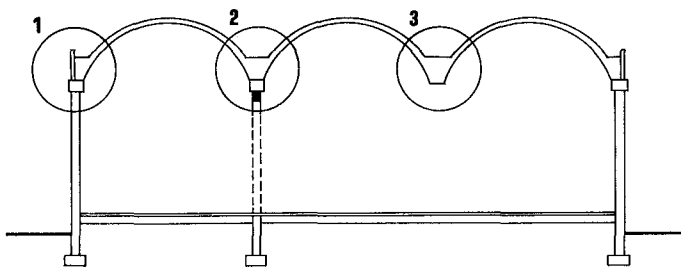


considerable anonymity and above all, a money-based economy, it became possible to exploit this mechanism of asking for alms for personal profit. A phenomenon occurred in which the students of some Koranic establishments spent most of their time begging for money (rather than for donations in kind) on the street corners, with

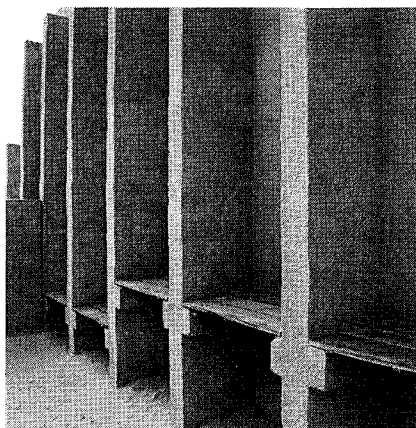
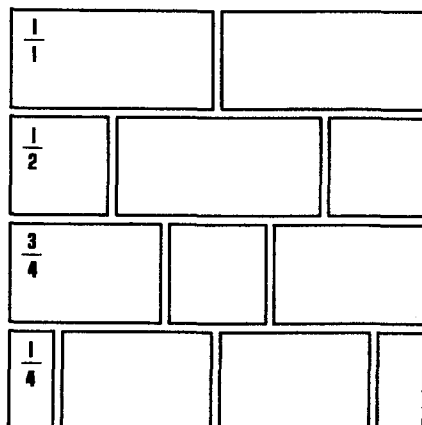
The text has been edited from a transcript by Raoul Snelder. The photographs were taken by Christopher Little, especially for MIMAR.

Top: Classroom and multi-purpose hall
Above: Roof Plan
Right, top: Detail, exterior view of Daara; entrance at right, classroom and dormitory with veranda at far left
Right: Covered porch of dormitory





The vaulting system



some *serignes* going so far as to fix the amount of 'take' a young boy was to bring back at the end of the day. To combat the serious dangers involved in this practice for growing numbers of urban youth, an association of Senegalese women (most of them mothers deeply alarmed by the situation) decided upon a programme which included the creation of boarding schools for the *talibés*. The Government of Senegal lent its support to this effort to stem the drift of many such youngsters towards delinquency. Key aspects of the training programme of the new Daara School include teaching of the Koran, agricultural training and small animal husbandry; craft techniques; and a programme for basic literacy.

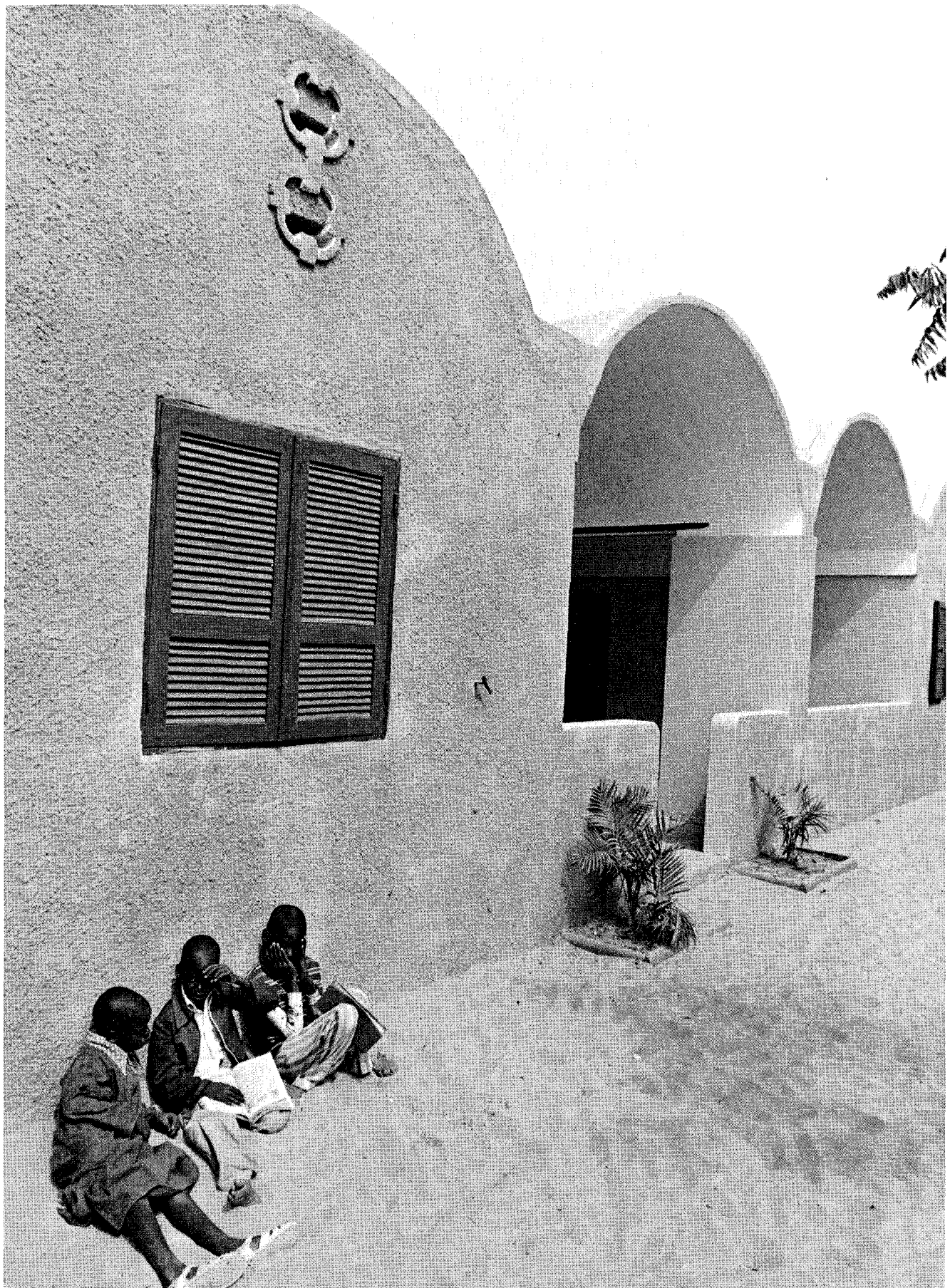
The Daara is a series of buildings whose principal function is to provide lodging for the young *talibés* as well as classroom and recreation space, and a dwelling for the *serigne* employed by the Association. The client specified that the structures should be modest, clean, functional, and designed so that the future residents would not be alienated by too radical a change in their living conditions. Moreover, it was asked that the complex resemble the large, traditional, family plantations in the countryside. Positive interaction between the *talibé* and his living environment was intended to be an integral part of his educational experience; hence, the way in which the outdoor spaces are divided into clearly defined areas offering a variety of potential uses but also encouraging independence and responsibility on the part of the *talibé*. Dormitories take the form of a series of ordinary dwellings, and the house for the *serigne* and his family demonstrates a type of domestic habitation, with front verandah, back courtyard for cooking, etc. Sanitary blocks and kitchen with separate courtyards are located at the corner junction of dormitory blocks.

Two possible modes of construction were initially studied; a modern conventional system using a local contractor, and a system of self-help building, aided by intensive supervision from an on-site architect. Whereas the first option had the advantage of guaranteeing a certain level of quality and kept the tasks and responsibilities of the client to a minimum, the second had far-reaching economic and social advantages for the community. Because of the extremely modest budget for the new Daara and the Association's desire to see the long-term activities of the school

Far left: The masonry blocks manufactured on site are based on a 10 cm module. The joint of 1.5 cm, yielded sand and cement blocks of 8.5 cm x 18.5 cm x 38.5 cm.

Left: Seating outside classroom, for meetings or relaxation.

Right: Exterior view of dormitories.



fully integrated into community life, the choice was made in favour of assisted self-help construction.

The fundamental principle upon which the construction system is based is ancient, dating back thousands of years in Africa: it avoids, wherever possible, using the tensile strength of materials, and relies upon buttressing where this occurs. Need for rare and expensive materials such as wood, steel and reinforced concrete is reduced, and local materials used in compression can suffice. While Hassan Fathy is to be credited with re-introducing this principle for low-cost construction, the UNESCO Breda office (Bureau Regional pour l'Education en Afrique) in Dakar developed a system of short-span structures along the same lines.

The system used for the Daara¹ consists essentially of solid masonry walls set upon concrete footings. A module of 10 centimetres was adopted for the masonry structure, and this module permeates the dimensioning of all designed spaces. Modular masonry blocks provide a load-bearing wall that needs no other vertical structure.

The roof used throughout is a barrel vault of ferro-cement, 4 to 5 cm in thickness, reinforced with chicken wire. The vaults themselves are constructed using square metal tubes to form centering, covered with sheets of plywood, (as opposed to the Breda system of using millet stalks set on plywood centering to create the shuttering) onto which the cement is poured. The span of the vault is 3.3 metres.

Advantages of this roofing system are economical, logistical, and finally architectural in nature. While the overall cost of the vault may not be less than a roof of asbestos cement or wood, a cost breakdown shows that only local, rather than imported materials and labour are required. Conven-

tional coverings require planning the transport and organisation of the necessary materials, whereas the vaults need basically only sand and cement — already utilised on site from the beginning. Finally from an architectural point of view, the vaults are more pleasing forms to behold than sheets of undulated fibro-cement.

In a few instances, a reinforced concrete beam in the form of an inverted "T" was employed to gain height and reduce the quantity of material. The vault rests on the beam. In the large classroom building the concrete beam was replaced by a steel truss

provided the decisive cohesive force in training the other masons from the beginning, with long explanations, photos, and anecdotes from his past building experience. Even the qualified masons in the crew rarely showed any reticence in learning the 'new' system, and were even enthusiastic.

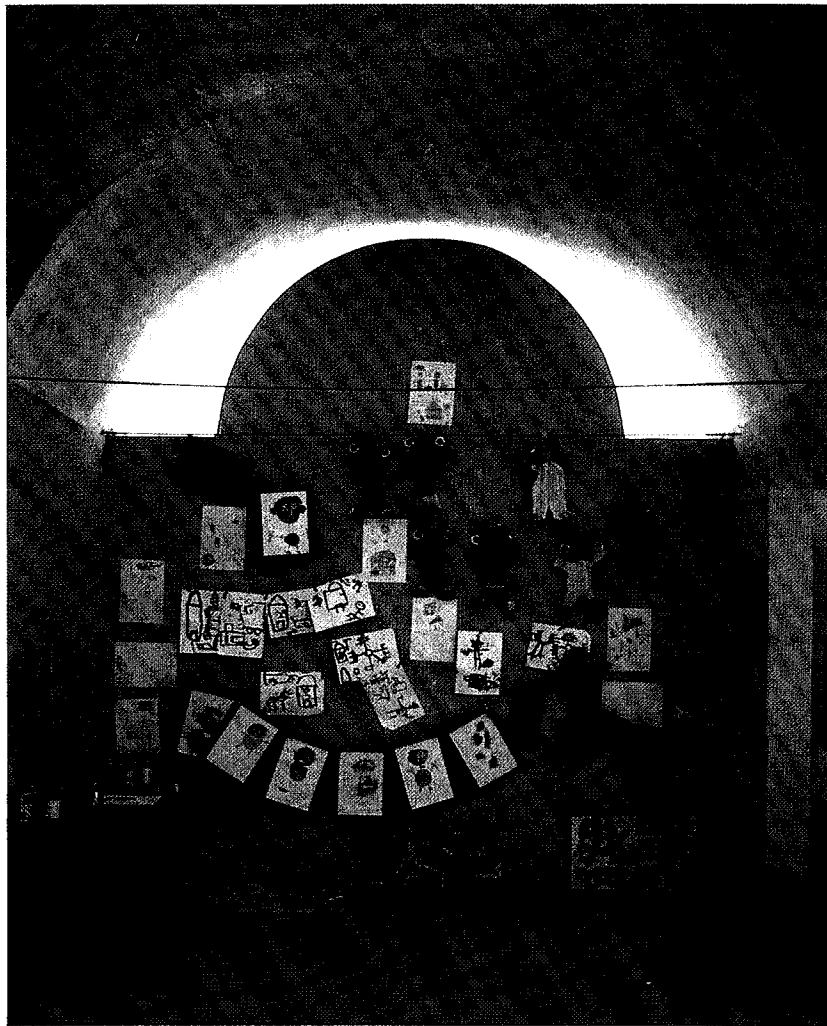
The master mason became ill some three months after the building began and another mason from the group was designated as liaison between architect and masons, which caused some decrease in productivity. Moreover, towards the end of construction, work again slowed as the

builders saw the spectre of renewed unemployment arising although they did not verbalise this to client and architect. It proved necessary, in order to finish the Daara, to pay workers on the old system by the job executed instead of on the hourly basis.

As to the long-term perspectives of this system of modular masonry for self-help building, the workers themselves who were questioned expressed some doubt that they would employ it on their future sites unless the client requested it. It was also clear that, if requested, it would be the client who would bear the necessary expenses, for example investment in equipment such as scaffolding.

It would appear that the technical possibilities involved here, of working better, more rapidly and less expensively than in the conventional, modern building sector, are not sufficient for it to be adopted automatically

by masons. The problem is linked on the one hand to the existing division of labour and of responsibilities, and on the other to the market situation. In the latter case, innovations of an experimental sort are rarely paid for by the client, and a mason who works rapidly is not always certain to find more work to keep him busy during slow periods. The problems linked to present divisions of labour could, in fact, be resolved by a 'coordinator' (the *Mimar* of the past? — Editors' note), who had overall responsibility for the different metiers, or craftsmen.

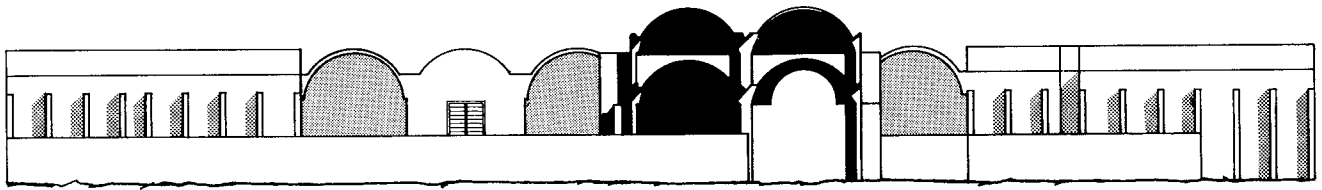


Interior of classroom: the high level openings diffuse the light evenly under the barrel vaults

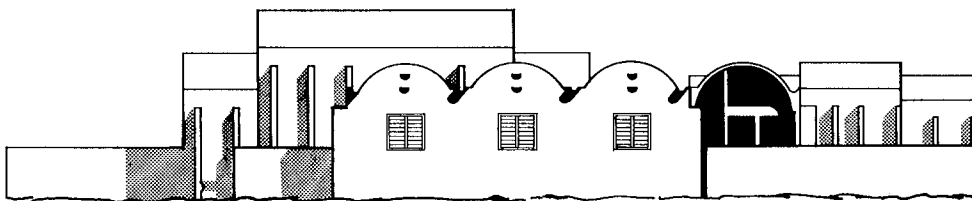
between two half arches. This modification proved light-weight, economical, and was easily rapidly executed. The large span of the classroom was thereby reduced from 7 metres to about 4 metres.

Construction workers were recruited from among the inhabitants of the village where the Daara is located. Only the site-foreman, an elderly mason from Dakar and previously trained in the system by Breda experts, was an outsider. This man pro-

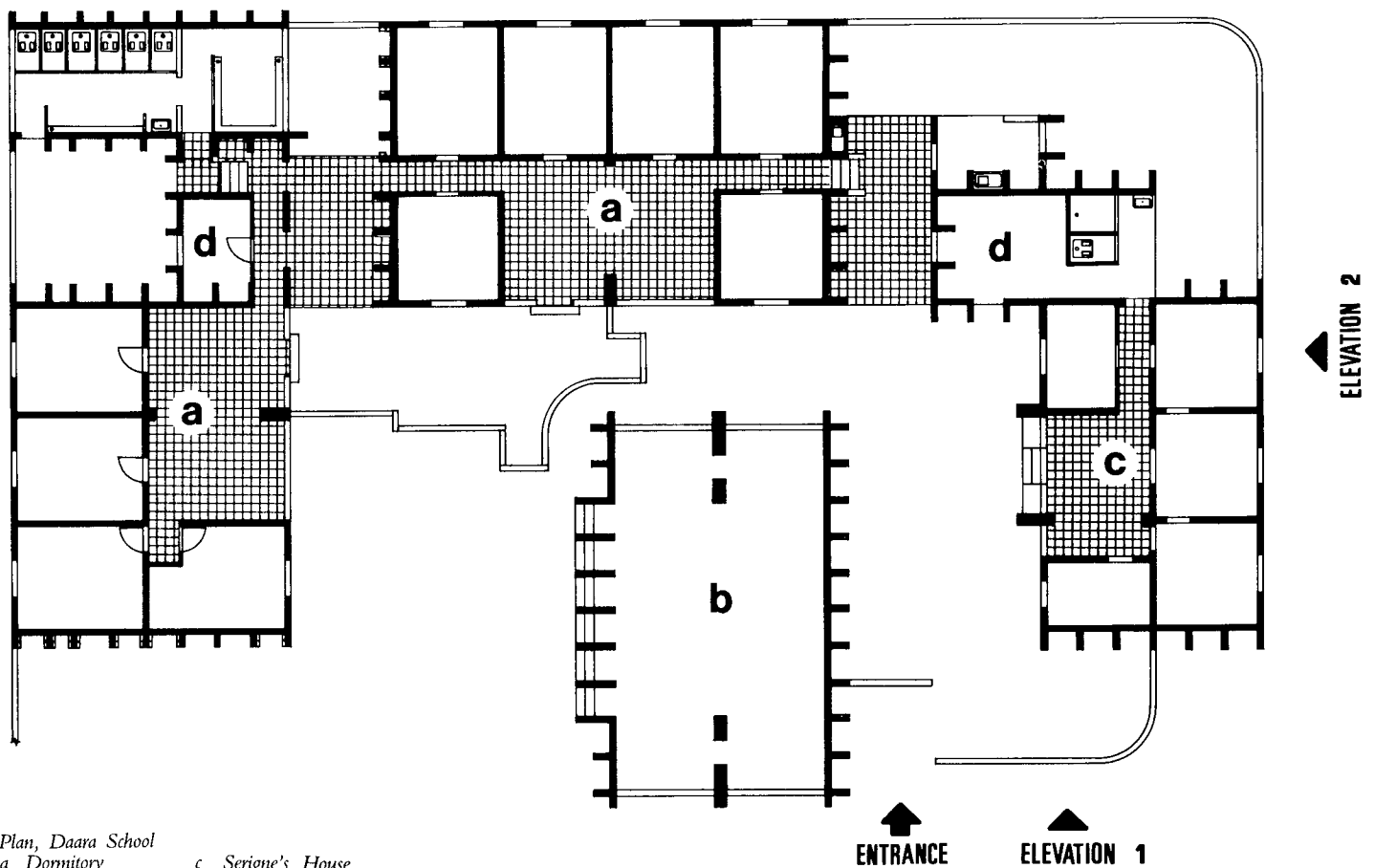
¹The system is fully described in the UNESCO publication: 'Vers Une Meilleure Utilisation de Ressources locales en Construction' UNESCO, 1978



Elevation 1



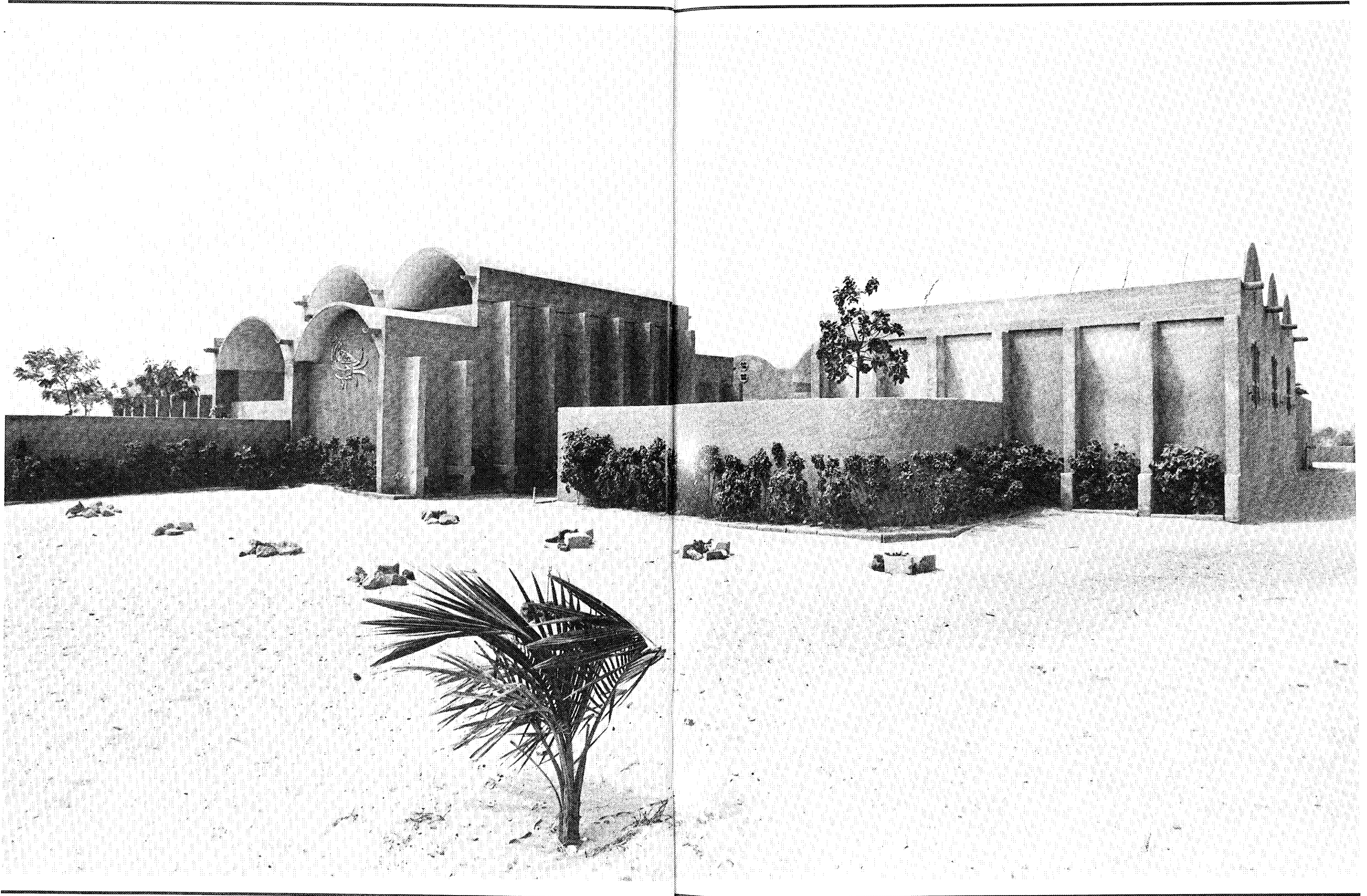
Elevation 2

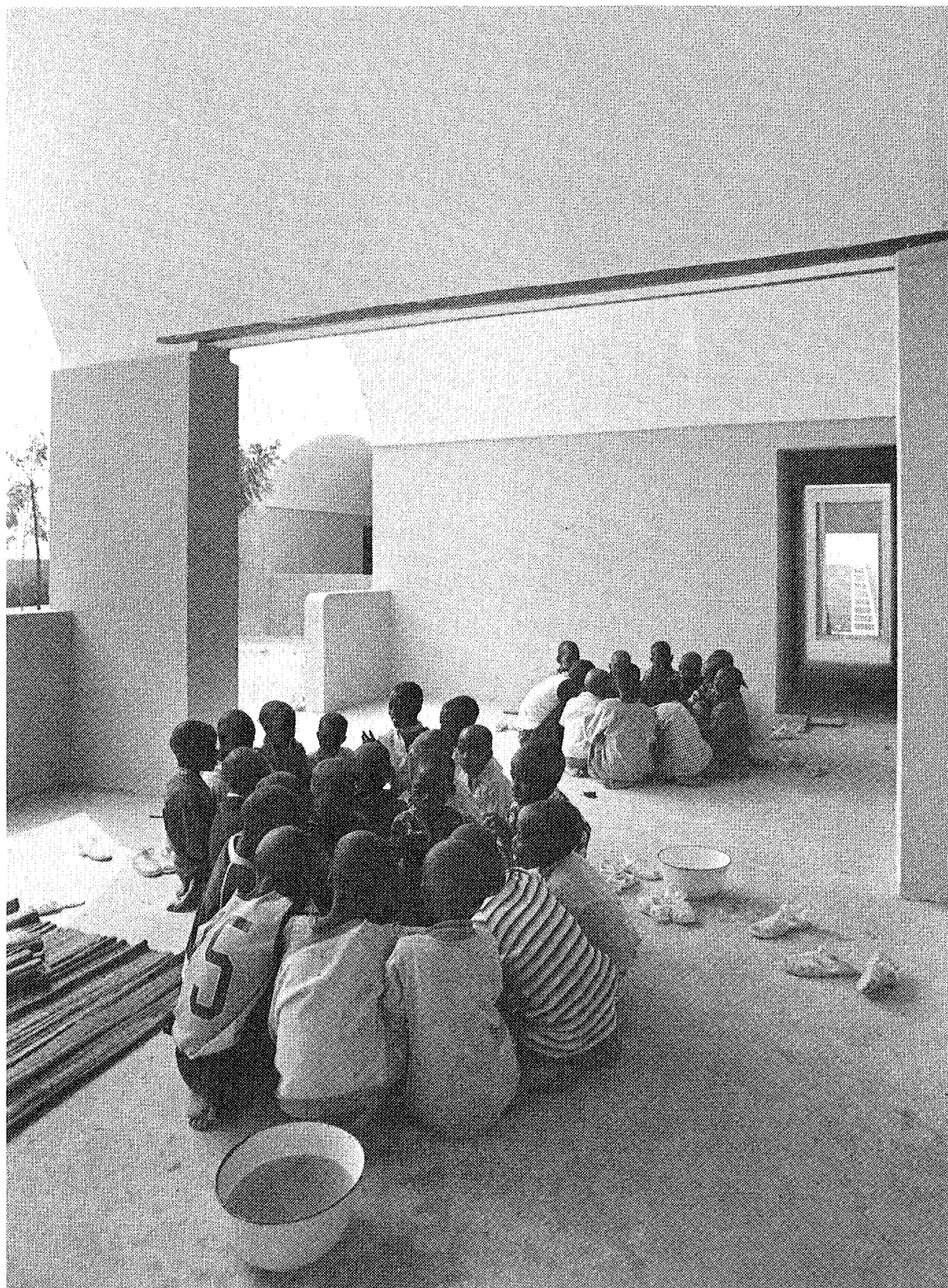


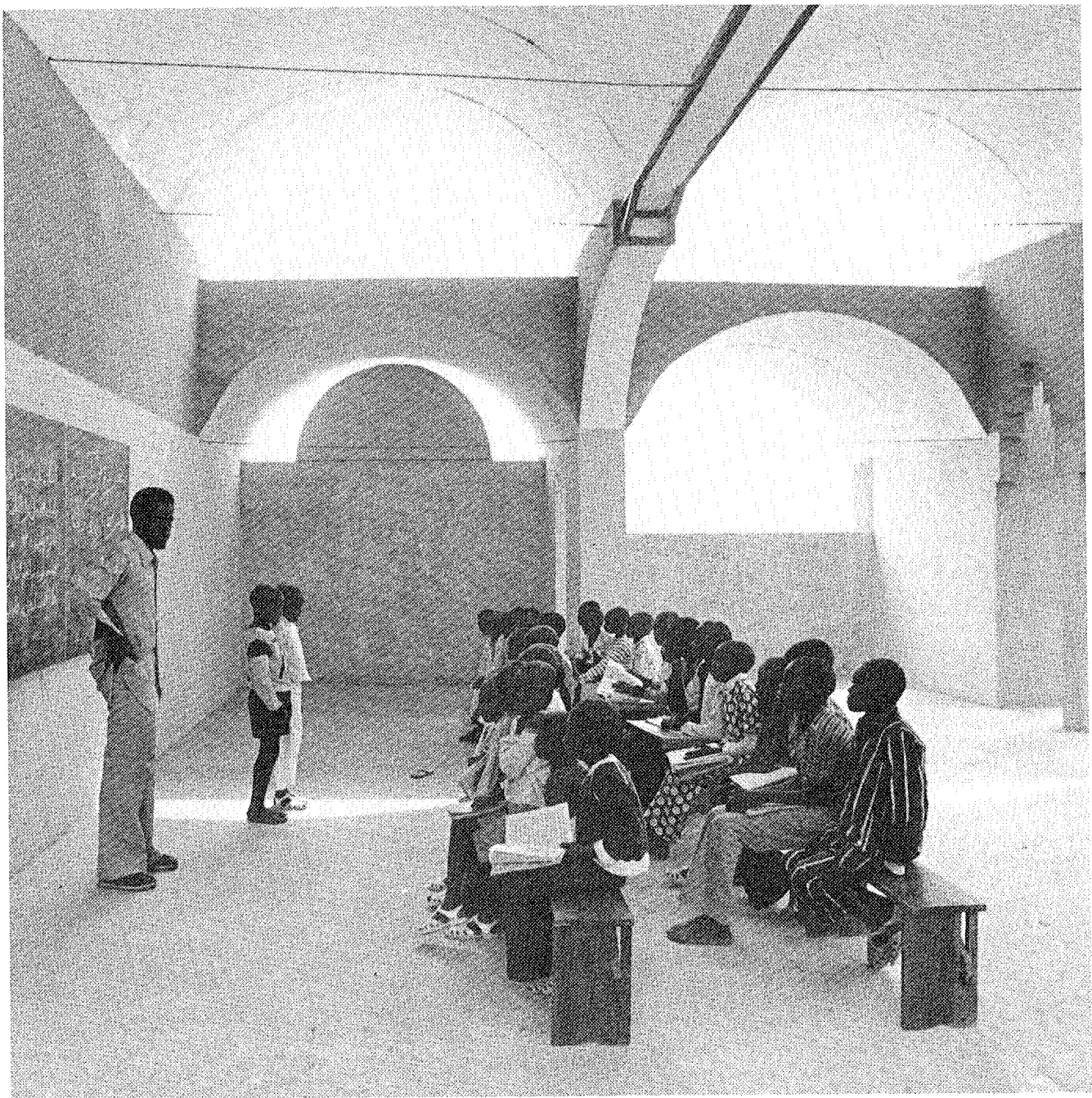
Plan, Daara School

a Dormitory c Serigne's House
b Classroom d Kitchen

Overleaf: Exterior of Daara, classroom at left and
marabout's family dwelling at right.







The experience may be considered a success, having met the objectives set forth in the beginning. It was less expensive than conventional building (less than half the cost for school building in Dakar): the local villages were positively influenced and mobilised to be involved in the construction: workers responded to suggestions for improving buildings techniques, and valuable information was obtained towards refining this approach. Self-help construction of this kind has potential for certain building types. Nonetheless, when it concerns the building of small, relatively dispersed units

Above: Interior of classroom, with students and Koranic teacher. Alcoves for small group meetings.

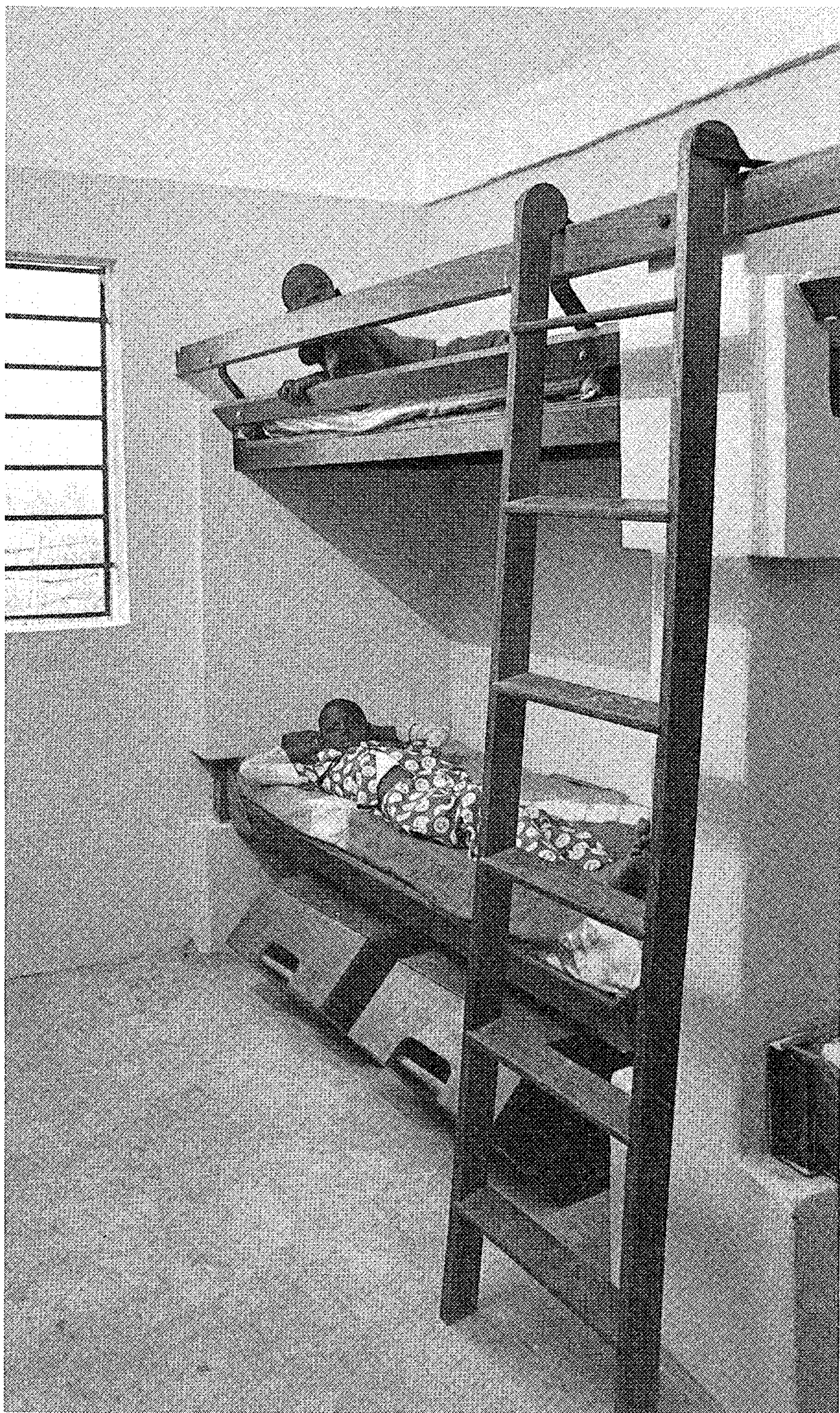
Left: Covered porches for recreation in front of dormitories.

Overleaf: Interior view of four-child dormitory room; beds and storage containers designed by the architect

in villages, the approach needs to be adapted to the circumstances in order to keep supervisory costs to a minimum. The Daara is a somewhat special instance, where approximately 16.5 million CFA (US\$80,000) was invested in a single locality twenty miles from Dakar a centre for procuring materials (cement) and tools as well as necessary supervisory expertise. Shipping and transportation costs were

minimised in comparison to what such costs would be for isolated sites; hence a different strategy must be developed.

An alternative might be *assisted self-help* construction for upper-level schools, maternity hospitals, dispensaries, or cultural centres. These might serve as intensive training experiences for one or two masons from back-country villages. The masons could then be made responsible for building individual village classrooms with the learned techniques and a minimum supervision when they returned to their homes. One ought to envision centralising the training experience in secondary towns and regional capitals, thereby reducing costs and increasing the numbers of able masons.



■ Raoul Snelder, architect from the Netherlands, trained at the Technische Hogeschool in Delft.

He has spent nearly ten years in Africa, having worked in the Ivory Coast, then collaborating on the Project Senegal RUL-12 for the

Centre de Recherche pour l'Habitat, l'Urbanisme, et l'Aménagement du Territoire (CRHUA). Mr. Snelder was recently sent by the United Nations as a consultant to Upper Volta to study the potential for developing small industries out of traditional craft production.

